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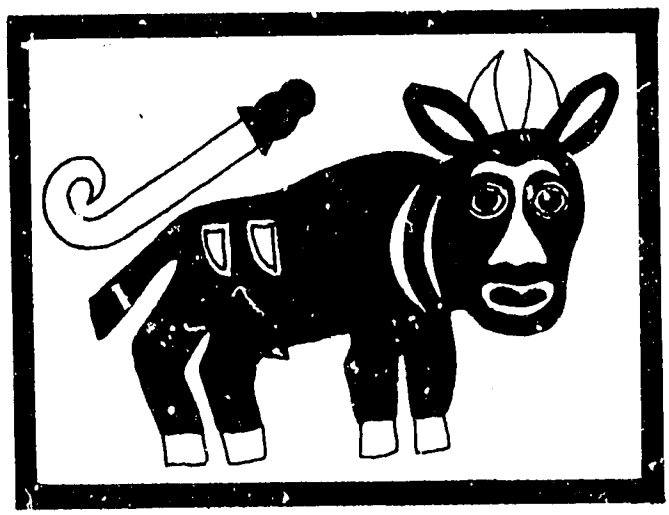
Livestock Production and Marketing in the Entente States
of West Africa

Monograph IV

THE LIVESTOCK AND MEAT MARKETING SYSTEM IN UPPER VOLTA: AN EVALUATION OF ECONOMIC EFFICIENCY

by Larry Herman



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FOREWORD

Private marketing systems in developing countries have frequently been cited as impediments to agricultural development. Producers are said to be at the mercy of a small number of traders whose collusive behavior dampens and distorts the incentives and signals of market prices. Such charges are particularly common for livestock marketing, in part because producers may be spread thinly in remote areas, because animal weights and grades are rarely used, because very long distances are often involved, and because a complex array of intermediary agents may be involved in an animal's progression from producer to consumer.

This study by Larry Herman in Upper Volta and the companion study by John Staatz in Ivory Coast examine the functioning of one of West Africa's major livestock trading networks. Herman's work is distinguished by its special emphasis on the first sale, from producer to trader.

For the most part Herman refutes the criticisms of private livestock marketing systems. He finds that producers often have good market information as well as the ability to choose the time and place of sale to their advantage. The marketing circuit was not found to support an abundance of nonproductive individuals, as is commonly alleged; the much maligned "intermediary" was found to provide useful services to both producers and merchants. Spatial price differentials and traders' margins are reasonably consistent with transportation and transaction costs. Major constraints to expanding or improving marketing are of a technical nature, involving mainly transportation infrastructure rather than market structure or conduct.

This monograph is part of a three-year study of West African livestock economics undertaken by the Center for Research on Economic Development, University of Michigan, for the United States Agency for International Development (Contract AID/afr-c-1169). The full study consisted of four eighteen-month field studies, two focusing on production and two on marketing, in addition to several investigations based on the existing data and literature. The geographic area of focus involved the five member states of the Conseil de l'Entente: Ivory Coast, Togo, Benin, Niger and Upper Volta, but also included, in a more general fashion, Mali and Nigeria. The following documents have been produced as a result of this study:

SUMMARY REPORT

K. Shapiro, ed. Livestock Production and Marketing in the Entente States of Africa: Summary Report. (This volume contains a summary and synthesis of Monographs I-IV, along with an annotated bibliography.)

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MONOGRAPHS

Delgado, C. Livestock versus Foodgrain Production in Southeast Upper Volta: A Resource Allocation Analysis. (Monograph I).

Staatz, J. The Economics of Cattle and Meat Marketing in Ivory Coast. (Monograph II).

Eddy, E. Labor and Land Use on Mixed Farms in the Pastoral Zone of Niger. (Monograph III).

Herman, L. The Livestock and Meat Marketing System in Upper Volta: An Evaluation of Economic Efficiency. (Monograph IV).

WORKING PAPERS

1. Ferguson, D. A Conceptual Framework for the Evaluation of Livestock Production Development Projects and Programs in Sub-Saharan West Africa.
2. Wardle, C. Promoting Cattle Fattening Amongst Peasants in Niger.
3. Swift, J. West African Pastoral Production Systems.
4. Sleeper, J. An Economic Analysis of the Role of Ox-Plowing and Cattle-Feeding in the Stratification of West African Livestock Production.
5. DeBoer, A.J. The Short Run and Long Run Position of Australian Beef Supplies and the Competitiveness of Australian Beef in International Trade.
6. Porter, R. The Uses of Economic Models in Analysis of the Cattle Sector.

These documents are available from the United States Agency for International Development, Bureau for Africa, Office of Development Resources (AFR/DR), Washington, D.C. Some of them are also available from the Center for Research on Economic Development. Most of the monographs and the summary report are also available in French.

Ann Arbor, Michigan
March 1983

Kenneth Shapiro
Project Director

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ABBREVIATIONS AND NOTES

AGRIPAC	Ivorian parastatal meat importing company
AVV	Amenagement des Vallées de Voltas
BND	Banque Nationale de Développement
CEAO	Communauté Economique de l'Afrique de l'Ouest
CEBV	Communauté Economique du Bétail et de la Viande
CDB	Cattle Development Board (Ghana)
CRED	Center for Research on Economic Development
DISTRIPAC	Ivorian parastatal meat importing company
ELP	Entente Livestock Project
FED	Fond Européan de Développement
IBRD	International Bank for Reconstruction and Development (World Bank)
IMF	International Monetary Fund
MDR	Ministère du Développement Rural
OCBV	Office Communautaire du Bétail et de la Viande (CEAO)
OFNACER	Office National des Céréales
ONERA	Office National de l'Exploitation des Ressources Animales
ORD	Organisme Regionale de Développement
PEOV	Projet de Développement de l'Elevage, Ouest Volta
RAN	Regie du Chemin de Fer Abidjan-Niger
RHV	République de la Haute Volta
SCET Int.	Société Centrale pout l'Equipement du Territoire Internationale (France)
SEDES	Société d'Etudes pour le Développement Economique et Social (France)
UBT	Unité de Bétail Tropical
USAID	United States Agency for International Development

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The term ton refers to metric tons, equal to 2200 pounds.

CHAPTER I

THE ROLE OF LIVESTOCK IN UPPER VOLTA

A stated goal of livestock policy in Upper Volta and throughout the Sahel is to increase the exploitation of existing animal resources and improve the efficiency of traditional livestock marketing circuits.[1] The government hopes to be able to increase offtake, improve the quality of marketed livestock, decrease marketing costs, and expand the capacity of the marketing network. Comprehension of the workings of the current marketing system is critical if planners are to propose useful interventions that improve upon existing marketing structure rather than conflict with it. Failure to do so poses the risk of destroying the basic marketing structure instead of correcting its weaknesses (McLeroy, 1974, p. 1). Interventions must be based upon a clear understanding of the commercial behavior of livestock owners, merchants, intermediaries, butchers, and other participants in the marketing circuit, and of the conditions under which they operate.

The motivations and mechanisms which result in livestock being sold, transported to a final market, slaughtered and ultimately sold to consumers in the form of meat are often far different in West Africa from those applicable to more modern livestock sectors; they subsequently call for interventions that go beyond the typical price and market control policies employed elsewhere. This monograph examines those factors which affect the commercial behavior of Voltaic cattle raisers, traders, intermediaries, and butchers. It formulates a framework for investigating and evaluating the efficiency of the marketing process and applies it to the Voltaic livestock marketing system. Many of the results will be of interest to policy makers in other Sahelian countries with important livestock sectors and to planners in coastal countries which depend on Sahelian sources for large portions of their meat requirements.

Most livestock policy in the livestock-producing countries of West Africa has, until recently, been directed towards production rather than marketing: programs for improving animal health, stock management, water resource availability, and range management -- all of which can have positive quantitative and qualitative effects on animals and meat production -- were thought to lead naturally to similar changes in livestock marketing. However, the assumptions that the offtake rate is relatively constant, and that increases in herd size and quality will thus result in more and better quality livestock being sold is under question.

Recently the focus has changed. Awareness of the importance and potential of interventions in the commercial sector has led to the recent creation by the Voltaic government of the Office National de l'Exploitation des Ressources Animales (ONERA) to carry out government policy in this area.[2] The government hopes that programs instituted by ONERA to improve market and transportation infrastructure, augment domestic meat processing capacity, and organize and facilitate trade will stimulate production and sale of livestock, reduce marketing costs, and increase the capacity of the livestock and meat marketing network. The assumption here is that the traditional marketing system constrains the growth of livestock trade and that a more modern and rational marketing system will yield a larger quantity and better quality of livestock marketed at lower cost.

The role of marketing in developing countries is widely discussed in the literature,[3] and the objectives which economists and government officials attach to marketing systems and marketing policy are many. However, the principal and commonly accepted criteria for judging a marketing system are:

1. low cost distribution.
2. responsiveness to supply and demand pattern.
3. promotion of an efficient allocation of resources to and from the sector.

To the extent that the marketing system fails to meet these goals, interventions are called for to alleviate the constraints to efficient marketing. Examples of often cited deficiencies in the Voltaic livestock marketing system include:[4]

1. Problems of market organization: It is often contended that the marketing chain is too long, involving excessive numbers of traders, middlemen, and transactions that serve no economic function.
2. Abuses in market conduct: Traders are accused of engaging in exploitive practices at the expense of livestock producers who are at a bargaining disadvantage because of a lack of market information, monopsonistic power held by traders, or collusion by the middlemen.
3. Institutional imperfections: Poor transmission of market information and credit market failures are two commonly cited examples.
4. Limitations of market infrastructure: It is often alleged that market efficiency is hampered by a lack of modern equipment in livestock markets and slaughterhouses, and by poor transportation infrastructure.

It is thus the goal of this monograph to provide an analytical economic evaluation of the Voltaic livestock marketing system which can substantiate or reject these allegations of poor market performance and suggest reasonable interventions for improving the system.

The remainder of this chapter provides a broad outline of the Voltaic economy and the livestock production sector. The second chapter describes the livestock marketing network and summarizes the recent evolution of livestock and meat flows. Chapter 3 presents the investigative framework of the rest of the study. It specifies the criteria of efficient market operation, reviews the economic literature on the structure of agricultural markets in developing countries, and shows how the Harvard model of industrial organization analysis is applied to this area. The marketing behavior by herdsmen is examined in Chapter 5. Chapter 6 describes the livestock and meat transportation network and evaluates the costs for alternative methods of transport and for varying destinations. Chapter 7 presents a detailed description of the cattle marketing system including a survey of the major markets and an evaluation of prices. Chapter 8 presents the data on the structure, behavior, and performance of the distribution system. It focuses on structural sources of market power such as market concentration, scale economies, and barriers to entry before measuring performance by looking at margins and

other elements of efficiency. Finally, Chapter 9 summarizes the conclusions of the research and evaluates Voltaic livestock marketing policy.

Survey of the Voltaic Economy

Upper Volta, having a surface area of 274,200 square kilometers, is a landlocked country in West Africa, covering Sahelian, Sudanian, and Guinean climatic zones. The country is bordered by Mali, Niger, Benin, Togo, Ghana, and the Ivory Coast, though it has few natural frontiers. The shortest distance to the sea is 800 kilometers through Ivory Coast, while its most vital route to the sea is the railroad from the capital, Ouagadougou, to Abidjan in Ivory Coast, covering 1145 kilometers. Other routes to the sea include roads through Ghana and Togo, each covering about 1,000 kilometers from Ouagadougou to seaport. The terrain is generally flat, averaging about 350 meters above sea level. Geography is dominated by three river basins; the Volta (Black, Red, and White) in the center and west, the Komoe in the southwest, and the Niger in the east. There are no rivers which are navigable to the sea. Upper Volta has few natural resources which can be easily exploited and no natural energy sources. The major mineral deposit is manganese, located in the isolated extreme northeastern part of the country, and this has yet to be exploited because of lack of adequate tranportation. There are minor deposits of phosphate, gold, copper, and bauxite.

Though included as a Sahelian country, only about 15 percent of Upper Volta's land area and 6.5 percent of its population can be accurately classified as Sahelian (see Table 1.1). This area in the northeastern region receives an average of between 400 and 600 millimeters of precipitation annually, spread over a three-month rainy season lasting from July through September. While rainfall is generally irregular throughout the country, large variations are most acute in the Sahel. The rest of the country is divided climatically between the Sudanian zone in the center (43 percent of the total area, 60 percent of the population) and the Guinean (sometimes referred to as Southern Sudanian) zone in the south and southwestern parts of the country (42 percent of total area, 33 percent of the population). Annual rainfall in these zones ranges from about 600 millimeters in the north to 1300 millimeters in the extreme southwest and is generally distributed over a four to five-month rainy season extending from May to October. As in the Sahel, irregular distribution of rain, both in terms of quantity and duration, is a problem in the Sudanian and Guinean zones.

Soils are generally poor throughout Upper Volta, especially in the north and east. Erosion is caused by heavy rainfall over short periods and by poor land management; another problem is poor drainage due to shallow laterite pans and low phosphate and nitrogen levels. In the south, fertile river valleys that would lend themselves well to agricultural development are sparsely populated because of the prevalence of endemic disease, principally onchocerciasis. The government, in cooperation with neighboring countries and international agencies, has been moving to control the disease and open up these potentially productive regions to resettlement by farmers.

Upper Volta's population is estimated to be 5,600,000, with a growth rate of about 1.6 percent annually. Population density is close to twenty people per square kilometer, one of the highest in West Africa and the highest among landlocked Sahelian countries. Density is even higher in the highly populated Mossi plateau, which accounts for 32 percent of the country's land area, but over 60 percent of the population.

Because of this, much of the country is heavily populated with respect to resources, resulting in a large annual migration of young men who find work in neighboring countries as agricultural workers on plantations or as urban laborers. The majority go to the Ivory Coast, though recently there has been a significant flow to Gabon. Ghana traditionally drew many Voltaic workers, but the currency exchange problems plaguing Ghana have tremendously reduced the buying power of wages earned by Voltaics in Ghana and repatriated to relatives in Upper Volta, causing a significant decrease in such labor migration. Total yearly migration is estimated at 500,000, of which a total of one-quarter remain permanently outside of Upper Volta (Jeune Afrique, 1975, p. 3; IBRD, 1975a, p. 42).

Upper Volta's labor force is estimated at 2.61 million, of which about 94 percent are engaged in agriculture. Urban population (towns with populations greater than 5,000) is about 11 percent. Over half of the approximately 35,000 wage earners are in public service. The literacy rate is between 5 and 10 percent; less than 10 percent of primary school age children and only 2 percent of secondary school age youths are enrolled. Emphasis is being placed on a rural education system which is more relevant to rural life. Mossi make up almost one-half of the population (48 percent) with Fulani making up the next largest ethnic group (11 percent), followed by Lobi, Bobo, Mandé, Senoufo, Gourounsi, Bisa, and Gourmentché, each comprising about 5 percent of the population). Moré, Foulfouldé, and Dioula are the major languages; Dioula is the most widespread and serves as the language of commerce.

Upper Volta's per capita Gross National Product (GNP) of $160 in 1978 was among the world's lowest (IBRD 1980). This generally poor state of affairs is attributable to the fact that Upper Volta is landlocked, has few exploitable natural resources, little developed industry, and an agricultural sector which is principally at the subsistence level and not at all modernized. Until 1970, real GDP was growing at an annual rate of 2 percent with non-agricultural sectors growing faster than the agricultural sector. During the drought in the early 1970s, growth dropped to about 1 percent overall; the agricultural sector declined by 5.5 percent, resulting in serious grain deficiencies and the need for large amounts of foreign grain to be imported. The traditional sector accounts for about 70 percent of GDP. Gross fixed investment is less than 10 percent of GDP.

Agriculture and livestock are by far the country's most important sectors, accounting for 43 percent of GDP (agriculture = 33 percent, livestock = 10 percent) and 91 percent of exports (45 percent agricultural, 46 percent livestock) in 1972. Only about one-fourth of agricultural production is marketed. Agricultural development is hampered by the poor soils found throughout the country, lack of water resources -- especially insufficient and irregular rainfall along with recurring droughts -- and traditional agricultural techniques, where most operations are done by hand with little use of animal traction or chemical fertilizers. The result has been generally poor yields. Eight percent of total land area is under permanent cultivation, but over 60 percent of the cultivated land is on the densely populated Mossi Plateau. This has led to average yields which are much lower (one-half those in the southwest) than those in the rest of the country.

TABLE 1.1

GENERAL INFORMATION: UPPER VOLTA (1969)

Zone	North	Central	South	Total
Climate	Sahelian	Soudanian	Southern Soudanian Guinean	
Latitude	13-15°	12-14°	9-12°	
Average Rainfall	400-600 mm	600-1000 mm	900-1300 mm	
Land area	41,000 km^2	117,000 km^2	116,000 km^2	274,000 km^2
Populations				
Number	325,000	3,025,000	1,650,000	5,000,000
Percent	6.5%	60.5%	33%	
Density/km^2	7.9	25.8	14.2	18.2
Cattle				
Number	600,000	1,270,000	630,000	2,500,000
Percent	25%	50%	25%	
Density (head/km^2)	14.6	10.8	5.4	9.1
Cattle per capita	1.85	0.42	0.38	0.5
Small Ruminants				
Number	1,000,000	1,900,000	1,100,000	4,000,000
Percent	25%	47.5%	27.5%	
Density (head/km^2)	24.4	16.2	9.5	14.6
Sm. ruminants per capita	3.1	0.63	0.66	0.8

SOURCE: SCET International, 1972.

Over 90 percent of agricultural production consists of subsistence crops; cereals account for 80 percent. Most cash crops are grown in the south; agriculture in the north is almost exclusively subsistence. The most important food crops are millet, sorghum, maize, rice, and groundnuts, while cotton is the principal export crop, representing 4 percent of agricultural land use and one-fifth of total exports in 1972; its importance has been rising steadily since the early sixties. There is some potential for offseason vegetable gardening and export of high quality produce to Europe, though such operations are at early stages of development.

The manufacturing sector has been growing at a faster rate than the rest of the economy, but still only accounted for 6 percent of GDP in 1970. Largely stagnant in the late 1960s, the manufacturing sector has been growing at about a 12 percent annual rate so that along with construction, it now represents about 18 percent of GDP. Most industry consists of import substitution and food preparation. It includes textiles (a large mill in Koudougou), bicycle assembly (Bobo-Dioulasso), shoe manufacturing (Bobo-Dioulasso), vegetable oil processing, sugar refining (Banfora), and beverage production. Mining is currently of marginal importance (1 percent of GDP) but has much potential for growth because of the manganese deposits in Tambao. Transportation accounts for about 6 percent of GDP; road transport is handled largely by small private truckers, and rail transport is operated by the Regie du Chemin de Fer Abidjan-Niger (RAN), which is jointly owned by the governments of Upper Volta and Ivory Coast. Finally, commerce and services make up 23 percent of GDP.

Total exports are less than 10 percent of GDP and are almost exclusively made up of agricultural and livestock products. The latter, which are mostly composed of cattle and small ruminants shipped to Ivory Coast and Ghana, account for about two-fifths of total exports. Cotton exports, the next largest category, are mainly directed toward France and make up over one-fifth of total exports. The other major exports include groundnuts, sesame, sheanuts, fruits, and vegetables. Upper Volta's trade balance has always been strongly negative, and imports of both consumer and capital goods have been growing rapidly since the late sixties. The decrease in exports during the drought years accentuated the trade deficit. However, these deficits are offset in the balance of payments accounts by two items: private transfer from Voltaics working abroad, and foreign aid, mostly in the form of grants. This situation has enabled the government to accumulate substantial reserves of foreign exchange.

Livestock Production

The importance of the Voltaic livestock sector in the national economy is evidenced by the fact that it traditionally accounts for about 10 percent of GDP, one-fourth of total agricultural production, and almost half of the country's exports (IMF, 1970, p. 696; IBRD, 1975b, p. 3; SCET International, 1972, p. i). Sales of livestock products are the leading source of rural money income. Stock raising is the principal economic activity for a large share of the population, especially in the Sahel and in the east. The ownership rate of cattle is .5 head per capita, only half that found in other Sahelian countries, but ten times the ratio found in the coastal Entente states.

Besides being an important source of foreign exchange, the livestock sector accounts for approximately 7 percent of domestic revenues to the national budget, largely through export taxes, head taxes, and the licensing of livestock marketing agents. Even so, direct government returns to the sector have been small, usually less than 2 percent of government expenditures (Robinet, 1973, p. ii). The sector annually produces about 54,000 metric tons of meat (excluding offals) plus 70 million liters of milk for human consumption (SCET International, 1972, pp. 56, 60). Since fish is of relatively little importance in the Voltaic diet, the livestock sector accounts for almost all of the animal protein consumed in Upper Volta.

The near absence of mineral resources, industry, and generally poor soils throughout the country result in pasture land being one of Upper Volta's major economic resources. There are 13.6 million hectares of permanent rangeland and another 8.8 million hectares of fallow available for forage (IBRD, 1975b, p. 5). Thus, 80 percent of total land area can be used annually for stock grazing. In addition, manure plays an important role in maintaining soil fertility in some areas. There is currently very limited use of animal traction. Most of the draft animals are donkeys used for pulling small carts.

The livestock sector is acutely affected by the uncertain rainfall which plagues the region. The risks inherent in traditional stockraising systems in the face of recurring drought lead to management systems which do not maximize offtake. Even during normal years of rainfall, the lack of water resources is a major constraint to production. In the north, communally held pasture results in there being little individual incentive for range management; thus, rangeland is often overstocked. Competition with agriculture, traditionally in the sub-Sahelian grasslands but increasingly in the north, impedes livestock production. Where land conflicts occur, it is usually the herdsmen who lose out (see Robinet, 1973 and Delgado, 1977). Animal production is constrained in the south by zones of endemic disease, principally trypanosomiasis and onchocerciasis. Animal health is a major problem throughout the country, most strikingly evident in high levels of calf mortality and low fertility levels for females. Finally, as noted above, the sector generally suffers from a lack of positive government interventions, since so little of the national budget is allocated to livestock production or marketing.

Herd Demography. -- Upper Volta's cattle population is estimated at 2.5 million, with goats numbering 2.4 million, and sheep 1.6 million (SCET International, 1972, pp. 34, 52). The cattle are divided between the zebu breed (*Bos indicus*) found predominantly in the north and central parts of the country, and the smaller taurin (*Bos taurus*) and crossed zebu-taurin breeds which are resistant to trypanosomiasis and are found throughout the south. Zebus make up two-thirds of the cattle population. The average cattle production rate[5] is estimated at 14 percent, with offtake at 12 percent and growth at 2 percent (SCET International, 1972, p. 12). Surveys during the late sixties indicate that males make up 32 percent of the herd and reproducing females 41 percent. Males, however, comprise about 60 percent of marketed offtake (ibid.).

The fertility rate for cows has been estimated at 35 percent by SCET International and up to 50 percent for Sahelian herds by Peretti (1976). Cows calve once every two or three years starting around ages four-six.

Peretti's study of Sahelian herds in 1976 showed that only 24 percent of the cows produce calves within five years, and 82 percent produce within six years. SEDES has calculated that under traditional extensive stock raising systems zebu cows should calve at around 48 months (SEDES, 1974, p. 14). While milk production varies tremendously with climatic conditions, cows average 350 kg of milk per lactation. Of this, approximately 30 percent is taken for human consumption (SCET International, 1972, pp. 59-60). Cows are usually culled after nine years. In the north the average age for culling cows is between twelve and thirteen years.

Calf mortality is very high, over 30 percent before weaning. Only 50 percent of the calves born reach maturity (IBRD, 1975b, p. 3). For Sahelian cattle, Peretti estimates mortality at between 35 and 45 percent for calves, 5 - 10 percent for yearlings, 2 - 5 percent for two and three-year olds, and 2 percent for adults (Peretti, 1976, p. 76). Because of the importance placed on reproducers and the better care they receive from the herdsmen, mortality rates are lower for heifers and cows than for males. Generally, cattle mature slowly under natural pasture grazing, a steer taking between four and eight years to reach a liveweight of 300-350 kilograms. Even so, the composition of offtake for males favors relatively young ages in the north, in part necessitated by the decrease in the population of older cattle due to the drought, noted below. Peretti found that half of the males were sold before they were five years old.

Less than a quarter of the country's cattle are found in the predominantly pastoral north (see Table 1.1). The carrying capacity of the northern rangeland is estimated at 13 hectares per UBT.[6] This is already thought to be exceeded (IBRD, 1975b, p. 6). In the south, carrying capacity is about 7 - 8 hectares per UBT with current density at between 10 and 14 hectares per UBT. Improved range management, including the planting of forage grasses, is thought to be able to raise carrying capacity in the south to nearly 4 hectares per UBT (ibid.). It is thus the feeling of the Voltaic government and various donor agencies interested in livestock, that prospects for increased animal production are best in the traditionally agricultural south rather than the already overstocked north.

Table 1.2 shows the variations in livestock density within the country. When broken down even further into smaller administrative regions, one finds that cattle densities range from only three head per square kilometer in the cercles of Léo (center south), Diapaga (southeast), and Houndé (southwest), to over 23 head per square kilometer in the Koupéla-Pouytenga region (140 kilometers east of Ouagadougou) (SCET International, 1972, p. 10). Comparing per capita distribution of cattle in Table 1.2, one immediately notes the importance of cattle in the ORD's[7] of the Sahel (2.2 cattle per capita) and Fada N'Gourma (east) (1.0 cattle per capita); no other ORD has more than .5 head per capita.

Livestock-raising systems vary throughout the country. In the north and parts of the east and northwest, traditional Fulani extensive livestock systems prevail, where the livestock manager usually owns most of the herd. Farther south, however, one finds enclaves of somewhat less mobile livestock raisers among the sedentary farmers of the region. These herders are more likely to manage herds made up of their own cattle as well as those they tend for absentee owners, usually local farmers, merchants, or government civil servants originally from the region. Even in the predominantly pastoral Sahelian zone, the three major livestock raising groups (Fulani, Bellah, and Tuareg) make up only slightly over half the population. The Fulani compose the largest group (58 percent of the Sahelian population) when their former slave caste, the Rimaibé, are also counted.

Growth Rates and the Effects of the Drought.[8]-- Lack of good herd census information makes it difficult to assess accurately herd growth rates or losses from the drought years. Taxes are paid on only 16 percent of the estimated herd; thus stockraisers are wary of any sort of census they feel may be used for tax purposes. Most estimates of total herd size are made from Livestock Service vaccination records or are projections from selected samplings such as Peretti's in the Sahel or SCET International's for the entire country in 1969-70 (SCET International, 1972, Annexes IX-XI). Though Table 1.2 uses the official Livestock Service figures for cattle populations, Peretti, in his survey of the ORD of the Sahel, estimated the predrought cattle figure to be much lower than had been reported. His estimates put the figure at around 500,000 head in 1969, with drought losses in the Sahel averaging 27 percent, but ranging as high as 62 percent in the Oudalan, the extreme northeast section of the ORD (SCET International, 1972, pp. 54-55).

It is believed that national herd growth was between 2 and 3 percent prior to the drought. Historically, herds in the Sahel have increased rapidly to the carrying capacity of the range during periods of good precipitation and are pruned during drought. The combination of good rains and improved government livestock services in the fifties and sixties served to stimulate herd growth to almost 4 percent between 1952 and 1969 (see Table 1.3). The initial response to the drought in the early seventies was an increase in offtake to salvage some value from animals least likely to survive. The increased short-run supply had the effect of decreasing price drastically. The anticipated long-run response is a reduction in offtake until herds are reconstituted to their stable structure.

In his study of the economy of the Voltaic Sahel, Peretti concludes that because of the drought and its reduction of the population of young females, herd size in the Sahel is not likely to increase significantly during the next twenty years. He questions whether the 2-3 percent growth rate previously attributed was ever realistic for Sahelian herds. Under the best conditions, without interventions likely to reduce calf mortality or increase cow fertility, herd size is likely to remain stagnant during the next two decades. Under the unlikely conditions of fertility being raised to 60 percent and calf mortality lowered to 25 percent through effective animal health interventions, the Sahelian herd will only grow at an annual rate of something on the order of .5 percent (Peretti, 1976, pp. 69-86).

The situation in the south, where traditional herders make up a much smaller percentage of the population (5-10 percent), was much different. There, the cattle population actually increased during the drought, in part due to the migration of some northern pastoralists seeking better grazing conditions, but largely due to the purchase of animals at favorable prices during the drought by the absentee owners referred to earlier. Tyé (SEDES, 1975) calculates in fact, that the Voltaic herd as a whole may have increased by 1.6 percent between 1969 and 1975 (see Table 1.4). Considering that he used a base of 600,000 head in the Sahel and a destocking rate

TABLE 1.2

LIVESTOCK DISTRIBUTION BY ORD (1969)

ORD	Area[a]	Population[b]	Cattle[c]	Density[d]	Cattle per Capita	Small Ruminants[c]	Density[d]	Hectares per UBT[e]
Sahel	36,869	258	560	15.2	2.2	900	24.4	6.3
Ouahigouya	12,293	540	152	12.4	0.3	300	24.4	7.4
Kaya	21,578	604	287	13.3	0.5	650	30.1	6.6
Ouagadougou	24,179	859	232	9.6	0.3	300	12.4	10.5
Fada N'Gourma	49,992	275	283	5.7	1.0	350	17.0	17.9
Koupéla	9,039	279	105	11.6	0.4	100	11.1	9.1
Koudougou	26,324	751	180	6.8	0.2	250	9.5	14.5
Dédougou	37,356	604	320	8.6	0.5	400	10.7	11.8
Bobo-Dioulasso	20,529	330	159	7.7	0.5	350	17.0	11.4
Gaoua-Diebougou	17,448	380	127	7.3	0.3	200	11.5	13.3
Banfara	18,393	218	95	5.2	0.4	200	10.9	17.4
Total Upper Volta	274,000	4,978	2,500	9.1	0.5	4,000	14.6	10.5

Source: SCET International, Ediafric

[a]Square kilometers

[b]In thousands

[c]Thousands of head

[d]Number of head per square kilometer

[e]Computed on basis: cattle=.8 UBT per head; Small ruminants=.15 UBT per head.

TABLE 1.3

EVOLUTION OF VOLTAIC CATTLE HERD, (1952-1975)

Year	Zebus and Crossbreeds[a]	Taurins	Total Cattle	Average Annual Growth Rate
1952	n.a.	n.a.	1,300,000	
1960	n.a.	n.a.	1,800,000	3.99%
1967	1,570,000	825,000	2,395,000	4.16%
1968	1,600,000	848,000	2,448,000	2.21%
1969	1,630,000	870,000	2,500,000	2.12%
1975[b]	n.a.	n.a.	2,540,000	0.26%

SOURCE: SCET International, 1972 and SEDES, 1975.

[a]zebu-taurin crossbreeds.

[b]From SEDES, 1975.

TABLE 1.4
EFFECT OF THE DROUGHT ON VOLTAIC CATTLE
(in numbers of head)

	Region			
Year	Sahel	Center	South	Total
1969	600,000	1,270,000	630,000	2,500,000
1975	408,000	1,402,000	730,000	2,540,000
% change	-36%	+10.4%	+15.9%	+1.6%

Source: S.E.D.E.S., 1975

of 36 percent for the Sahel, both higher than Peretti's more exact figures, his estimate of increase may have been conservative. What is clear is that there has been a geographical redistribution of cattle from the north to the south since the drought.

Besides the absolute decrease in numbers of cattle in the north, the drought had serious consequences on the long-run structure of Sahelian cattle herds. According to Peretti, the major effects were 1) a reduction in cow fertility; 2) an increase in calf mortality; and 3) an increase in the age structure of the herd. His particular concern was that there has been a decrease in the number of young females which will determine the productiveness of the herd for years to come (Peretti, 1976, p. 66). Peretti noted that the drought did not seem to increase substantially the mortality rate for cattle born prior to the start of the drought. He saw the crisis, rather, as being a shortage of young cattle, particularly heifers, because of reduced fertility during the drought years. He projects that with fertility, mortality, and offtake remaining constant, the number of reproducing cows will in fact begin to decrease during the next decade and fall below its present level in the 1990s.

A comparison of herd structure data from three different surveys made around the time of the drought years (1969 by SCET International, 1974 by Dr. Garcia of the CEBV,[9] and 1976 by Peretti) does not bear this out (see Tables 1.5 and 1.6, and Figures 1.1a and 1.1b). It indicates that the Sahelian herds have moved to a younger age structure since 1969, whereas animals less than or equal to five years of age comprised 62 percent in 1976 by Peretti's own count, the number of young females (less than 5 years old) increased as a percent of the total herd from 26 percent in 1969 by the SCET International study, to 32 percent according to Peretti's 1976 findings. What does seem apparent in Figures 1.1a and 1.1b is that as a result of the drought, herders were forced to sell their stocks of older and likely not very productive cattle to purchase grain during those years of poor harvests, and are now left with generally younger, albeit smaller, herds. The result has been a decrease in the average age of marketed cattle.

Pastoralist and Extensive Stock Raising. -- Traditional pastoralism in Upper Volta is characterized by communally held pasture land, the absence of any permanent physical structures such as corrals or stock buildings, the lack of significant forage planting, and few cash costs of production. Animals are fed almost exclusively on natural pasture and stubble from fields planted with staple food crops. Only lactating cows receive any feed supplement during the dry season. Water is generally scarce and is one of the prime factors for transhumance patterns. These seasonal movements range between twenty and one hundred kilometers. Herd size varies widely in terms of ownership, but cattle management units are usually kept between thirty and eighty head. Larger herds represent too great a risk from disease and herd control. Cattle herds are valued more for their milk production than for their meat, though exchange value plays an important role in providing for that part of pastoralist's grain needs which they cannot meet from their own agricultural efforts.[10]

The majority of the livestock owners in Upper Volta are pastoralists: Fulani, Tuareg, and Bellah. Though no official census information is available, according to the World Bank, the Fulani make up only 10 percent of the Voltaic population, but own about 70 percent of the cattle (IBRD, 1975b, p. 3). Though associated primarily with northern pastoralism, three-fourths of the Fulani reside outside the Sahel. In the south they herd both their own cattle and those entrusted to them by farmers, merchants, and civil servants. Thus, the Fulani control practically the entirety of the Voltaic cattle herd.

There is a great misconception that the Sahel continues to be populated principally by nomadic and semi-nomadic herders who live almost exclusively off their livestock through subsistence consumption of milk and exchange of animals for money to purchase grain to complement their dairy diet. This often romanticized impression is largely in error with regard to the Voltaic Sahel. Historic, climatic, biologic, and economic factors have combined to motivate vast segments of the traditionally pastoral populations to become less mobile and increasingly dependent upon agriculture. The emancipation of the slave castes greatly restricted the mobility and independence of the Fulani and Tuareg who relied upon the Rimaibê and Bellah, respectively, to provide them with their staple grain needs. Drought, herd losses, increased competition for range and water resources as agriculturalists pushed into traditionally open rangeland, and deteriorating terms of trade between cattle and grain provoked these traditional herdsmen to satisfy larger portions of their grain needs through their own agricultural efforts and subsequently reduced their mobility. Thus, animal production in Upper Volta, especially in the Sahel, is increasingly affected by agricultural constraints.

Though few Voltaic pastoralists follow a nomadic lifestyle, most do move their livestock in regular seasonal patterns. Transhumance is motivated by six factors:

1. Search for pasture: In the north, herdsmen move their cattle to "remote" pasture lands to take advantage of wet season grasses and surface water. These lands are usually unable to maintain many livestock during the dry season.

2. Search for water: Herdsmen take advantage of temporary water holes that appear during the rainy season and remain for a short period of time. Often following water courses, the herdsmen return to permanent water sources (lakes or wells) for the dry season.

3. Protecting crops: Throughout the country, herdsmen move cattle away from their fields during most of the growing season to reduce the risk of crop damage from cattle.

4. Labor supply: During those months of peak labor requirements for agricultural tasks, almost all family members must be available. Herds are tended by the fewest young family members possible.

TABLE 1.5

AGE COMPOSITION OF MALES AND FEMALES IN THE HERDS: ZEBUS AND CROSS BREEDS, 1969-1970[a]

	Djibo (Northern Zone)						Other (Southern Zone)					
Age	No. of Males	% of Total	No. of Females	% of Total	Total	% of Total	No. of Males	% of Total	No. of Females	% of Total	Total	% of Total
Less than 2	236	12	237	12	473	24	4,860	11	6,293	14	11,153	26
2	93	5	108	5	211	11	2,259	5	3,043	7	5,302	12
3	74	4	86	4	160	8	2,040	5	3,137	7	5,177	12
4	66	3	99	5	165	8	1,555	4	3,552	8	5,107	12
5	87	4	122	6	209	11	1,480	3	4,577	10	6,057	14
6-8	85	4	160	8	245	12	1,111	3	6,256	14	7,367	17
9+	138	7	395	20	533	27	245	1	3,098	7	3,343	8
Total	779	39	1,207	61	1,986	100	13,550	31	29,956	69	43,606	100
Approx. Mean Age	4	-	6	-	5	-	3	-	5	-	4	-
Median Age	3	-	5	-	4	-	2	-	5	-	4	-
Mode Age	less than 2	-	9+	-	9+	-	less than 2	-	less than 2	-	less than 2	-

	Total Upper Volta					
Age	No. of Males	% of Total	No. of Females	% of Total	Total	% of Total
Less than 2	5,096	11	6,530	14	11,626	26
2	2,352	5	3,151	7	5,503	12
3	2,114	5	3,223	7	5,337	12
4	1,621	4	3,651	8	5,272	12
5	1,567	3	4,699	10	6,266	14
6-8	1,196	3	6,416	14	7,612	17
9+	383	1	3,493	8	,876	9
Total	14,329	31	31,163	69	45,492	100
Approx. Mean Age	-	-	5	-	4	-
Median Age	2	-	4	-	4	-
Mode Age	less than 2	-	less than 2	-	less than 2	-

SOURCE: SCET International, 1972.

[a]Percentages may not total exactly due to rounding.

TABLE 1.6

AGE STRUCTURE OF SAHELIAN CATTLE HERDS, 1974/1976

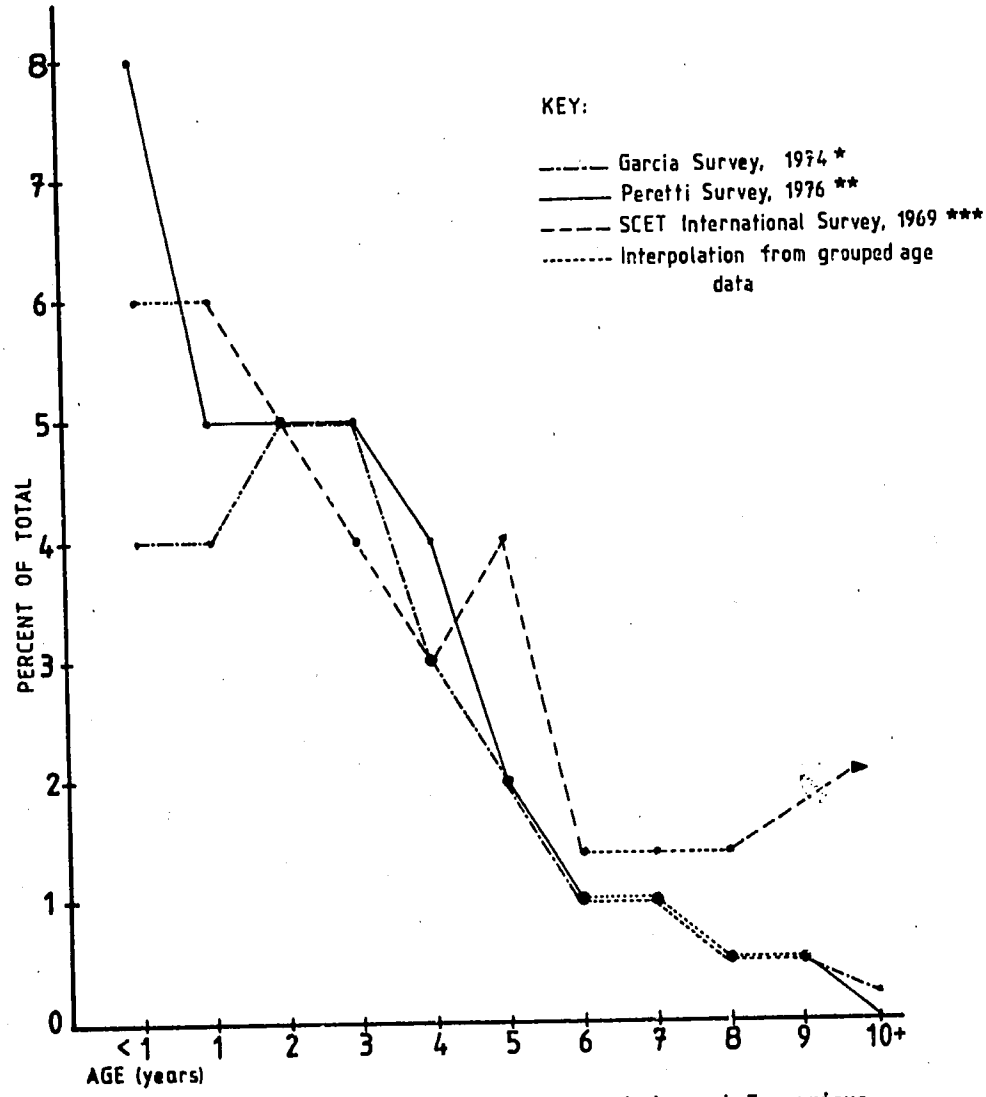
	PPERETTI SURVEY, 1976[a]			GARCIA SURVEY,* 1974		
	male % of total	female total	total % of total	male % of total	female % of total	total % of total
< 1	8	8	16	4	5	9
1	5	6	11	4	4	8
2	5	6	11	5	8	13
3	5	6	11	5	9	14
4	4	6	10	3	9	12
5	2	7	9	2	7	9
6-9	3	21	24	3	24	27
10+	-	7	7	*	7	7
total %	32	67	99	26	73	99
absolute total	2491	5311	7802	1644	4519	6163

*less than .5 percent

[a]Peretti, Projet Mise en Place de l'ORD du Sahel, 1977, p.59.

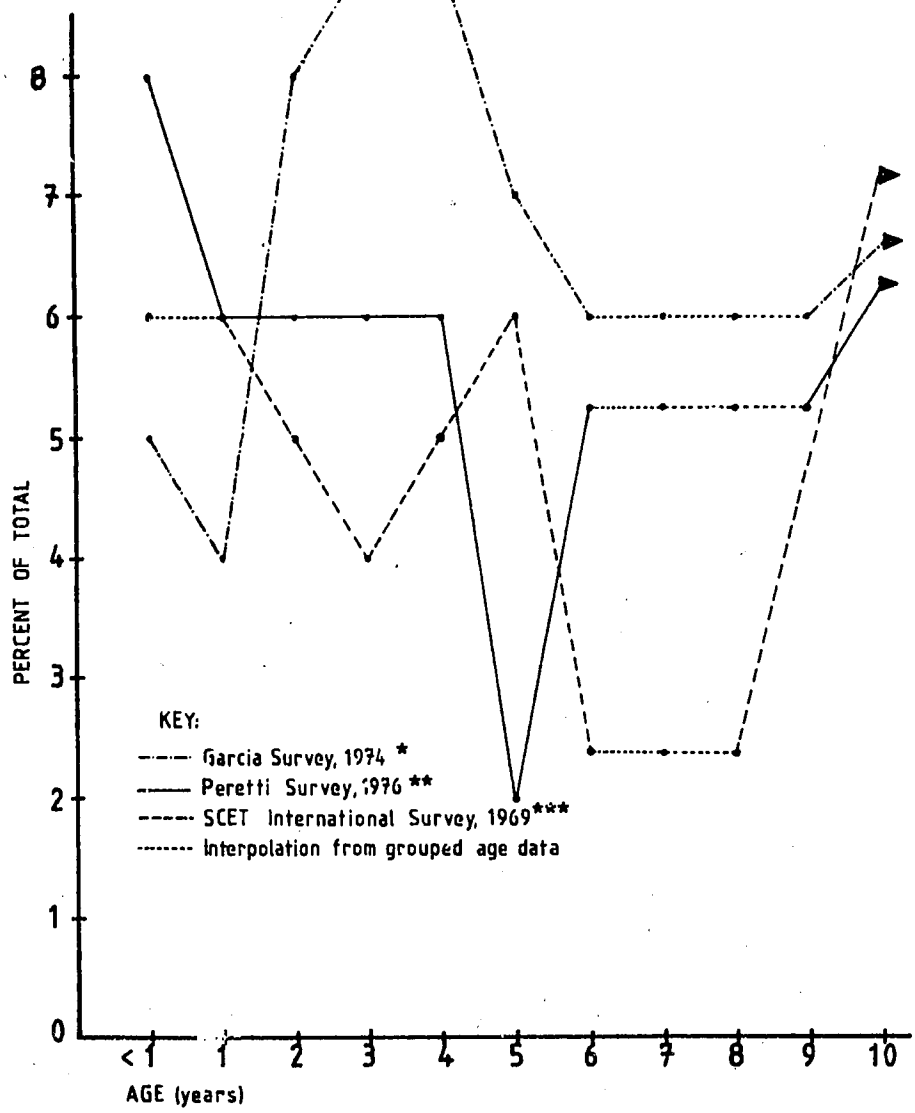
[b]Garcia, Revue Trimestrielle d'Information Technique et Economique, No. 8-9, 1974, pp. 4-13.

FIGURE 1.1a Structure of Sahelian Cattle Herds, 1969/1974/1976
MALES



*Garcia, Revue Trimestrielle d'Information Technique et Economique, Nos. 8-9, 1974 pp. 4-13
**Peretti, Projet Mise en Place de l'ORD du Sahel, 1977, p. 59
***SCET International, La Production Animale Voltaique, 1972

FIGURE 1.1b Structure of Sahelian Cattle Herds, 1969/1974/1976
FEMALES



*Garcia, Revue Trimestrielle d'Information Technique et Economique, Nos. 8-9, 1974 pp. 4-13
**Peretti, Projet Mise en Place de l'ORD du Sahel, 1977, p. 59
***SCET International, La Production Animale Voltaique, 1972

5. Market opportunities: This is only a significant factor for those pastoralists frequenting the most remote regions of the Sahel. Before harvest, when grain supplies are lowest, herdsmen are required to move toward markets where they are able to sell animals or milk for millet.

6. Search for salt: Some nothern pastoralists traditionally take their cattle to salt-rich pastures in Mali and to some areas of the Sahel in Upper Volta. Presently, most herdsmen purchase salt for their cattle rather than follow such migrations.

In general, northern herdsmen move north to short-term pasture land during the rainy season (July-September). They return south during the cool season (October-February) according to the availability of pasture and surface water. The herds are kept near permanent water sources during the dry season (March-June), where they graze on field stubble and available grasses. It is rare for more than a few young men from any household to take the herd on its transhumance (Riesman, 1974, p. 48). Almost all of the adult males and a few lactating cows (to provide milk for the herders) are taken. The rest of the females and calves remain in the permanent villages near the households' fields. The amplitude of transhumance movements is more constrained than is often thought. Rarely do northern herders take animals south into the densely populated Mossi Plateau.

Pastoral migration patterns in the south vary considerably. Herdsmen maintain rainy season camps near their fields where permanent huts, granaries, and cattle enclosures are constructed. Consequently, the fields benefit from concentrated livestock droppings. In order to protect his crops the herdsman has three alternatives: First, he may keep the cattle near the village and fields, providing that he corrals them or encloses the fields with thorn brush. Second, he may move his entire camp away from his field during the growing season, close enough to permit easy access by the agricultural laborers but far enough away to reduce risk of damage by livestock. Third, young men often take the herds away on transhumance after planting, which is done commonly in the north as well. This strategy is most often followed by herdsmen with the largest herds (Rochette, 1976, p. 5). The cattle return after the harvest to graze on the stubble. The advantages of this integration of agriculture with stockraising are:

1. Fields are heavily manured, thus increasing their fertility (see Delgado, 1977).

2. Crops are protected from livestock damage.

3. Livestock benefit from agricultural by-products.

Southern pastoralists' dry season movements are also motivated, as in the north, by the search for water resources. While southern water supplies are more readily available than in the north, southern pastoralists have the disadvantage of having to pay careful attention to their social relations with the dominant local population, even if they are long established in the region. There are basically three types of behavior:

1. Completely sedentary: These groups remain in permanent villages near their fields where there is an ample water supply throughout the dry season and where they usually maintain good relations with the dominant local population, often by providing manure for their fields and by herding their cattle.

2. Semi-sedentary: The young men depart with the majority of the herd and move to dry season water holes, leaving some cows and calves. The rest of the household remains in the permanent village. Often these migrations take place only at the end of the dry season, or not at all if water is readily available.

3. Completely transhumant: There are two types of transhumance which fall into this category. (a) In the "unique transhumance" pattern, the household and herd move together to a dry season camp. (b) Under "double transhumance," the major portion of the herd is again split off from the household and taken to dry season watering, while the rest of the family moves to a camp near an established sedentary village.[11]

As in the case of most northern migrations, the degree of movement is generally small, usually ranging between ten and thirty kilometers. In his study of Fulani in the White Volta region (between Ouagadougou and Koupela), Rochette calculated that 11 percent of the population and 41.5 percent of the cattle were semi-sedentary, and 45 percent of the population and 47.5 percent of the cattle totally transhumant (Rochette, 1976, pp. 6-7).

As in the north, milk plays an important role in southern pastoralism, though it is, perhaps, even more important commercially. Rochette estimates the terms of trade between millet and milk to be approximately 3-4 to 1 in terms of volume (Rochette, 1976, p. 8). Though the majority of the Fulani in the south are well established in their region -- two-thirds of the Fulani were resident in the area for more than six years according to Rochette (ibid., p. 10) -- in a neighboring region studied by Delgado, where herdsmen were present from the eighteenth century (Delgado, 1977, p. 17) they are most often looked upon as "foreigners." Because of this, the Fulani herdsmen usually lose out in conflicts between herdsmen and farmers. According to Rochette, one of the greatest needs expressed by southern pastoralists is access to permanent pasture and farmland (Rochette, 1976, p. 13).

Pastoralists' herd management practices are influenced by historical, climatic, and economic conditions, many of which have been ingrained in cultural institutions. The greatest risks to the herdsman are those which arise from herd loss due to drought and disease. As a result, pastoralists, especially in the Sahel where the

environment is particularly harsh, tend to structure their herds in a manner that minimizes risk of total loss. This is done by keeping large herds with many older animals which are particularly resistant to both drought and disease. This can be seen by examining Figure 1.2. It is evident that the predominantly pastoral herds of the north contain a significantly higher proportion of cattle over nine years old than do southern herds which are not exposed to such harsh conditions.[12]

In addition, pastoralists have traditionally been outside the mainstream of the monetized economy. As such, they tend to avoid holding assets in any form -- especially cash -- other than livestock and jewelry. No other assets carry the prestige of those two in traditional pastoral life.

The herdsman's cultural tradition to maintain large and varied stocks of animals is often translated into a stated repugnance to sell any animals out of his herd.[13] Still, pastoralists do sell animals in response to their cash and herd management requirements, and are, at least in the short run, generally responsive to economic stimuli, most noticeably prices. Besides the sale of livestock, offtake also takes the form of gifts and slaughter for ceremonies and holidays. However, herdsmen rarely slaughter cattle and consume the meat as a matter of course; thus, beef is not an important part of pastoralists' diet.

Pastoralists' cash income is limited to revenues from sales of milk and livestock, the latter being by far the more important. The income from milk sales accrues to the women who sell their surplus milk in nearby towns or neighboring villages. This income is used for small household expenses. Livestock sale decisions are made by the household head and are usually motivated by immediate cash need, most often for grain purchases. Other important uses of livestock sale revenue are for the payment of taxes, purchases of clothing or jewelry, religious holidays or ceremonies, pilgrimages, and purchases of household goods. Generally, small ruminants are sold off to meet the smallest financial obligations while cattle are marketed in the case of major expenditures. Total revenues from livestock sales for an average cattle herd of fifty head are estimated to be 60-100,000 CFA F or between 5,000 and 10,000 CFA F per capita annually (SCET International, 1972, p. 6; Robinet, 1973, p. 3).

In general, traditional herdsmen's long-run management and marketing strategies are constrained by several factors. The most important are:

1. Herdsmen independently assume all the risks of loss through a catastrophe such as drought, and thus tend toward a strategy of herd expansion whenever possible.

2. To the extent they are not self-sufficient, pastoralists must rely on livestock sales to satisfy basic cash and commodity needs, most importantly grain; thus livestock sales may depend largely on factors outside the livestock sector, notably the herders' agricultural output and grain prices.

3. Herdsmen choose to hold assets only in the form of livestock which may lead to a "target-income approach" to cattle sales.

These issues regarding herder commercial behavior will be covered in greater detail in Chapter 5.

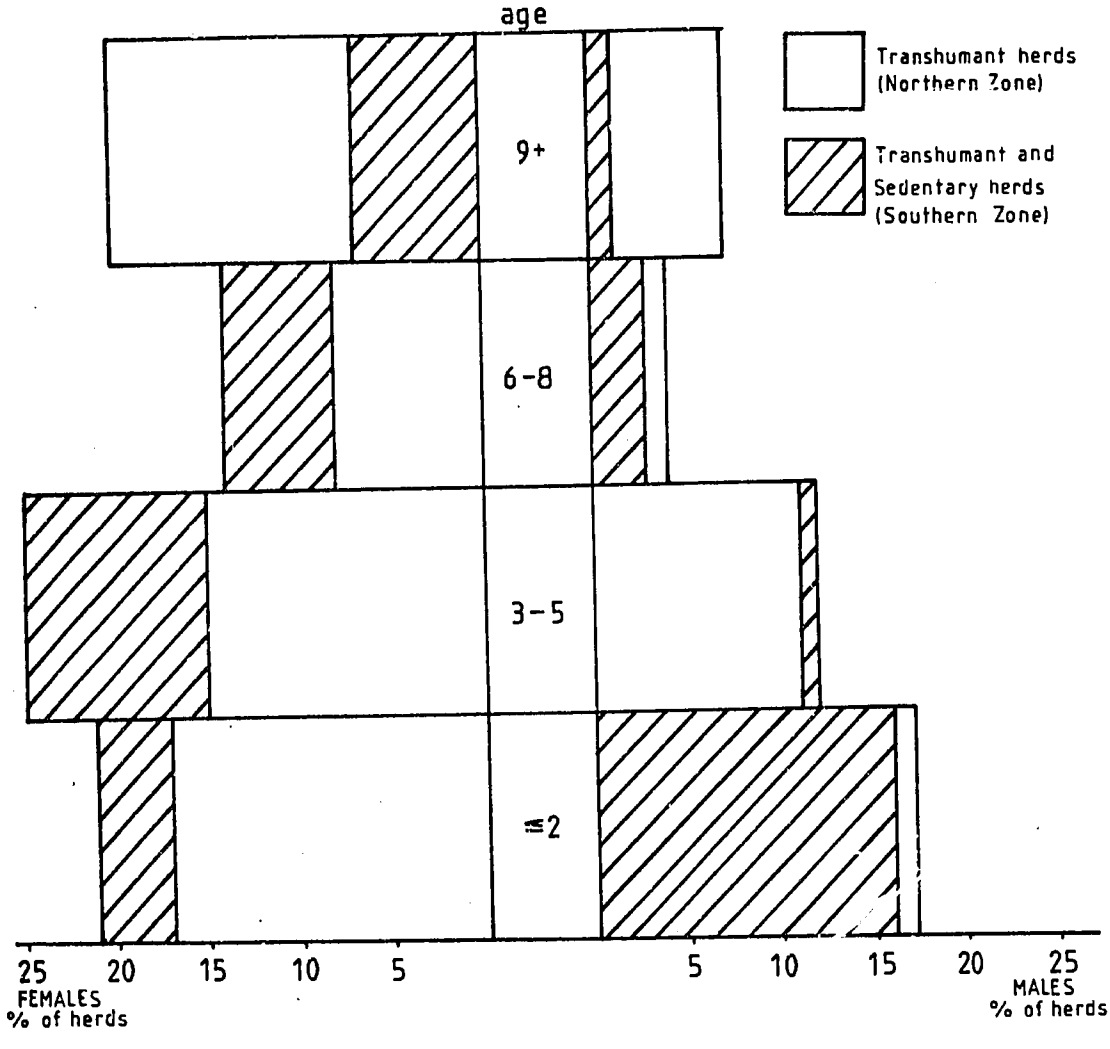
Nontraditional Stockraising. -- As noted earlier, the Fulani in Upper Volta own about 70 percent of the nation's cattle resources. The remaining 30 percent are largely owned by farmers, merchants, and civil servants. It is important to note, however, that a large portion of this latter group of animals are entrusted to the Fulani for raising. In the south, this results in separation of ownership and management, to some degree.[14] In most cases, however, the absentee owner retains control over major decisions such as marketing.

Such relationships are perhaps not what is envisioned by policy makers advocating the increased integration of agriculture and stock-raising. Many see such integration as being the most likely strategy for Upper Volta to follow to achieve improvements in livestock production because of the theoretical potentials for growth in the agricultural south and the unlikelihood of the Sahel to exhibit much advancement in livestock production in the near future as noted in the previous section (SEDES, 1975a; SCET International, 1972; IBRD, 1975b). This attitude is the basis for the Voltaic long-run strategy of "stratification." The objectives of this plan are to divide the country into two zones of production. The northern or Sahelian zone would be devoted to breeding -- supplying young male cattle out of traditional extensive stockraising systems. These yearlings would be moved south through the livestock marketing circuit to farmers and businesses for growing out, fattening, and finishing. They would also be used in animal traction programs and ultimately finished before final shipment for slaughter. This would be carried out by encouraging the organization of feedlots, animal traction, short and long-term fattening by peasants, village livestock projects, better management of existing pasture land, forage farming, and the increased use of agro-industrial by-products such as livestock feed, (Upper Volta, Sous-Commission, 1976).

In the grand sense envisioned, stratification bears little relation to the state of the livestock production system in Upper Volta today. Even the limited part of production not in the hands of traditional pastoralists is perhaps far from the ideal hoped for by planners. While mixed farming has several important benefits for those who adopt it, it also has many disadvantages -- one of the most important of which is the increased labor required to care for the livestock, often a major constraint when dealing with large stock. Thus, the level of true mixed farming by nontraditional herdsmen is currently low.

Currently, non-Fulani ownership of cattle usually takes one of four forms: 1) farming integrated with stock breeding; 2) fattening by peasants; 3) animal traction; and 4) Fulani entrustment. Under the first system, the peasant behaves to some degree like the traditional herdsmen in both farming and breeding. This form of management is relatively rare for several reasons. First, the herd represents an investment of enormous dimension for the farmer. A small twenty-five head breeding herd represents a capital stock of roughly one-half million CFA F. In a country where the mean agricultural income is less than 3,000 CFA F, it can be seen that this option is not open to many. Second, unless pasture is readily available, maintenance costs for such a large herd are high. Third, the care for such herds tends to require considerable amounts of labor, a requirement that is bound to conflict with the peasant's agricultural labor needs.

FIGURE 1.2 Age Composition of Males & Females in the Herds: Zebus and Cross Breeds, 1970



SOURCE: SCET International, 1972.

Peasant small-scale fattening is a more popular alternative. Here, agriculturalists invest in one or several head, usually relatively young males. Kept tethered in or near the household compound, the cattle may graze on the stubble from fields. Their diet is often supplemented with purchased agricultural or agro-industrial by-products. While the first is available in many areas, the quantity is relatively limited. Forage cultivation is constrained by four factors: 1) it conflicts with the labor requirements for most subsistence and more profitable cash crops; 2) forage crops are highly combustible and present a significant risk of fire; 3) there is no tradition of forage cultivation in Upper Volta; and 4) the economic incentives are lacking because of limited marketing opportunities. The quantity of agro-industrial by-products has been rather limited, mostly concentrated in the southwestern part of the country, and what exists is usually relatively expensive because of high transport costs (ONERA, 1977). Still, many peasants and some city dwellers find both short-term (less than one year) and long-term fattening reasonably profitable investments.

The use of animal traction in agriculture is very limited in Upper Volta. It is estimated that there were less than 10,000 draft oxen in Upper Volta in 1973 (Robinet, 1973, p. 11). While the number has undoubtedly increased in recent years due to programs such as that of the AVV, and a Dutch-sponsored program in the Kaya region, traction in agricultural production has still not caught on. Most animal traction is concentrated in transport, largely through the use of donkeys pulling small carts to transport firewood to cities and to carry agricultural produce to market.

The entrustment system of livestock raising by nontraditional livestock owners is probably used most often. It can involve both short and long-term stockraising. The cattle are turned over to Fulani herdsmen who keep them with their personal stock in return for certain implicit and explicit costs. The herdsmen gain milk rights for the animals they tend. They benefit from the improved fertility of their fields, which receive most of the manure. In some cases, especially where the herd is predominantly male, the herdsman receives grain, cash, cola nuts, or other considerations for his service. The owner, for his part, avoids the labor constraint of keeping cattle. He may receive some milk from the herder, may receive manure benefits to the extent that he has an arrangement with the herder, and most importantly, retains control over all new calves and receives the revenue from the sale of cattle. This system is decribed in detail in Delgado, 1978.

Whatever the system, the nontraditional livestock owner is usually more favorably inclined to "modernization" and more responsive to economic incentives than his pastoral counterpart (SCET Internatioal, 1972, p. 10). The interest of the former in livestock is almost exclusively an economic one. Because they usually meet their subsistence needs from other sources, they are not likely to be as averse to risk as the pastoralist who counts on his herd for subsistence. Their interest in maximizing income from the sale of livestock coincides with the public interest of increasing meat production. These are individuals most likely to respond favorably to government interventions in the livestock sector, be they technological or economic. It is for these reasons that the government views the promotion of nontraditional stockraising as one of the keys to improving the livestock sector.

FOOTNOTES TO CHAPTER I

[1]See, for example, Sous-Commission de la Production Animale Programme de Production Animale Pour le 3eme Plan, 1977-81, Ministère du Developpement Rural, Republique de Haute-Volta.

[2]Previously, livestock marketing was supervised by the veterinary and customs services.

[3]A discussion of the literature is found in Chapter 3.

[4]The objective is not to set up a straw man. The list of market failings include only charges found throughout the literature on West African livestock marketing (SEDES, 1969; Bishop, 1972; Bary, 1971; and USAID, 1975, to cite four examples) and often voiced by government officials and local experts. The system has also been credited for performing effectively and at low cost considering its numerous "handicaps" (SEDES, 1969, p. 333). The question of interest here is to what degree are these "handicaps" inherent in the marketing system, and how can one best deal with them to achieve some precise goal of efficiency.

[5]Surviving calves divided by total herd size.

[6]Tropical Livestock Unit (Unite Betail Tropicale), computed by the pasture requirement of different livestock classes. Typically 1 UBT = 1 lactating cow = 2/3 draft ox = 1.1 adult steer = 4 six-month-old calves = 5 sheep = 6.6 lambs = 5.8 goats (SEDES, 1974, p. 147). For calculating carrrying capacity the hectare per UBT unit is intuitively appealing. For comparing densities, however, the number of head of (UBT equivalent) is the more commonly used figure. There is, of course, a direct inverse relationship between the two. Given the hectare per animal unit, hone inverts and multiplies by 100 to find density expressed in animal units per square kilometer:

Hectare per UBT:	30	24	20	15	10	5
UBT per km^2:	3.3	4	5	6.7	10	20.

[7]Organisme Regional de Developpement (Regional Development Authority).

[8]The "drought" is used here and throughout the monograph to refer to conditions in the Sahel between 1968 and 1974.

[9]Economic Community for Livestock and Meat (Communauté Economique du Bétail et de la Viande.

[10]The above description borrows liberally from that found in SCET International, 1972, p. 11.

[11]The terms "unique" and "double" transhumance are adopted following Rochette (1976, p. 7).

[12]Delgado analyzed the differences in herd structure between cattle owned by Fulani and those owned by the sedentary population and civil servants in the Tenkodogo area. This more exact comparison (though based on a relatively small sample shows striking differences in age composition, with Fulani herds having a far greater proportion of old males and females than did those of traditional cattle owners. See Delgado, 1978, Chapter 6.

[13]During the course of interviewing herders in the Djibo region for this study, interviewers regularly questioned herders as to whether they had sold any cattle recently. One subject became increasingly annoyed by this line of questioning and finally retorted, "Would I sell my sister?"

[14]Delgado found that less than one-third of the Fulani-controlled herds which he surveyed in the southern region of Tenkodogo actually belonged to the Fulani. Each herd was made up of cattle belonging to three or four proprietors (Delgado, 1977, p. 33).

CHAPTER II

THE LIVESTOCK AND MEAT MARKETING NETWORK

This chapter presents an overview of the Voltaic livestock and meat marketing network and discusses the historical pattern of supply and demand. The first section notes Upper Volta's advantages in livestock and meat marketing and discusses the statistical difficulties associated with the work. The rest of the chapter is divided into four sections: an analysis of the geographic pattern of meat production and consumption; examination of livestock market activity; description of commercial livestock flows, focusing on international movements; and discussion of butchering and meat marketing patterns and historical trends.

Introduction and Caveat

Livestock and meat marketing in Upper Volta is carried out under a complex traditional system with a labor intensive organization. Until recently, there were few government interventions and little market infrastructure. One of Upper Volta's major advantages as a livestock supplier is its location. Geographically, it lies as a corridor for livestock movements between the northern cattle surplus regions of the Sahel and the coastal deficit countries. Traders from eastern Mali and western Niger have traditionally passed through Upper Volta on their way to markets in the south, often interacting with Voltaic cattle merchants in the markets along their trade routes. The marketing system draws cattle from both Sahelian and savannah producing zones and channels them toward terminal markets in Upper Volta, Ivory Coast, Ghana, Togo, Benin, and even Nigeria. Upper Volta has an advantage over its northern neighbors and fellow cattle-surplus states because of its proximity to four meat-deficit states and also because of the railroad line from Ouagadougou to Abidjan, historically one of West Africa's largest markets for Sahelian beef.

Before outlining the marketing circuit, a qualification is in order regarding the use of available statistics. Official Voltaic government data on livestock flows, market supply, and prices must usually be regarded with suspicion. Movements across borders are recorded by both the Customs Bureau and the Livestock Service. Information from the former is often vastly understated because of export or import tax evasion. Generally, exports are better recorded than imports. Animals exported to the coast are most often zebus; when they are trekked through southern zones in which taurins and crossbreeds predominate, they stand out. On the other hand, zebu imports from Mali and Niger usually blend in with northern Voltaic cattle. A large part of livestock exports are by rail; levying duties is a much easier task than in the bush, where skillful drovers can evade customs points. Also, the government imposes rather strict sanctions against export fraud. The same cannot be said for imports, where there is almost tacit encouragement of clandestine commercial entries, since the government stands to gain more from the export tax placed on those animals considered Voltaic than it does from transit taxes. It is estimated, then, that only 10 percent of cattle imports and 14 percent of small stock imports are officially recorded (SCET International, 1972, p. 125).

Data on market entries are also inexact; records are not kept at all in some important markets.[i] Where they are kept, the recording is usually done by a tax collector who charges a fee for each animal presented in the market; thus, the official statistics do not count animals for which the tax has been evaded.

Records are kept of most large stock slaughterings. Most cattle are slaughtered in regulated slaughterhouses or markets, but the number of sick, injured, or old cattle which are slaughtered and consumed locally is not as easily recorded and is likely understated in official statistics. In large towns, information on small stock slaughters is usually understated in official records because of large numbers of household slaughterings. There is also a problem with the accuracy of meat export data since the export tax is paid on weight, and carcass weights are understated to evade some taxation. Finally, price information in official government documents is of questionable value since there has been no organized collection of livestock or meat prices. Markets were not equipped with livestock scales until recently, so the Livestock Service could give little indication of per kilogram prices.

To make up for some of the gaps in government statistics, several studies are available, most notably by SEDES (1969) and SCET International (1972). These efforts have involved extensive field surveys and provide estimates of uncounted livestock movements, prices, etc., based upon the available information and interviews with people involved in marketing.

Meat Production and Consumption Patterns

The supply of beef on the hoof is a heterogeneous mix in Upper Volta. Generally, cattle are thin and of poor quality. The mean dressed weight is under 100 kilograms, and on average an additional twenty-five kilograms is derived from edible offals. Carcass weights vary widely; however, the most slender and weakest cattle are often slaughtered in the bush or in small markets. These are usually cull cows or sick or injured cattle which yield less than ninety and sometimes as little as fifty kilograms of dressed carcass. Carcass weights are considerably higher in urban centers, averaging over 100 kilograms -- some very large and good quality carcasses are found in Ouagadougou and Bobo-Dioulasso, ranging between 150 and 250 kilograms. Most good quality cattle, however, are shipped to the coastal markets. The supply of these cattle is limited; it is estimated that only one-third of Voltaic cattle have a net carcass weight of over 110 kilograms (SCET International, 1972, pp. 39-49).

Table 2.1 breaks down beef production by cattle type and age. This was accomplished by applying estimates for herd population, composition, and offtake to data on carcass weights in the appropriate class. All the information is from SCET International surveys (SCET, 1972). The contribution to domestically produced beef supplies by zebu and cross bred cattle is far higher than that of taurins, both in terms of total tonnage (73 percent) and per head production (12.5 kg per head). The single age and sex classification that contributes the

TABLE 2.1

NATIONAL BEEF PRODUCTION, 1969 (estimated)

Cattle age and sex		Zebus and Cross Breeds			Taurins from the Diebougou-Gaouna ORD			Other Taurins			Total for Upper Volta		
		Offtake[a]	Mean carcass wt.[b]	Total tonnage[c]	Offtake[a]	Mean carcass wt.[b]	Total tonnage[c]	Offtake[a]	Mean carcass wt.[b]	Total tonnage[c]	Offtake[a]	Mean carcass wt.[b]	Total tonnage[c]
Young	Males	2.0%	70kg	2,310mt	0.7%	65kg	60mt	1.9%	65kg	930mt	1.9%	69kg	3,300mt
<4.5 yrs.	Females	-	60kg	-	-	60kg	-	-	65kg	-	-	60kg	-
Adult	Males	3.7%	132kg	8,000mt	1.7%	85kg	190mt	5.0%	85kg	3,150mt	4.0%	114kg	11,340mt
4.5-9 yrs.	Females	2.0%	100kg	3,250mt	1.1%	80kg	120mt	2.0%	80kg	1,200mt	2.0%	93kg	4,570mt
Old	Males	1.1%	115kg	2,100mt	2.3%	85kg	250mt	0.3%	85kg	200mt	0.9%	100kg	2,550mt
>9 yrs.	Females	3.2%	90kg	4,700mt	1.2%	70kg	100mt	2.8%	70kg	1,440mt	3.0%	87kg	6,240mt
Total	Males	6.6%	111kg	12,410mt	4.7%	82kg	500mt	7.2%	80kg	4,280mt	6.8%	101kg	17,190mt
all ages	Females	5.2%	94kg	7,950mt	2.3%	75kg	220mt	4.8%	74kg	2,640mt	5.0%	89kg	10,810mt
	TOTAL	12.0%	104kg	20,360mt	7.0%	80kg	720mt	12.0%	78kg	6,920mt	11.8%	96kg	29,000mt
Total # of head			1,630,000			127,000			743,000			2,500,000	
Net production/head			12.5kg			5.7kg			9.3kg			11.2kg	

SOURCE: SCET International, 1972.

[a]In percent of total estimated herd size.

[b]As estimated based on SCET International carcass weight survey.

[c]Tonnage = offtake x est. herd size x avg. carcass weight.

most is the adult male zebu, accounting for 29 percent of production. Beef from adult males including taurins makes up over 40 percent of domestic production. The next most important classification is old females or cull cows; they yield almost one-quarter of national beef production. The other age and sex classifications account for between 9 percent and 16 percent of beef supplies, except for heifers, which are rarely slaughtered.

Meat sold in villages and small markets is most often from small stock because they are more divisible than cattle. Butchers in small towns prefer goats and sheep to cattle for slaughter because of the greater control they can exercise over meat quantity each day. Aside from Ouagadougou and Bobo-Dioulasso, there are no provisions for cold storage, so meat must be sold fresh, usually within hours of a slaughter. Since cattle slaughters involve 100 kilograms or more of beef plus about 25 percent of carcass weight in edible offals, cattle slaughters can often yield too large a quantity of meat to sell in one day in small markets. Sheep and goats, on the other hand, yield between ten and thirteen kilograms of dressed carcass plus 15 percent of that in edible offals (SEDES, 1974, pp. 53, 56). Small town and village butchers, having a much easier time managing such quantities, prefer slaughtering and selling the meat from small ruminants, and this is the most common meat sold outside urban areas.

Table 2.2 incorporates the information from the previous table with estimates of herd distribution, small ruminant meat production, and regional meat consumption. Two points are clear from this table and from Map 2.1. The first is the dominance of the Sahel over other regions, both in terms of production and even more so in terms of surplus available for export. In fact, the Sahel supplied all surplus meat in 1969 according to these estimates; the rest of the country was only self-sufficient in meat production. Although the data reflect the conditions existing prior to the most disastrous effects of the drought in the Sahel, it is likely that that region still holds the dominant position.

The second point is that the country is broadly divided between a surplus meat zone in the north and east, and a deficit zone in the south and west. Besides the Sahel, the other surplus regions are the Black Volta (with production concentrated around Nouna and Tougan in the north), Kaya, Fada N'Gourma, and Banfora. While Banfora is actually a surplus zone according to these estimates, this is largely a function of the area's sparse population. The southwest region as a whole is a deficit area. The deficit in both Yatenga and Koupéla is so small that in reality these regions should be considered self-sufficient because the supply of meat is within 10 percent of regional consumption.

The overall picture of meat supplies in Upper Volta from all types of livestock is presented in Table 2.3. It includes poultry, which is not really a butchery meat since most fowl is raised by individual households and is not important commercially for local consumption, except in large cities. It is, nonetheless, an important meat source in Upper Volta, as can be seen in the table, representing one-eighth of meat supplies.

Table 2.3 also includes four other types of meat -- horse, donkey, camel, and pork. These sources comprise only 7.5 percent of the available meat and 10 percent of domestic consumption. Horses and donkeys are slaughtered in various regions, and together account for only 2.5 percent of meat supplies. Donkey meat is primarily from culled draft animals. Camel meat is found in very small quantities in the north, comprising less than one-tenth of one percent of Voltaic meat. Pork, which is increasing in popularity, is sold throughout the south and makes up 5 percent of meat supplies.

The estimates used in Table 2.3 are from 1969-70. However, as pointed out previously, the livestock population upon which the calculations are based has not changed significantly in terms of total numbers. And although imports are now officially non-existent,[2] the magnitude of clandestine entries into Upper Volta has probably not declined significantly and is likely closer to the 1969-70 estimate than to the recorded rate of zero.

Livestock Market Activity

Diagram 2.1 is a schematic drawing of the Voltaic livestock marketing network. It broadly describes the origin and type of cattle most likely to be sold in different types of markets. Markets are divided into three major categories: 1) collection or primary markets; 2) regroupment or redistribution markets; 3) terminal or slaughter markets. Map 2.2 identifies the most important of these markets in Upper Volta.

The collection market is characterized as a northern market in the cattle-producing or surplus zone where animals usually first enter the marketing chain. There is also a set of smaller southern collection markets. What distinguishes primary cattle markets from other types is the predominance of herders as sellers, herders and traders as buyers, with local butchers playing a minor purchasing role. Cattle are "collected" by traders who form commercial herds for shipment south, to regroupment or to terminal markets, where the animals are resold to butchers or other traders. Herders often buy young animals in these markets to replace the older stock they have sold off.

What distinguishes the redistribution market from the collection market is not so much its location in the south -- for, as explained earlier, there are many small collection markets throughout that region of Upper Volta -- but the dominating presence of traders as sellers. These merchants, having bought their cattle in other markets or in the bush directly from the herder, sell their herds to other merchants who move the cattle onward toward terminal markets. Regroupment markets generally attract greater numbers of butchers, both local and from nearby urban areas, than do primary markets.

Upper Volta has no true terminal markets, where practically every sale is to a butcher and no cattle move on to other markets. In both the Ouagadougou and Bobo-Dioulasso cattle markets, approximately half of the sales are to exporters; thus, one would not be wrong in defining these markets as redistribution points. Bearing this in mind, both of these markets will be referred to as terminal markets in this report for two reasons: butchers' purchases of cattle are of so much greater importance in these two cities than in other redistribution centers; and secondly, practically all of the remaining sales are to exporters, making these two cities major embarkment points for exports.

TABLE 2.2
DISTRIBUTION OF DOMESTICALLY PRODUCED MEAT SUPPLY, CONSUMPTION, AND SURPLUS[a]
by ORD, 1969 (estimated)

ORD	BEEF			Goat and Mutton			Total surplus
	Production[b]	Consumption[c]	Surplus	Production[d]	Consumption[e]	Surplus	
Sahel	7,000	800	+6,200	3,260	620	+2,640	+8,840
Yatenya	1,750	1,750	0	1,090	1,275	- 185	-185
Kaya	3,300	1,920	+1,380	2,355	1,430	+ 925	+2,305
Ouagadougou	2,550	5,650	-3,100	1,090	2,230	-1,140	-4,240
Fada N'Gourma	3,200	900	+2,300	1,270	670	+ 600	+2,900
Koupéla	1,150	870	+ 280	360	650	- 290	- 10
Koudougou	1,980	2,500	- 520	905	1,820	- 915	-1,435
Volta Noire	3,640	1,580	+2,060	1,450	1,150	+ 300	+2,360
Bobe-Dioulasso	1,830	3,650	-1,820	1,270	960	+ 310	-1,510
Gaoua-Diebougou	720	1,180	- 460	725	880	- 155	- 615
Banfora	880	700	+ 180	725	515	+ 210	+ 390
Total Upper Volta	28,000	21,500	6,500	14,500	12,200	+2,300	+8,800

Source: SCET International, 1972.

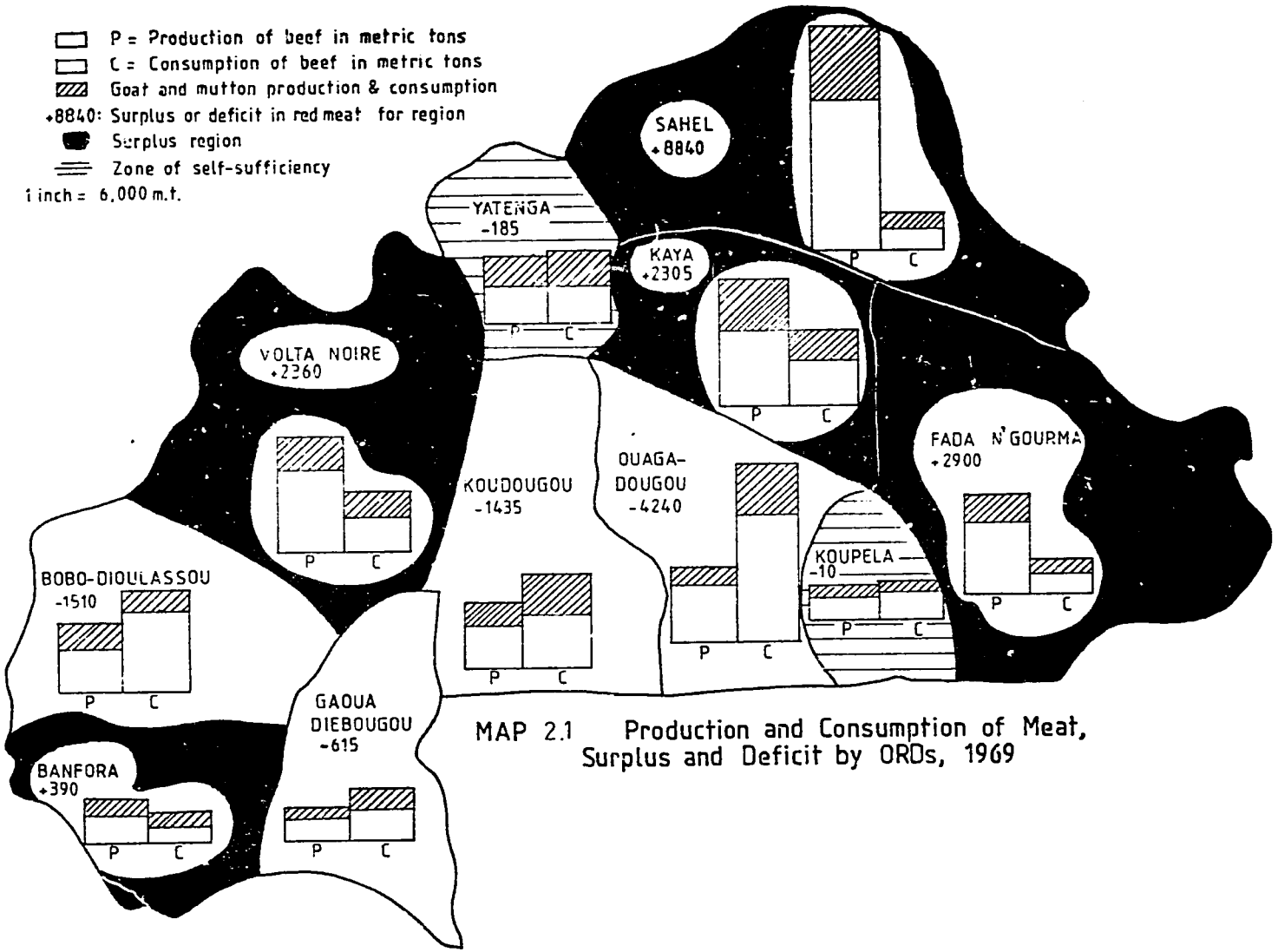
[a]In metric tons.

[b]Production based on herd population (Table 1.2) and meat production per head, averaging 11.2 kg (Table 1.9).

[c]Calculated as follows: 3.3 kg per capita i rural areas; 29.5 kg per capita in urban centers.

[d]Production based on herd population (Table 1.2) and 3.625 kg meat production per head.

[e]2.5 kg per captita



MAP 2.1 Production and Consumption of Meat, Surplus and Deficit by ORDs, 1969

TABLE 2.3

NATIONAL MEAT SUPPLY AND DISPOSITION IN 1969-70 (estimated)

Type of Meat	National[a] Production(%)	Imports[a]	Total Disposable[a] Meat (%)	Domestic[a] Consumption(%)	Available[a] for Exports(%)
Beef	28,000[b] (51.4)	4,000[g]	32,000 (53.3)	21,500 (50.1)	10,500 (61.2)
Goat & Mutton	14,500[c] (26.6)	1,500[h]	16,000 (26.6)	12,200 (28.4)	3,800 (22.3)
Pork	3,000[d] (5.5)	-	3,000 (5.0)	2,850 (6.6)	150 (0.9)
Other Red Meat	1,500[e] (2.8)	-	1,500 (2.5)	1,400 (3.3)	100 (0.6)
Poultry	7,500[f] (13.8)	-	7,500 (12.5)	5,000 (11.6)	2,500 (14.7)
TOTAL	54,500	5,500	60,000	42,950	17,050

SOURCE: SCET International, 1972.

[a]In metric tons.

[b]Offtake = 11.8%, 294,000 head available @ 95 kg per carcass = 28,000 mt.

[c]Goats: 35% offtake, 850,000 head @ 11 kg ea. = 9,350 mt; Sheep: 25% offtake, 400,000 head @ 13 kg ea. = 5,200 mt.

[d]Offtake = 50%, 75,000 head @ 40 kg ea.

[e]Camels: 7% offtake, 350,000 head @ 150 kg ea. = 50 mt; Horses: 9% offtake, 6,300 head @ 125 kg ea. = 750 mt; Donkeys: 7% offtake, 14,000 head @ 50 kg ea. = 700 mt.

[f]Offtake = 100%, 10 million fowl @ .75 kg ea.

[g]31,000 head imported at 130 kg ea.

[h]110,000 head imported at 13.5 kg ea.

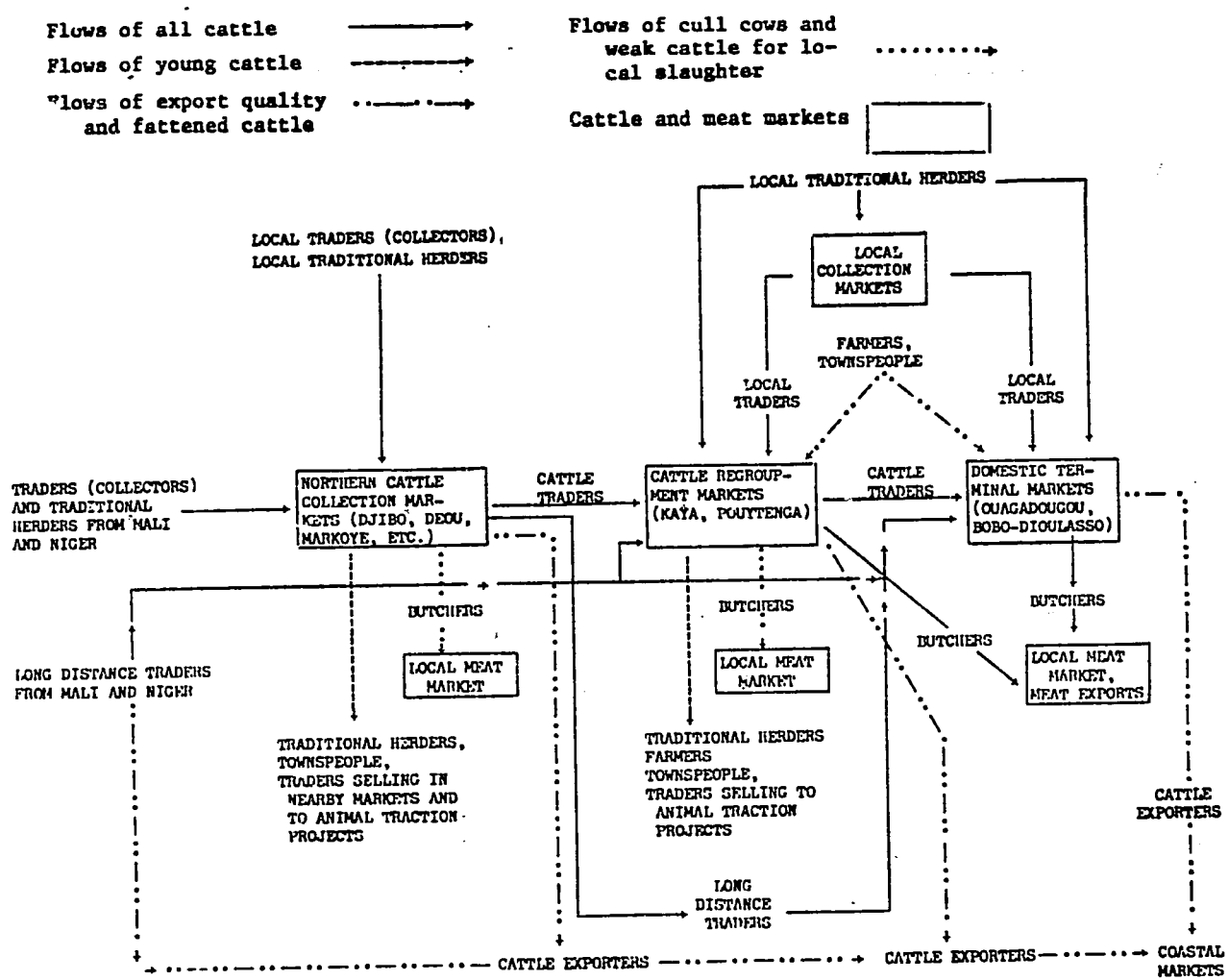
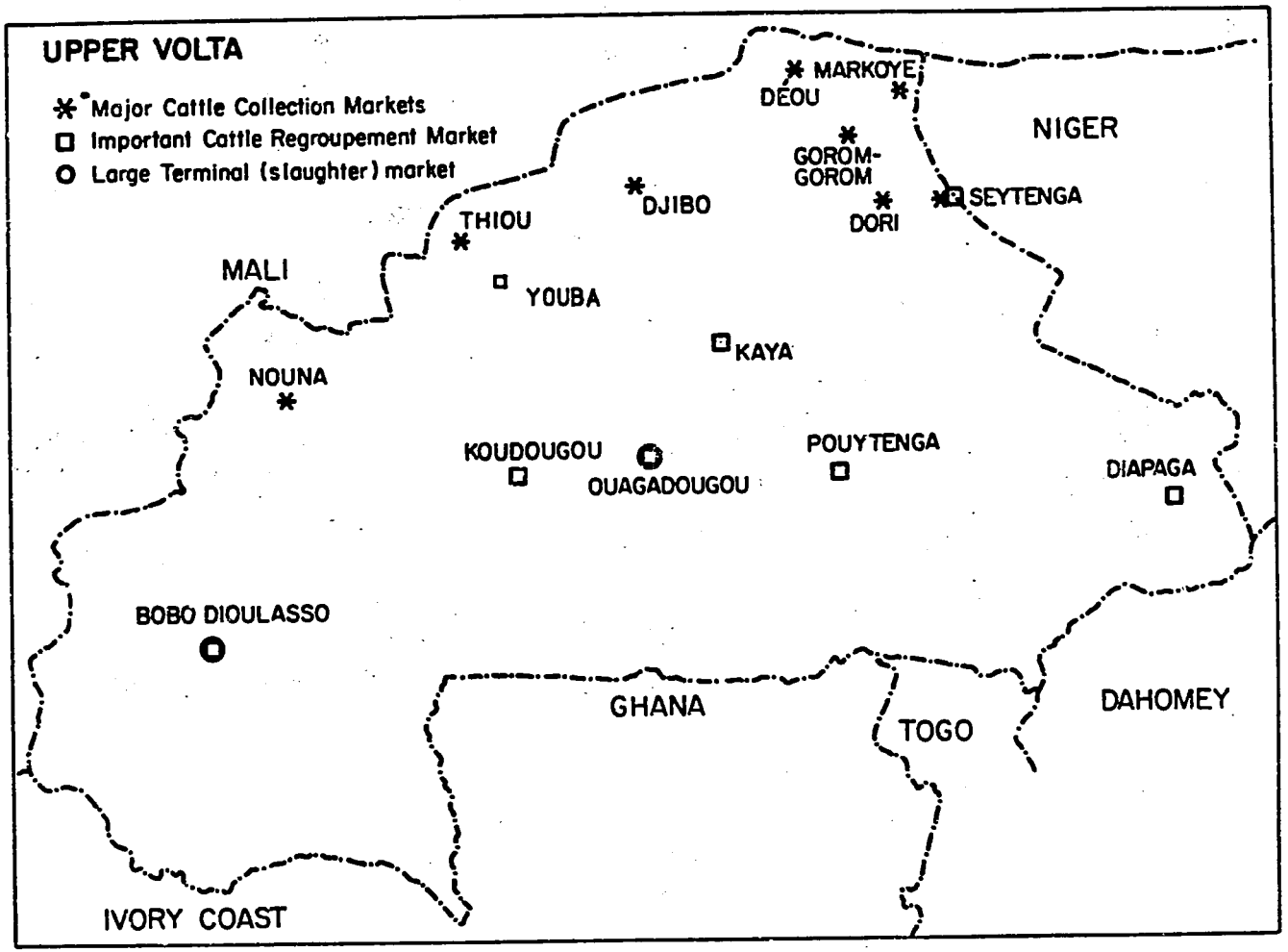


Diagram 2.1
ORGANIZATION OF CATTLE MARKETING IN UPPER VOLTA



Map 2.2: MAJOR CATTLE MARKETS IN UPPER VOLTA

The definitions used are somewhat arbitrary; other analysts might use different criteria for market classification. Indeed, it is clear from the diagram that herders sell in every sort of market -- not to mention the enormous number of non-market transactions in which they engage; traders buy from and resell in each market type. Geographically there is no simple division, since many small collection markets are located throughout the south. Nor is city size a good criterion, with the exception of the terminal markets. These are largely defined as such because of high levels of urban meat consumption, since many large cities have weak livestock markets (e.g., Fada N'Gourma, Koudougou, and Banfora), while other small towns have developed as important centers for livestock exchange (e.g., Pouytenga, Nouna).

Table 2.4 presents the official statistics for cattle offered for sale in selected markets of each type. The data indicate an overall pattern of decline in market activity. Much of the decline can be attributed to a fall in offtake as a result of the drought following the initial period of increased offtake during the drought years. Another factor is the disappearance of imported and transit cattle from Niger and Mali. The most severe declines in market activity occurred in Sahelian primary markets, especially in the Oudalan (northeast). Also declining in importance was the cattle market in Diapaga, though this market is now making a resurgence as a redistribution market for exports to Nigeria.

Two other changes in marketing patterns not evident in Table 2.4 are worth noting. First, during 1976 and 1977, the border market in Seytenga emerged as a major redistribution market for cattle exports to Niger and Nigeria. This phenomenon was temporary, as the point of exchange later moved east, to Téra and Gotheye in Niger. Second, there has been an increase in unrecorded market activity in small primary markets in the south such as those which surround major redistribution markets like Kaya and Pouytenga. These markets attract traders, butchers, and intermediaries from the larger markets and offer the growing cattle-owning populations in the south alternatives to selling in redistribution markets.

In all but the smallest cattle markets, the mechanics of transacting business are similar; intermediairies or brokers negotiate the sale for the seller, and the seller retains the right to approve the price. Markets usually meet on an open field, though the government is moving some markets to newly constructed enclosures. Animals are purchased singly or in groups, but scales are never employed -- even where they exist -- so price is always determined per head and never by weight (at least not explicitly). Because prices are bargained openly, information is quite available within the market. A detailed description of the activities and organization of Voltaic livestock markets and the functions of market participants is presented in Chapter 7.

Commercial Livestock Flows

Map 2.3 shows the major flows of livestock in Upper Volta. The wide dotted arrows represent imports and transit cattle from Mali and Niger which traditionally entered Upper Volta at many points along the northern border, continued through the Voltaic marketing circuit or transportation network, and moved toward Voltaic or coastal terminal markets. The darker narrower dotted arrows show the major exit points for trekked export cattle. The striped arrows found only within the Upper Volta borders represent important domestic trade routes and cattle trails. It is along these domestic routes that cattle are moved from points of entry and from northern collection markets, to regroupment, domestic terminal, and foreign markets. Finally, the "tracked" line indicates the railroad line (RAN) over which almost two-thirds of Upper Volta's cattle exports pass.

The pattern of imports, exports, and domestic movements is constantly changing as traders adjust to the conditions of the market. In general, the dominant flow of cattle is from the northeast toward the southwest. These movements can be seen in the Markoye-Kaya-Ouagadougou-Ivory Coast and the Djibo-Ouahigouya-Bobo-Dioulasso-Ivory Coast vectors. It is also true, however, that traditionally many Malian cattle found their way to Ghana through Upper Volta, moving in a southeasterly direction. Most recently, cattle have been shipped east and even northeast as traders responded to high prices in western Niger for both young and slaughter cattle.

Cattle Imports and Transits.-- The evolution of cattle imports is presented in Table 2.5. Total imports had fallen drastically in the years preceding their total prohibition in 1976; it is also clear that more Malian cattle were officially imported than Nigerien cattle. Official importation is only one of several ways in which cattle from Niger or Mali may pass into or through Upper Volta; perhaps the most common method is for herders to bring their own animals to one of the northern Voltaic collection markets. In the past, Malian cattle made up the majority of cattle being offered for sale in markets like Markoye, Déou, and Djibo. In the east, a similar situation existed in the Seytenga market, where Nigerien cattle were predominant until the flow reversed in 1976. Now, instead, one finds large numbers of Voltaic cattle in the Téra (Niger) market, though most of these are being sold by traders, not herders.

Another official way that cattle entered Upper Volta from Mali or Niger was for the trader to claim to be only transiting his cattle through the country. In this case, the merchant usually had to show proof of having paid an export tax in Mali or Niger and submit to a Voltaic transit tax of 500 CFA F per head. Legalized, the trader moved his cattle to their final destination, usually Ghana or Ivory Coast. Cattle transits from Niger and Mali are shown in Table 2.6. Once again, one notes that Malian cattle are more prevalent than Nigerien cattle. As was the case with imports, the total number of cattle transiting through Upper Volta decreased drastically in the years preceding the official closing of such trade.

Four factors are primarily responsible for the fall in the recorded and actual number of cattle entering Upper Volta from Mali and Niger:

1. The effects of the drought on cattle herds in eastern Mali and western Niger.
2. A restructuring of import, transit, and export taxes affecting such cattle entries.
3. The border conflict between Upper Volta and Mali in 1974-75.
4. A shift in West African cattle trade away from exports to Ghana and towards markets in Niger which channel cattle towards Nigeria.

TABLE 2.4: NUMBER OF CATTLE OFFERED FOR SALE ANNUALLY IN SELECTED VOLTAIC MARKETS

Market	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
PRIMARY MARKETS											
Djibo	na	na	4,000	13,328	13,197	15,210	9,787	6,949	9,403	6,700[b]	20,096
Dori	9,888	6,314	7,150	2,225	7,595	4,629	3,658	3,762	4,086	3,298	3,352
Markoye	47,241	28,664	22,770	21,467	24,354	23,935	18,579	13,359	6,387	5,262	7,152
REDISTRIBUTION MARKETS											
Diapaga	6,085	6,350	4,374	688	2,888	2,570	6,193	29	110	583	1,071
Kaya	27,199	32,111	24,482	31,922	33,794	39,102	33,973	21,181	14,950	16,832	21,123
Pouytenga	22,013	26,420	18,508	27,042	28,327	25,779	27,589	22,440	24,175	47,508	21,144
Youba	3,725	6,427	4,587	8,347	5,530	4,232	4,383	6,065	2,808	6,030	11,897
SLAUGHTER MARKETS											
Bobo-Dioulasso[a]	11,567	18,716	15,000	28,614	26,867	21,372	6,177	9,782	na	na	na
Ouagadougou	30,480	32,160	26,207	28,026	31,078	43,537	40,364	35,490	25,278	na	na
TOTAL OFFICIALLY RECORDED ENTRIES											
	na	na	201,053	na	285,703	290,666	271,809	181,072	159,971	215,236	180,620

[a]The figures for Bobo-Dioulasso are curious since market entries are considerably exceded by recorded slaughters in the Bobo-Dioulasso Abattoir and most butchers purchase cattle at the city's cattle market. There are, however, two separate cattle markets in Bobo-Dioulasso and the numbers recorded may reflect only one of these markets.

[b]The figure appearing in the official statistics was 47,508. This was assumed to be an error since the author's own market survey in Djibo counted only 4,467 head offered for sale from May through December. The figure appearing is the author's estimate for 1976.

SOURCE: Statistiques: Direction des Services de l'Elevage, Ouagadougou, Haute Volta.

Map 2.3: CATTLE FLOWS IN UPPER VOLTA

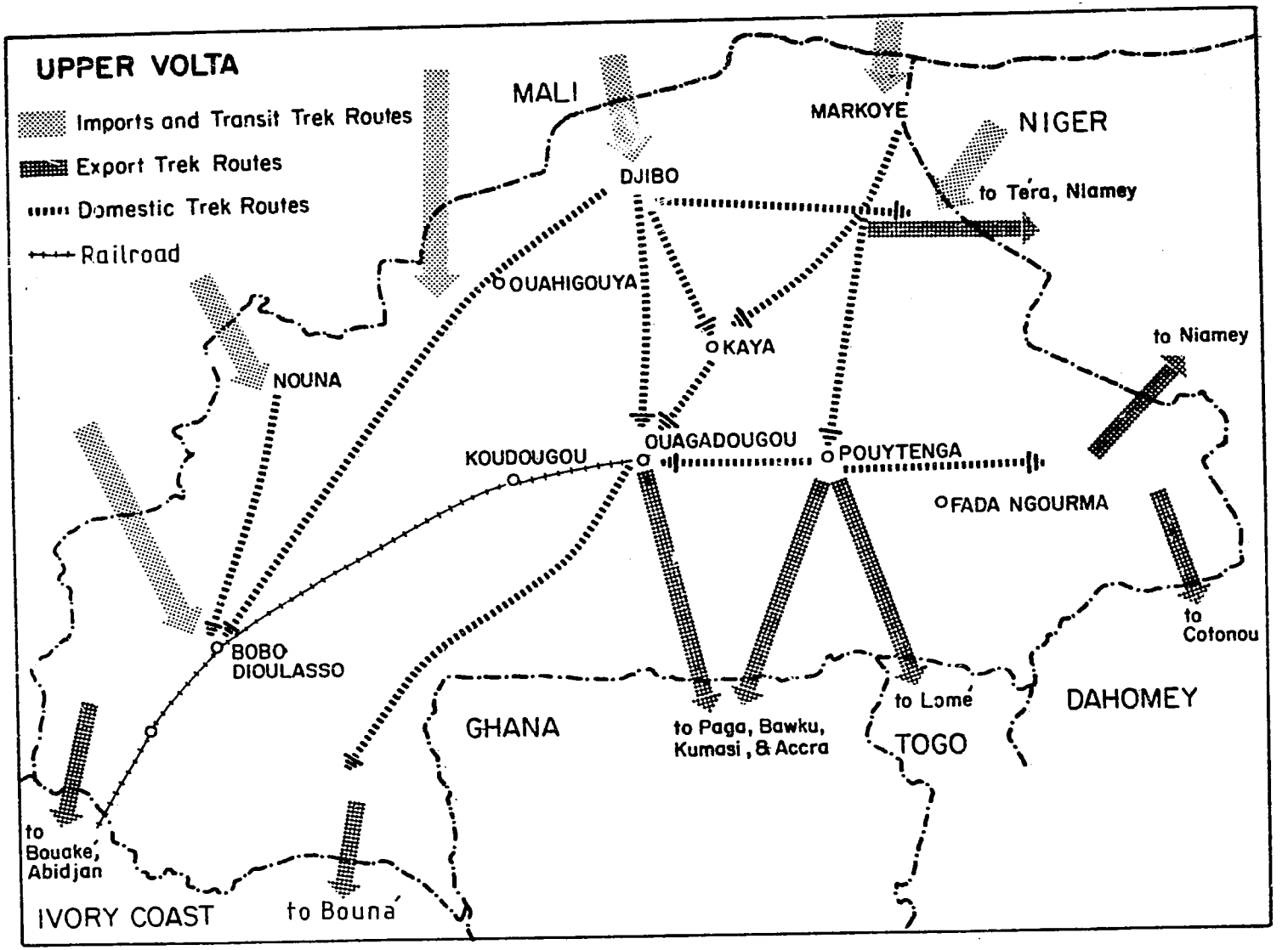


TABLE 2.5

RECORDED[a] CATTLE IMPORTS INTO UPPER VOLTA 1961-1976[b]

Year	ORIGIN Mali	Niger	Total
1961	2,561	1,488	4,049
1963	14,994	2,229	17,223
1964	1,289	7,450	8,739
1965	n.a.	n.a.	15,882
1966	23,138	--	23,138
1967	13,557	--	13,557
1968	n.a.	n.a.	9,573
1969	n.a.	n.a.	7,319
1970	10,622	--	10,622
1971	13,805	--	13,805
1972	7,949	40	8,005
1973	154	--	154
1974	1,257	--	1,257
1975	--	--	0

[a]Cattle for which Voltaic import taxes are paid in number of head.

[b]Imports no longer allowed as of 1976.

n.a. Breakdown according to country unavailable.

Source: Statistiques: Service de l'Elevage, Ouagadougou, Recueil Statistique, SEDES. 1975b, and SCET International, 1972.

TABLE 2.6

EVOLUTION OF RECORDED TRANSIT CATTLE[a] THROUGH UPPER VOLTA, 1953-1976[b]

Year	ORIGIN AND DESTINATION						Total Transit Cattle
	From Mali			From Niger			
	To the Ivory Coast	To Ghana, Togo, and Benin	Total from Mali	To the Ivory Coast	To Ghana, Togo, and Benin	Total from Niger	
1953-58[c]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	52,667
1960	25,406	11,250	36,656	--	3,844	3,844	40,500
1965	19,621	30,313	49,934	--	6,702	6,702	56,636
1966	63,421	37,047	100,468	--	18,868	18,868	119,336
1967	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	36,220
1968	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	48,272
1969	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	60,974
1970	13,095	35,062	48,158	--	12,787	12,787	60,945
1971	17,857	36,219	54,076	6,453	10,335	16,788	70,864
1972	16,013	24,665	40,678	--	7,492	7,492	48,170
1973	24,580	11,450	36,030	182	15,450	15,632	51,662
1974	5,690	10,685	16,375	--	14,000	14,000	30,375
1975	3,702	--	3,702	100	2,870	2,970	6,672

[a]Cattle for which export taxes paid in country of origin and transit tax paid in Upper Volta.

[b]Transists prohibited as of 1976.

[c]Annual Average for six-year period.

n.a.: Breakdown according to country unavailable.

Source: Statistiques: Service de l'Elevage, Ouagadougou, SEDES, 1975b, and SCET International, 1972.

The national herds of Mali and Niger were far more seriously affected by the drought between 1968 and 1974. Total cattle losses are estimated to be on the order of 30-40 percent of the pastoral Sahelian herd in those countries (SEDES, 1975a, p. 3). For the regions adjoining the Voltaic Sahelian zone the losses were quite probably similar to those described for the Voltaic Sahel in the previous chapter (around 33 percent). This undoubtedly led to a massive reduction in cattle sales by these herders, both because of the reduced number of cattle upon which to draw and because of the need to reduce offtake in order to reconstitute the herds. This led to the decrease both in the number of Malian and Nigerien herders who brought cattle to northern Voltaic markets for sale, and in the number of cattle that merchants could import into or transit through Upper Volta.

The second factor involved the changes in the structure of import, export, and transit taxes which are applicable to traders passing through western Upper Volta on their way to the Ivory Coast from the Delta region of Mali. Whereas traders would at one time profitably ship their herds directly to Bobo-Dioulasso where they were loaded onto the train to Abidjan, they now choose to route the herds via Koutiala or Sikasso. There they either arrange truck transport for shipment farther south or continue onto Ouangolodougou or Ferkessédougou where they pick up the train, avoiding payment of Voltaic taxes.

The third factor was the border conflict between Upper Volta and Mali in 1974-75, resulting in the closing of the border to all official trade. The final and possibly most important element was the shift away from the Ghanaian market, largely due to the inconvertibility of the Ghanaian currency. As can be seen from Table 2.6, at one time this represented a large share of the cattle transited through Upper Volta (over 50 percent of the transit cattle passing through Upper Volta between 1960 and 1974).

Still, Malian cattle continue to enter Upper Volta, and many are ultimately shipped to markets in the Ivory Coast. These herds are brought into the country clandestinely and given papers indicating that they originated in Upper Volta. Principal entry points are in the northeast around Déou, Markoye, and Gorom-Gorom; in the north central near Djibo and Thiou; and in the northwest around Barani, Djibasso, and N'Dorola. Many of the cattle embarking on the train in Bobo-Dioulasso are actually Malian in origin but bear the name of one of these places on their certificates of origin and thus are treated as Voltaic animals, both fiscally and statistically.

The reversal of flows from Niger to Upper Volta occurred for many of the same reasons as the decline in Malian entries. The declining market for Sahelian beef in Ghana, the prospects of waiting several months for payment for a herd, the increased costs of transiting through Upper Volta, and high prices in Nigerien cattle markets all combined to stop movements from Niger into Ghana through Upper Volta.

Cattle Exports.-- As noted earlier, livestock product exports are Upper Volta's single largest international trade item, accounting for nearly one-half of all official exports by value. Taxes on exports are also one of the largest sources of domestically generated revenue. The bulk of both of these accounts is derived from the shipment of live animals to the coast, with cattle being the most important form of export. Livestock exports have been declining in recent years, however, in terms of volume, revenues, and percent of total exports (SCET International, 1972, Part II, pp. 211-213). This section investigates the reasons for this decline as it is affected by cattle exports.

Cattle exports from Upper Volta are, for the most part, the largest, healthiest, and best quality animals produced in the country. There are three principal reasons for this. First, cattle must be healthy and strong to travel the thousand or more kilometers they must go before reaching the coastal markets; weak or unhealthy cattle are slaughtered locally. Second, there is a very limited demand for high quality beef in Upper Volta, concentrated in Ouagadougou and Bobo-Dioulasso; a larger demand does exist to a greater degree on the coast. And third, the fixed costs per head of export favor larger cattle over smaller cattle since costs are distributed over a larger quantity of meat and thus represent a lower cost per kilogram.

Most exported cattle are males, either adult steers or bulls; net carcass weights average roughly 150 kilograms. The major importing countries are Ivory Coast, Ghana, Togo, Benin, and Nigeria. In terms of tonnage, live cattle exports represent about 13 percent of offtake annually. (IBRD, 1975b, Annex 1, p. 4). Cattle travel on hoof or are shipped by train; there is practically no use of truck transport originating directly from Upper Volta. During the early seventies, 63 percent of exported cattle were transported by train, 36 percent on hoof and only 1 percent by truck. Over two-thirds of the cattle exported to the Ivory Coast are shipped by train. The remainder are cattle coming from the western part of Upper Volta. Cattle transportation is examined in detail in Chapter 6.

Table 2.7 and Figure 2.1 illustrate the evolution of officially recorded cattle exports from Upper Volta. Prior to the opening of the rail connection between Ouagadougou and the coast (Abidjan) in 1954, cattle were exported at a rate of between 30,000 and 40,000 head annually. Beginning with the establishment of the rail link and through the first few years of independence (1960-1965) exports increased steadily, peaking at 135,189 head in 1965. This period of growth was characterized by three major factors:

1. Growth of herd size and offtake throughout the fifties and early sixties due to an extended period of above average rainfall, expansion of veterinary services, and reduction of disease outbreaks (USAID, 1975, Section III, p. D-34).

2. Increased demand for cattle in the Ivory Coast as a result of the dynamic economic growth in that country and increased urbanization, especially in Abidjan. This growth in demand includes the influx of Europeans who consume more meat than Africans.

3. Improved transportation links with the coast, most notably the railroad from Ouagadougou to Abidjan, which effectivley lowered transport costs and improved the ability of cattle merchants to respond to coastal market conditions by reducing shipping time from two months to two to three days.

TABLE 2.7
EVOLUTION OF CATTLE EXPORTS FROM UPPER VOLTA
1931, 1948-1958, 1960-1977

	Destination						
	IVORY COAST		GHANA		TOGO AND BENIN		
	Number of head	Percent of total	Number of head	Percent of total	Number of head	Percent of total	Total number exported
1931	11,815	35	21,810	65	-	-	33,625
1948	2,783	8	31,202	92	-	-	33,985
1949	4,980	16	25,518	84	-	-	30,498
1950	3,684	8	40,752	92	-	-	44,436
1951	7,415	18	33,216	82	-	-	40,631
1952	6,375	17	30,165	83	-	-	36,540
1953	a	a	a	a	a	a	30,000
1954	a	a	a	a	a	a	47,000
1955	a	a	a	a	a	a	51,000
1956	a	a	a	a	a	a	61,000
1957	a	a	a	a	a	a	56,000
1958	a	a	a	a	a	a	48,000
1960	16,406	19	64,648	74	5,895	7	86,949
1961	12,280	13	78,427	84	2,128	2	92,835
1962	34,397	33	67,803	66	509	1	102,709
1963	43,852	39	68,382	61	-	-	112,234
1964	44,235	39	68,638	60	1,703	1	114,576
1965	79,486	59	53,763	40	1,940	1	135,189
1966	66,629	68	27,306	28	4,054	4	97,929
1967	62,239	70	23,184	26	3,046	4	88,469
1968	76,824	78	19,396	20	2,083	2	98,303
1969	62,539	72	20,711	24	3,458	4	86,708
1970	59,207	71	20,865	25	3,248	4	83,320
1971	59,589	73	18,482	23	3,045	4	81,116
1972	58,041	80	9,949	14	4,915	7	72,905
1973	48,573	60	27,497	34	5,365	7	81,435
1974	49,490	62	23,481	29	6.957	9	79,929
1975	57,918	87	3,706	6	4,826	7	66,450
1976	23,219	66	3,503	10	8,416	24	35,138
1977	24,729	78	2,835	9	4,004	13	31,892[b]
TOTAL (1960-1977)	879,653	57	602,576	39	65,592	4	1,548,146

Source: Statistiques de Service de l'Elevage, Ouagadougou, R.H.V.

[a]Breakdown according to country unavailable.

[b]Includes 324 head exported to Nigeria.

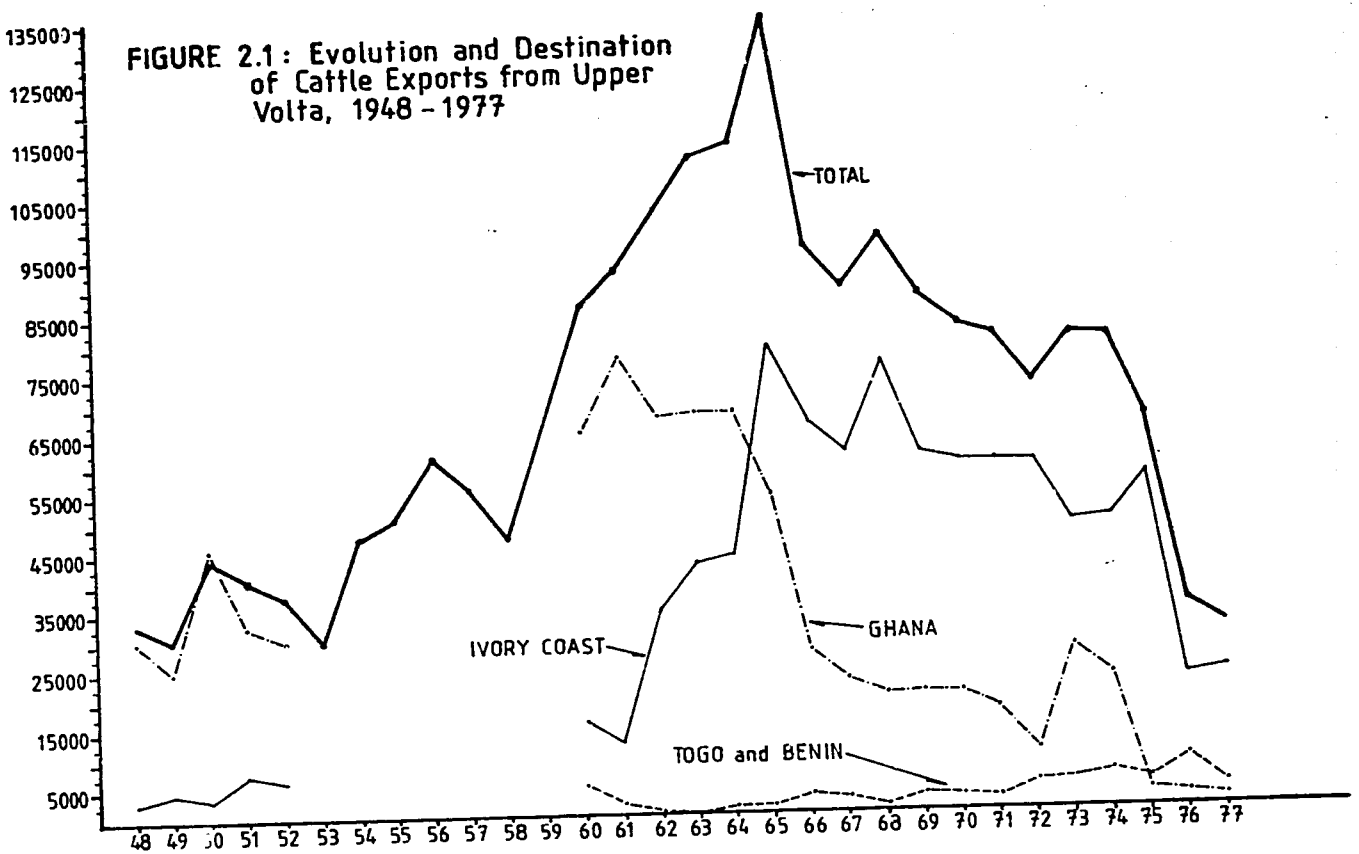


FIGURE 2.1: Evolution and Destination of Cattle Exports from Upper Volta, 1948 - 1977

SOURCE: Statistique de Service de l'Elevage, Ouagadougou, R.H.V.

In addition to these factors, which affected real growth in exports, the figures probably also reflect improved record-keeping, especially for export to Ivory Coast, since cattle shipped by train are easier to control than those trekked.

Since 1965, exports have been declining almost continuously, beginning with a drastic decrease of 35 percent between 1965 and 1967, dominated by shrinkage of the Ghanaian market. In 1968 exports rose in response to salvage sales by herders as a result of a bad year of rainfall. The level of cattle exports then continued to fall until 1973. The decline in 1972 was most pronounced, probably as a result of the 1968 drought which reduced the calf crop and increased calf mortality, and was just beginning to show up in significant decreases in offtake. Two more years of serious rain deficiency from 1972-1974 once again caused an increase in salvage sales by herders and shows up as a peak in cattle exports during those years. In 1975 the overall pattern of decline evident in the previous decade resumed, as exports fell by 17 percent. This was followed by an even larger decrease in 1976, when exports fell by almost half. The decline in cattle exports continued in 1977, though by a much smaller margin. The principal cause of the shrinkage of the export trade during the seventies was the reduced offtake by herders following the drought years. However, it was exacerbated by an increase in domestic demand and a decrease in foreign demand, especially in Ivory Coast; Sahelian exports lost much of their market share to non-African suppliers, most notably Argentina. Once again, the figures are misleading to some degree since exports to alternative markets in Niger and Nigeria during this period were largely unrecorded.

The breakdown of exports according to destination (also shown in Table 2.7 and Figure 2.1) presents an interesting pattern of change. Ghana's position as the principal foreign market for Voltaic cattle was traditionally established in pre-colonial times (Osseindowski, 1928, p. 277) and continued through the early sixties. In absolute volume, cattle exports to Ghana remained stable through 1964, averaging just under 70,000 head in the early years of the Voltaic independence. The Ghanaian market for Voltaic cattle fell off sharply in 1965 and 1966, corresponding to the years of Ghanaian political and economic instability. The most serious factor was the establishement in 1965 of an independent Ghanaian monetary unit, the cedi. The unwillingness of Voltaic cattle merchants to accept cedis in payment for cattle and the high cost of foreign exchange to Ghanaian buyers resulted in a decline in exports to Ghana through 1972. The Cattle Development Board (CDB) was established by the Ghanaian government in 1972 and was given the responsibility of taking over the importation of livestock. After a difficult time in 1972, when trade declined to under 10,000 head, the CDB began buying directly in the Ouagadougou cattle market, increasing the cattle trade between the two countries three-fold in their second year of operation; however, the CDB was only able to sustain purchases into 1974. The closing of the quarantine stations at the border because of an outbreak of disease and the subsequent backlog of cattle and delays in payment by the Bank of Ghana led to a drying up of sales to Ghana in late 1974. Since then, only a small number of cattle have been exported by private Voltaic merchants, leaving Ghana behind even Togo and Benin in the share of Voltaic cattle exports.

In sharp contrast to the Ghanaian market, exports to Ivory Coast were relatively small prior to and during the early years of independence. However, the Ivorian market share grew rapidly during the late fifties and sixties, both in absolute and relative volume. As noted above, this was in response to increased demand due to the rapid growth of Ivory Coast, facilitated by the rail link between the two countries. During the last decade, Ivory Coast maintained its market share of over two-thirds of total Voltaic cattle exports. In 1968 exports to Ivory Coast rose as a result of increased sales by herders, noted above. The decline in 1973 and 1974 is attributed to the redirection of exports toward Ghana as a result of the CDB purchases in Ouagadougou. However, in 1976 a precipitous fall in exports to Ivory Coast had disastrous effects on total Voltaic cattle exports. In late 1975, unhappy with the fall in Sahelian exports and hoping to find a stable source of cheap beef, the Ivorian government began importing large quantities of frozen beef from Europe and South America. By the following year, these frozen imports had displaced a large part of the fresh meat market. The frozen meat was priced below fresh meat prices, thus eroding further the position of Sahelian cattle exports to Ivory Coast.

Exports to Togo and Benin traditionally made up a small but stable share of total Voltaic exports. Their share increased steadily from 1971 until 1976, when it accounted for over 8,000 head or one-fourth of total cattle exports. Exports to Nigeria have been of increasing importance since 1976, when Niger cut off exports as part of a herd rebuilding program. At first, Nigerian traders bought cattle in Upper Volta for shipment to northwestern Nigeria. More recently, Voltaic merchants have established the necessary contacts in Nigeria to enable them to deal there. Still, few of these exports are officially recorded.

The overall flow of cattle destined for foreign markets (both transits and exports) during the early seventies can be seen in Table 2.8. This shows the part of Upper Volta from which cattle are shipped and the importing country. For the years 1970-75, 57 percent of the cattle shipped from Upper Volta to foreign markets were destined for the Ivory Coast, 36 percent were directed toward Ghana, 6 percent to Togo, and less than one percent were headed toward markets in Benin. In terms of origin, these flows were divided fairly evenly between the western, central, and eastern parts of the country. Twenty-nine percent of the cattle moved out of the West, 40 percent of which were transit cattle. Thirty percent of the cattle were from the east, over half of which were in transit from other countries. And 41 percent of the cattle originated in or passed through the northern and central part of the country, the vast majority of which were Voltaic exports, transits comprising only 20 percent. The most important specific flows are: western Upper Volta to the Ivory Coast (29 percent); central Upper Volta to the Ivory Coast (29 percent); central Upper Volta to Ghana (12 percent); eastern Upper Volta to Ghana (24 percent) and eastern Upper Volta to Togo (6 percent).

TABLE 2.8 CATTLE FLOWS; EXPORTS AND TRANSITS BY REGION[a]
1970-1975

Year	WEST (Bobo-Dioulasso) Exports	Transits	Total	CENTRAL and NORTH (Ouagadougou, Kaya, and Markoye) Exports	Transits	Total	EAST (Fowytenga) Exports	Transits	Total	TOTAL UPPER VOLTA Exports	Transits	Total
1970	28,304	13,096	41,400	30,903	-	30,903	-	-	-	59,207	13,096	72,303
1971	16,666	22,486	39,352	42,628	1,824	44,452	75	-	75	59,569	24,310	83,879
1972	14,260	15,155	29,415	43,781	858	44,639	-	-	-	58,041	16,013	74,054
1973	21,230	24,664	45,894	27,343	98	27,441	-	-	-	48,573	24,762	73,335
1974	21,030	5,520	26,550	28,460	170	28,630	-	-	-	49,490	5,690	55,180
1975	22,971	3,702	26,673	34,947	100	35,047	-	-	-	57,918	3,802	61,720
Total	124,661	84,623	209,284	208,062	3,050	211,112	75		75	332,798	87,673	420,471
	(27%)	(31%)	(29%)	(45%)	(1%)	(29%)				(72%)	(33%)	(57%)
1970	102	-	102	3,295	13,610	16,905	17,468	29,872	47,340	20,865	43,482	64,347
1971	119	-	119	3,569	17,801	21,370	14,794	26,364	41,158	18,482	44,165	62,647
1972	162	-	162	739	15,596	16,335	9,048	12,667	21,715	9,949	28,263	38,212
1973	824	-	824	14,086	5,447	19,533	12,587	19,632	32,219	27,497	25,079	52,576
1974	1,386	-	1,386	8,940	5,321	14,261	13,156	16,384	29,540	23,482	21,705	45,187
1975	391	-	391	1,527	-	1,527	1,788	809	2,597	3,706	809	4,515
Total	2,984		2,984	32,156	57,775	89,931	68,841	105,728	174,569	103,981	163,503	267,484
	(1%)			(7%)	(22%)	(12%)	(15%)	(39%)	(24%)	(22%)	(61%)	(36%)
1970	-	-	-	-	-	-	2,663	4,309	6,972	2,663	4,309	6,972
1971	-	-	-	-	-	-	2,685	2,389	5,074	2,685	2,389	5,074
1972	-	-	-	88	-	88	4,638	3,894	8,532	4,726	3,894	8,620
1973	-	-	-	11	-	11	4,645	1,821	6,466	4,656	1,821	6,477
1974	-	-	-	-	-	-	6,669	2,980	9,649	6,669	2,980	9,649
1975	-	-	-	-	-	-	4,811	2,061	6,872	4,811	2,061	6,872
Total				99		99	26,111	17,454	43,565	26,210	17,454	43,664
							(6%)	(6%)	(6%)	(6%)	(6%)	(6%)
1970	-	-	-	-	-	-	585	58	643	585	58	643
1971	-	-	-	-	-	-	360	-	360	360	-	360
1972	-	-	-	-	-	-	189	-	189	189	-	189
1973	-	-	-	-	-	-	709	-	709	709	-	709
1974	-	-	-	-	-	-	288	-	288	288	-	288
1975	-	-	-	-	-	-	15	-	15	15	-	15
Total							2,146	58	2,204	2,146	58	2,204
	127,645	84,623	212,268	240,317	60,825	301,142	97,173	123,240	220,413	465,135	268,688	733,823
	(27%)	(31%)	(29%)	(52%)	(23%)	(41%)	(21%)	(46%)	(30%)	(100%)	(100%)	(100%)

[a]Percentages given with respect to grand totals for each category (column). Thus, 27 percent of all Voltaic exports were from western Upper Volta to the Ivory Coast, etc. Units are in number of head.
Source: Statistique de Service de l'Elevage, Ouagadougou, R.H.V.

Butchering and Meat Marketing

Like most other livestock production and marketing operations, butchering and meat marketing is largely carried out in the traditional sector, with little reliance on modern technology. Except in the largest cities, there are neither mechanized slaughter nor cold room facilities, and little differentiation between cuts of meat. In most places, the traditional butcher buys live animals, slaughters them himself, cuts the meat, and resells it in retail markets --a fully integrated butchering system.[3]

For the most part, poor sanitary conditions exist both in places of slaughter and in meat markets. In most villages, slaughtering is usually done on the ground in the market itself. In small towns it is done on a stone or cement slab floor which receives only superficial rinsing with cold water. Even in Ouagadougou, which has a new, modern abattoir in which sanitation during slaughter is as good as anywhere in West Africa, wholesale meat sales take place on the ground just outside the abattoir's delivery dock. The area is rarely, if ever, cleaned, and vultures congregate on the roof and dock, picking at the displayed carcasses whenever they can. Throughout the country, retail meat sales take place in open markets from wooden tables which are infrequently washed down with hot water. The meat is sold almost immediately, because of its perishability and the lack of refrigeration equipment. Even in Ouagadougou and Bobo-Dioulasso, where both public and private cold rooms are available, the use of such equipment is limited to a small number of European-style retailers who use their own facilities, and some meat wholesalers and exporters who use the chill-rooms of the abattoirs.

Most retail meat sales take place in open air markets from small stalls or by vendors who circulate through the markets with trays of meat in piles, or tas.[4] Meat is most often sold in this form, consisting of an assortment of meat, fat, bone, and stomach and intestinal parts. Most organ and other edible fifth-quarter parts[5] are sold separately by retail specialists. Prices are usually set by the tas; in most cases, even identifiable cuts of meat are not explicitly sold by weight. Official prices are set by the government, but they are not enforced and have little relation to actual meat prices in retail markets.

Butchering and meat marketing operations in Ouagadougou and selected rural markets will be examined in greater detail in Appendix C. Included will be an examination of wholesale and retail meat prices. The remainder of this section will be devoted to looking at the evolution of recorded slaughters in Upper Volta, per capita consumption of meat domestic slaughter infrastructure, and the evolution of meat exports from Ouagadougou and Bobo-Dioulasso.

Recorded Meat Slaughter.-- Most of the commercial meat marketing activity in Upper Volta takes place in established markets and is fairly well documented. This is especially true for cattle, horse, pork, and to a lesser degree, for small ruminant slaughters and meat sales. A large amount of small ruminant slaughters and almost all of the poultry slaughtered are not commercialized, being handled entirely within the household. Since scales are not commonly in use, the information on tonnage in official government documents is based on estimates of carcass weights, some of which have proved to be far out of line with reality. Thus, variations in tonnage appearing in these documents are often meaningless.

Table 2.9 shows the evolution of official slaughters of all butchery animals from 1954-76. The recorded number of head of cattle slaughtered increased dramatically between the mid-fifties and midsixties. This might, in fact, have been due to an increase in beef consumption resulting from increased urbanization, but it is more likely accountable to better recording of these slaughters. Similar increases take place in other categories and are attributable to the same phenomenon. During the late sixties and through 1976, official cattle slaughters have remained relatively stable, increasing or decreasing by roughly 10,000 head per year (about 15 percent) but showing no significant long-run trend. Accounts of official tonnage jumped substantially from 1975 to 1976, largely the result of adjustments in the mean carcass weights applied to the recorded slaughter figure, after weighings at the Ouagadougou slaughterhouse showed the prior estimates for cattle carcass weights to be significantly in error.

With the exception of a downward aberration in 1969, recorded slaughters of small ruminants show a fairly steady increase throughout the period covered. As with cattle, much of the increase is due to the efforts of the government to locate all commercial slaughters in slaughterhouses and other controlled areas. The fact that the number of head increased sharply in 1976 while tonnage fell is again due to adjustments in the mean carcass weights applied to the slaughter figures to calculate tonnage. The data on pork can be interpreted similarly, though without question demand for pork as an acceptable substitute for beef is increasing rapidly.

Table 2.10 attempts to adjust for some of the tonnage inconsistencies in Table 2.9 by applying standardized mean carcass weights to the slaughter data for each year from 1967 to 1976. It shows a rather steady decline in beef as a percentage of official slaughters, while both small ruminant and pork production increase in importance, both relatively and absolutely. Using the figures in Table 2.3 one sees that only about one-half of cattle slaughters and between 10 percent and 20 percent of small stock slaughters were actually recorded.

Together with Figure 2.2, Table 2.10 also gives some indication of the effects of the drought on livestock slaughters. The significant decline in butchering of all types of animals in 1969 followed a year of very poor rainfall in 1968. One might speculate that offtake declined as herders attempted to adjust to the high mortality rates inflicted by the drought.[6] In response to a good year of rainfall in 1969, both offtake and slaughters increase in succeeding years. The disastrous-rainfall years from 1971-73 had two counteracting effects in terms of offtake and slaughter: first, herders restricted offtake of healthy animals to preserve their herds and to maintain stocks for rebuilding herds. This might account for the decline in offtake in 1972 and again in 1974-75. On the other hand, the length of the drought had weakened much of the livestock to the point where herders were forced to sell off some stock or take complete losses. This might account for the increased slaughter in 1972.[7] Cattle slaughters returned to their previous level in 1976, after two years of more normal rainfall.

Table 2.11 presents the official statistics for livestock slaughters in the country's two largest and most modern abattoirs, Ouagadougou and Bobo-Dioulasso. In terms of registered cattle slaughters, activity in the

TABLE 2.9

EVOLUTION OF BEEF AND MEAT OFFICIAL SLAUGHTERS,[a] 1954 - 1976

YEAR	CATTLE			SMALL RUMINANTS			PORK			HORSES, DONKEYS, CAMELS			TOTAL MEAT TONNAGE (mt)
	# of Head	Tonnage[b] (mt)	% of Total Meat	# of Head	Tonnage[b] (mt)	% of Total Meat	# of Head	Tonnage[b] (mt)	% of Total Meat	# of Head	Tonnage[b] (mt)	% of Total Meat	
1954	27,180	3,533	83	48,467	630	15	2,397	96	2	-	-	-	4,259
1955	9,670	1,257	59	58,833	765	36	2,624	105	5	-	-	-	2,127
1956	33,955	4,414	89	57,791	751	14	2,739	110	2	-	-		5,275
1957	36,004	4,681	83	63,687	828	15	3,068	123	2	-	-	-	5,632
1958	38,532	5,009	83	63,584	827	14	4,374	175	3	-	-	-	6,011
1959	37,034	4,814	82	70,409	915	16	3,426	137	2	142	18	-	5,884
1960	42,995	5,589	82	79,496	1,032	15	4,541	182	3	264	34	-	6,837
1961	50,820	6,607	81	92,997	1,209	15	6,629	265	3	624	81	1	8,162
1962	53,348	6,935	81	99,816	1,298	15	6,220	249	3	739	96	1	8,578
1963	62,866	8,173	81	121,937	1,585	16	5,716	229	2	1,200	156	2	10,143
1964	75,239	9,781	82	130,921	1,702	14	6,903	276	2	1,419	185	2	11,944
1965	73,979	9,617	81	131,637	1,711	14	7,452	298	3	1,492	194	2	11,820
1966	72,096	9,372	80	141,435	1,839	16	7,709	308	3	1,802	234	2	11,753
1967	81,160	10,551	79	170,161	2,082	16	10,911	436	3	1,126	263	2	13,332
1968	82,995	10,784	80	157,874	2,052	15	9,777	391	3	1,320	270	2	13,497
1969	65,627	8,485	82	97,762	1,271	12	8,525	341	3	1,721	205	2	10,302
1970	75,730	9,845	80	142,627	1,854	15	10,122	405	3	1,726	210	2	12,314
1971	83,481	9,865	77	175,010	2,275	18	10,110	401	3	2,402	283	2	12,824
1972	74,032	9,624	74	206,583	2,716	21	10,983	439	3	2,495	155	1	12,934
1973	81,816	7,775	71	229,278	2,607	24	12,404	496	5	1,755	136	1	11,014
1974	72,682	6,905	67	236,061	2,714	26	12,982	519	5	2,655	233	2	10,371
1975	61,532	5,846	62	258,735	2,947	31	13,378	535	6	1,501	167	2	9,495
1976	72,116	8,669	72	330,501	2,546	19	16,703	869	7	1,285	296	2	13,335

SOURCE: 1954-1966, SCET International, 1972.
1967-1976, Direction de la Statistique, Service de l'Elevage, Ouagadougou.

[a]Weights in metric tons.

[b]Tonnage calculated from following estimated mean carcass weights:

Animal	1954-72	1973-75	1976
Cattle	130 kg.	95 kg.	*
Small ruminants	13 kg.	-	-
Sheep	-	13 kg.	8.5 kg.
Goat	-	11 kg.	7.5 kg.
Pork	40 kg.	40 kg.	52 kg.
Horses	150 kg.**	125 kg.	145 kg.
Donkeys	80 kg.**	52 kg.	81 kg.
Camels	250 kg.**	155 kg.	198 kg.

*For 1976, mean weights of cattle were broken down into following categories: Bulls - 125 kg.; steers - 137 kg.; cows - 104 kg.; young males - 85 kg.; calves - 73 kg.

**For horses, donkeys and camels breakdown by type unavailable for 1954-1966. 130 kg. used as estimate of mean overall carcass weights — consistent with overall mean for 1967-72.

TABLE 2.10

ADJUSTED TONNAGE OF SLAUCHTERS, 1967-1976[a]

Year	BEEF[b]		GOATS & SHEEP[c]		PORK[d]		Total Tonnage[c]	% of Change Previous Year
	Tonnage	% of Total	Tonnage	% of Total	Tonnage	% of Total		
1967	9756	82%	1318	11%	567	5%	11,898	-
1968	9972	84%	1221	10%	508	4%	11,883	- 0.1%
1969	7846	85%	757	8%	443	5%	9,241	-22.2%
1970	9103	83%	1105	10%	526	5%	10,935	+18.3%
1971	1,0035	82%	1356	11%	526	4%	12,191	+11.5%
1972	8899	78%	1593	14%	571	5%	11,346	- 6.9%
1973	9835	79%	1766	14%	645	5%	12,461	+ 9.8%
1974	8737	76%	1833	16%	675	6%	11,553	- 7.3%
1975	7397	72%	1995	19%	696	7%	10,264	-11.6%
1976	8669	71%	2545	21%	869	7%	12,239	+19.2%

[a]Numbers of head slaughtered and 1976 calculated carcass weights used to compute tonnage in metric tons.

[b]Calculated with average carcass weight of 120 kg.

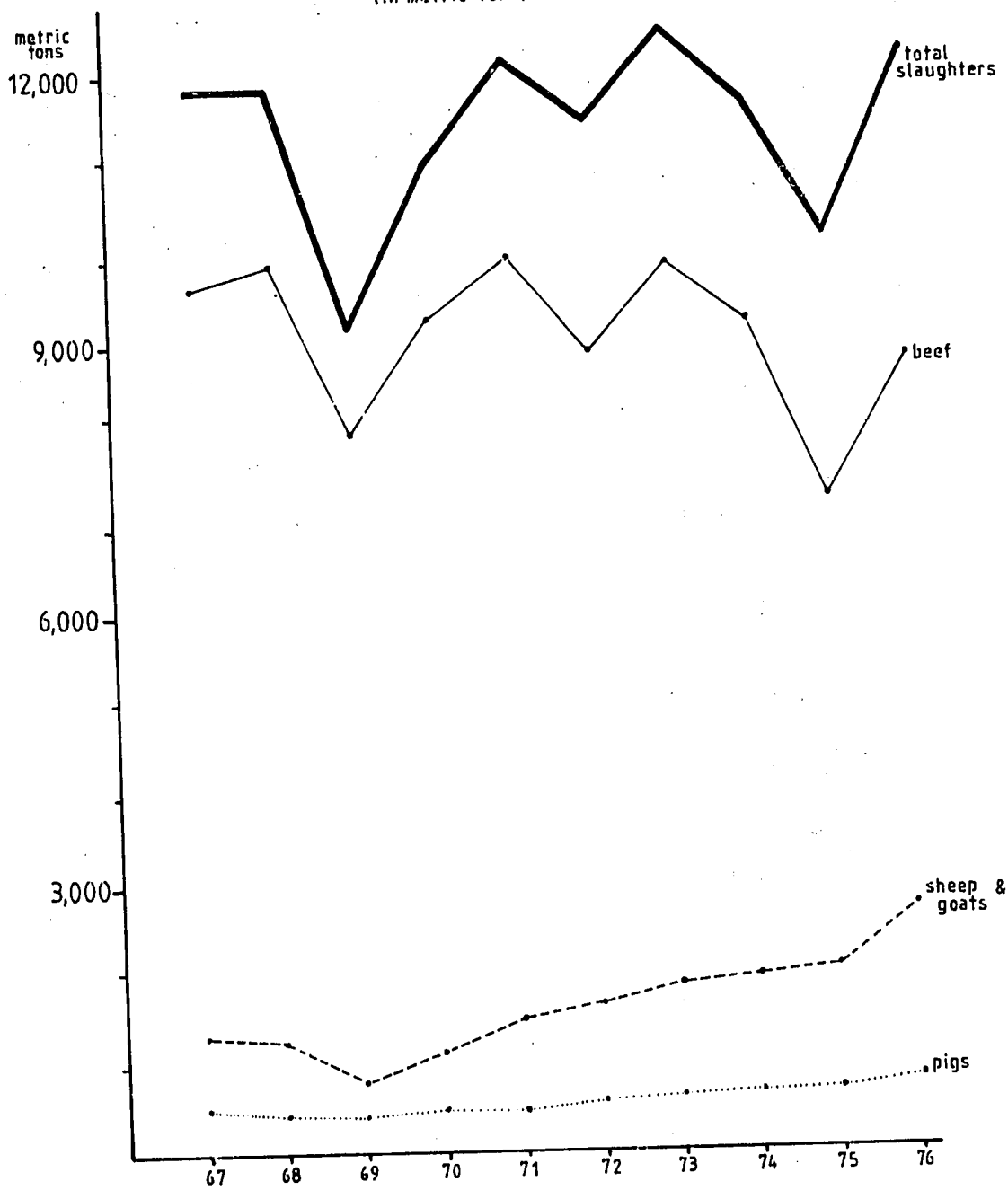
[c]Sheep carcasses: 8.5 kg; Goat carcasses: 7.5 kg.

[d]Pork carcasses: 5.2 kg.

[e]Includes horses, donkeys and camels using 1976 calculated carcass weights.

Source: Direction de la Statistique, Service de l'Elevage, Ouagadougou.

FIGURE 2.2 Adjusted Tonnage for Recorded Slaughters, Upper Volta 1967-76
(in metric tons)



SOURCE: Direction de la Statistique, Service de l'Elevage. Ouagadougou

TABLE 2.11

LIVESTOCK SLAUGHTERS IN OUAGADOUGOU AND BOBO-DIOULASSO ABATTOIRS, 1965-1976

YEAR	OUAGADOUGOU					BOBO-DIOULASSO					TOTAL TONNAGE (mt)
	Cattle		Small Ruminants		Total tonnage (mt)[a]	Cattle		Small Ruminants		Total tonnage (mt)[a]	
	number of head	tonnage (mt)	number of head	tonnage (mt)		number of head	tonnage (mt)	number of head	tonnage (mt)		
1965	26,342	3,424	25,601	333	3,835	16,454	2,139	21,035	273	2,690	6,525
1966	22,853	2,971	20,208	263	3,307	17,480	2,272	20,747	270	2,821	6,128
1967	27,412	3,564	32,401	421	4,118	18,238	2,377	13,696	178	2,779	6,897
1968	24,185	3,144	18,314	238	3,467	19,392	2,521	13,412	174	2,868	6,335
1969	18,711	2,432	14,255	185	2,699	16,016	2,082	7,524	98	2,327	5,026
1970	19,770	2,570	16,280	212	2,895	17,734	2,305	9,385	122	2,601	5,496
1971	25,884	3,365	22,715	295	3,766	20,097	2,613	10,299	134	2,918	6,684
1972	20,048	2,606	26,620	346	3,043	19,408	2,523	7,982	104	2,770	5,813
1973	22,412	2,129	32,458	368	2,555	20,215	1,920	5,288	74	2,088	4,643
1974	16,563	1,573	31,076	352	1,973	22,161	2,105	8,945	107	2,360	4,333
1975	15,203	1,444	57,699	651	2,176	19,404	1,844	11,908	145	2,052	4,228
1976	22,352	2,780	115,060	886	3,874	20,503	2,573	11,492	93	2,717	6,591

Source: 1965-1969, SCET International, 1972.
1970-1976, Direction de la Statistique, Service de l'Elevage, Ouagadougou.

[a]Tonnage includes pork, horses, camels and donkeys. Weight estimates are taken from the Direction de la Statistique for the years 1970-76 for which various mean carcass weight estimates are used to arrive at total figures. For the years 1965-69, the same estimates as used in 1970 are applied and are as follows: cattle-130 kg.; sheep and goats-13 kg.; horses-150 kg.; donkeys-80 kg.; and camels-250 kg.

Bobo-Dioulasso abattoir showed a long-run increasing trend (see Figure 2.3), even through most of the drought years. Yearly fluctuations were fairly gentle, slaughters changing by no more than 17.5 percent in any one year (1968-69). Cattle slaughters in Ouagadougou, on the other hand, appeared to indicate a long-run decreasing trend with volatile fluctuations. Yearly variations in cattle slaughters ranged up to 47 percent, (1975-76) and averaged 20 percent per year.

Despite these cyclical and secular trends, it is possible to make out marked effects from the drought years, 1968-1974. In both cities, the number of cattle slaughters declined sharply during the early years of the drought, consistent with the theory of initial reduced offtake by herders. The number of slaughters then went back up during the most difficult years in terms of rainfall (1971-73) likely because of salvage sales by herders. Finally, the number of slaughters again declined at the conclusion of the drought (1973-75), as herders reduced offtake to reconstitute their herds. That the pattern in Bobo-Dioulasso is not as obvious as that in Ouagadougou is attributable to the fact that its principal supply regions in northwestern Upper Volta were not as badly affected by the drought as those areas supplying the Ouagadougou abattoir, northeastern (Sahelian) Upper Volta.

The spectacular increase in small ruminant slaughters in Ouagadougou in 1975 and 1976 is accounted for by the opening of the new abattoir and a government crackdown on clandestine commercial slaughters. On the other hand, the secular decline in small ruminant slaughters at the abattoir in Bobo-Dioulasso can be explained by the crowded conditions that exist in that facility, where cattle slaughters alone tax its capacity greatly. Nonetheless, small ruminant slaughters make up a small share of total slaughters in both abattoirs, combining with slaughters of other types of livestock to account for usually less than one-quarter of annual tonnage in the Ouagadougou abattoir and an even smaller portion (usually less than 10 percent) in Bobo-Dioulasso.

Per Capita Meat Consumption.-- As noted above, only a small portion of the animal goes to waste in Upper Volta; there is little which is not considered fit for human consumption. On the average, 25 percent of cattle net carcass weight is available in the form of edible offals; 15 percent of net carcass weight for small ruminants and 10 percent for pork are available. This includes meat from the head and hooves, organ parts, stomach and intestines, and almost anything else that can be cooked and eaten. Bones are highly marketable also if they contain even minimal amounts of meat. These and other scraps are used in the soups and sauces which make up the primary animal protein food source for most Voltaics. In some regions (Pouytenga for example) blood is collected and used to make sausage. In fact, one might say that entrail contents, horns, and hides are the only parts of the animal not marketable for human consumption as food.[8]

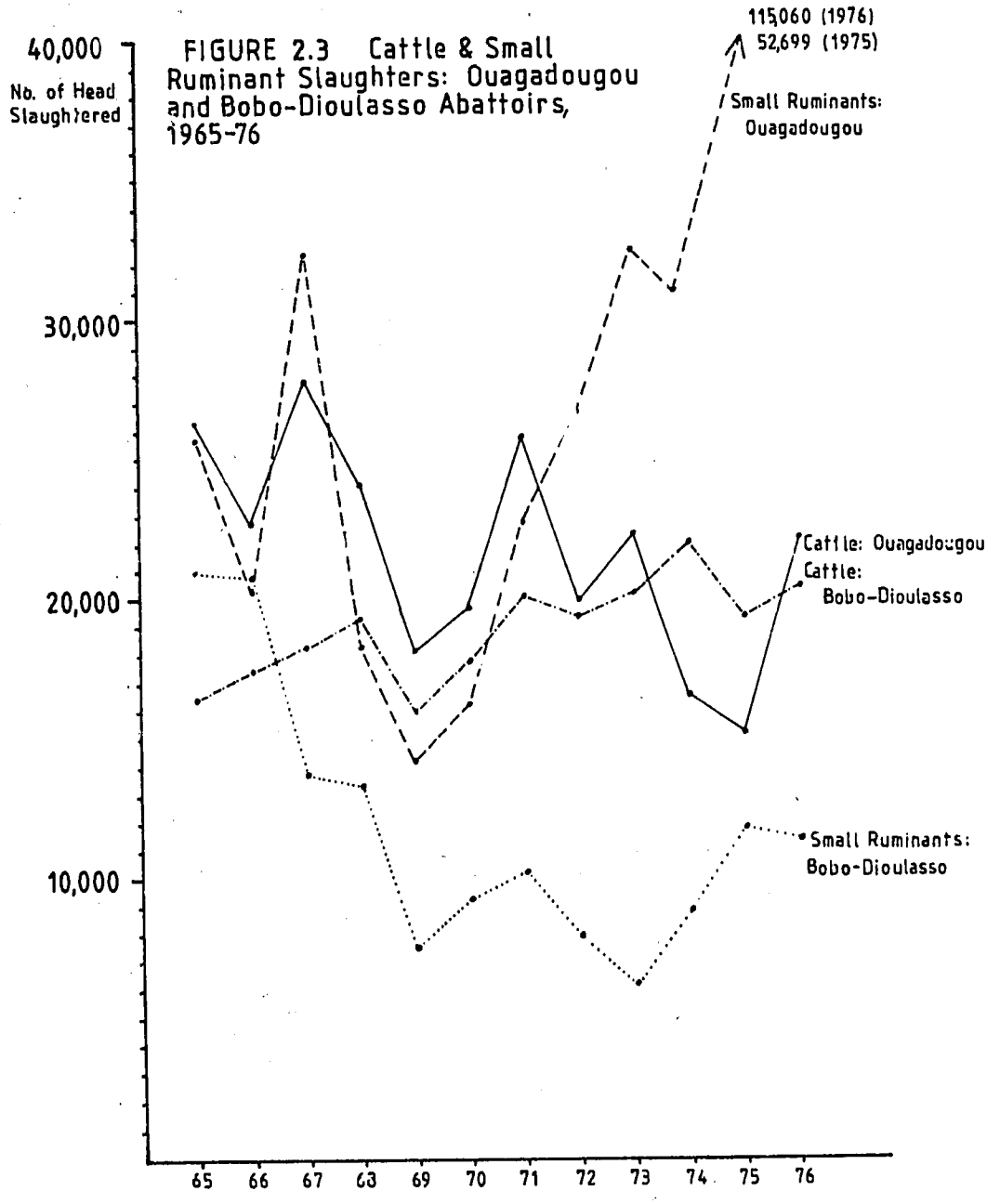
Table 2.3 estimated total domestic meat consumption, including fowl, at 42,950 metric tons. After including edible offals, the total consumption of meat and meat byproducts is around 50,000 metric tons annually. This means that per capita consumption is roughly ten kilograms. In 1966, SEDES broke down this data for major urban consumption (Ouagadougou and Bobo-Dioulasso), small town consumption (17 cities), and rural consumption as follows (SEDES, 1969, Tome I, p. 83):

Fresh Meat Consumption

	Beef	Other Meat	Total
Ouaga/Bobo	31.8 kg	3.5 kg	35.3 kg
17 cities	14.8 kg	4.6 kg	19.4 kg
Rural	3.1 kg	3.5 kg	6.6 kg
Total National Consumption	4.4 kg	3.6 kg	8.0 kg

SCET International later divided the country up into similar categories of major urban (Ouagadougou and Bobo-Dioulasso), semi-urban (thirteen large towns), and rural (including small towns) for purposes of examining per capita consumption. The results are given in Table 2.12. Per capita consumption of red meat (excluding offals and fowl) totals 7.6 kilograms. This may be compared to the figures estimated for neighboring countries (SCET International, 1972, p. 84):

Niger	14.6 kg
Ivory Coast	9.8 kg
Nigeria	7.7 kg
Togo	6.8 kg
Benin	6.4 kg
Ghana	4.3 kg



SOURCE: Direction de la Statistique: Service de l'Elevage, Ouagadougou

TABLE 2.12
ESTIMATED PER CAPITA CONSUMPTION OF MEAT (1967)[a]

AREA	BEEF	SMALL RUMINANTS	PORK	OTHER READ MEAT	OFFALS	FOWL	TOTAL
Major Urban[b]	29.5	1.7	0.6	0.2	7.7	1.0	40.7
Semi-Urban[c]	13.0	2.2	0.4	0.1	3.6	1.2	20.5
Rural[d]	3.0	2.5	0.5	0.3	1.0	1.0	8.5
TOTAL UPPER VOLTA	4.3	2.5	0.5	0.3	1.3	1.0	9.9

Source: SCET International, 1972.

[a]In kilograms per capita.

[b]Ouagadougou and Bobo-Dioulasso with a combined estimated population of 188,000.

[c]Koudougou, Kaya, Ouahigouya, Banfora, Réo, Villy, Nourma, Nandiala, Yako, Tenkodogo, Gourcy, Fada N'Gourma, and Tougan with a combined estimated population of 162,000.

[d]Population estimated at 4,620,000.

If one takes into account the fact that consumption of fish is significantly higher in the coastal countries (around twenty kilograms per capita in the Ivory Coast)[9] than in Upper Volta estimated at only two kilograms per capita by Robinet (1973, p. 10), it becomes clear that though it is a surplus livestock country, Upper Volta's per capita intake of animal protein is low, relative to that of its neighbors.

Several observations arise from these estimates of per capita meat consumption in Upper Volta. First, urban consumption of commercialized butcher meat is three to five times that in rural areas on a per capita basis. Comparing the figures on total tonnage of meat passing through Upper Volta's two major slaughterhouses from Table 2.11 with the national production figures in Table 2.3, one can see that the populations of Ouagadougou and Bobo-Dioulasso consume over 17 percent of the country's production of red meat while accounting for only roughly 5 percent of the population. Second, beef consumption is the dominant component of urban animal protein intake in Upper Volta, accounting for more than three-quarters of urban meat and meat by-product consumption. Conversely, rural populations rely predominantly on other sources of animal protein, most notably small ruminants and in some areas, milk. Finally, one might conclude that, given the high absolute levels of meat consumption in urban areas, the urban consumer's preference for beef in particular, and the high rates of urban growth currently being registered (6 percent for Ouagadougou, Bobo-Dioulasso, and Koudougou, 4 percent for medium sized towns, and 3 percent for small towns versus a less than 2 percent rural growth rate (SCET International, 1972, p. 78)), domestic beef demand is likely to sustain high rates of growth in the future. Obviously, the implications of this will be a decrease in the available surplus beef stocks for export without significant increases in cattle production.

Domestic Slaughter Infrastructure. -- Slaughter in most regions is done with a minimum of equipment and government interference. Bush and village slaughters are carried out on the ground, and the meat is sold without being inspected. Veterinary agents visit some small markets, usually infrequently, to inspect meat and sanitation conditions. Such inspections are unpopular with butchers (because of the chance of losing profits through meat condemnation) and with livestock agents (because of the inconvenience of traveling to remote villages).

The livestock service maintains a system of local abattoirs in most important markets and medium-sized towns. Each slaughterhouse is serviced by a livestock service agent who is responsible for meat inspection, the operation of the abattoir, and the collection of local slaughter taxes. The buildings are most often no more than covered cement slabs, sometimes with railings and carcass hooks. Butchers slaughter the animals and dress the carcasses in traditional fashion, on the ground, and then hang up the carcasses for inspection. There are few scales available in these slaughterhouses, and where they exist they are never used.[10] The veterinary agent records the number of slaughters, collects the abattoir tax, collects the skins and hides, and cleans the facility.

Only two relatively modern slaughterhouses with refrigeration equipment exist in Upper Volta. The one in Bobo-Dioulasso was constructed in 1961 at a cost of 70 million CFA F. The facilities are open seven days a week. The animals are slaughtered by the butchers and their apprentices, as throughout the rest of the country, though the abattoir set-up seems to have been designed for production-line type slaughter. A live animal scale is installed at the animal entrance, but it is said not to have been used in quite some time. Cattle are delivered to the slaughterhouse in the evening and butchers return in the early morning to slaughter. Once again, animals are slaughtered on the floor and the carcasses are later lifted up by means of a hand winch or more often, simply raised up by the apprentices. Working conditions are crowded and sanitation is poor; hot water is not available for cleaning up the slaughter floor. The carcasses are moved toward a hanging scale where the weight is recorded and the tax assessed; the carcasses are then inspected by veterinary agents and delivered to markets in the city by a municipal truck.

The slaughterhouse is located on the rail line into the city, and a spur passes by a loading dock one story above the slaughter level. However, neither the elevator nor most of the chill-rooms work well, and what little meat exports that still originate from Bobo-Dioulasso are loaded onto the train at the main railway station in the center of the city, about four kilometers away. The abattoir employs about twenty permanent employees including five meat inspectors, an equal number of administrators, and other manual laborers. Plans are already underway for renovation of the abattoir to increase capacity, improve sanitation, and modernize its operation. The project is being financed by the World Bank as part of its Western Upper Volta Livestock Development Project.

The most modern abattoir in Upper Volta is located in Ouagadougou. Financed by the FED and built with Italian assistance at a cost of 600 million CFA F, it was completed in early 1974 but did not open until August 1975. Its opening was delayed by resistance of local butchers who protested the location (seven kilometers from the center of town), the method of slaughter,[11] and the fact that all operations would be carried out by abattoir personnel and not the butchers and their assistants. The building is equipped with four slaughter lines, two for cattle and other large stock, one for small ruminants, with a separate room for pork slaughter.[12] All lines are completely mechanized and designed for operation by trained personnel. In addition, there are ten refrigerated lockers (one of which is a deep freeze), hanging scales, incineration equipment, an adjoining rendering plant, and facilities for collecting blood.

The plant employs about ninety workers on the lines plus twenty meat inspectors and administrators. It has a 13,000-metric ton annual capacity, though as Table 2.11 indicates, it is currently operating at only 30 percent of capacity. Chill-room capacity is about forty tons per day, but it too is vastly under-utilized. The abattoir is run by a public agency, the Abattoir Frigorifique de Ouagadougou; its operation is directed by the Livestock Service in conjunction with the BND (Banque Nationale de Développement). Currently, the slaughterhouse provides only carcass preparation services for the local butchers, but the government envisions that it will carry out livestock purchasing and meat exporting operations on its own. The fact is that though the abattoir was constructed with increased meat exports in mind, such exports have decreased precipitously in recent years, and two years of operation have not altered that decline.

Meat Exports. -- One of the major goals of Voltaic livestock marketing policy is to increase the levels of meat exports so that Voltaic butchers and merchants can capture a greater measure of the value added in the livestock marketing chain. Consistent with this is the opening of the modern abattoir in Ouagadougou, plans for renovation of the Bobo-Dioulasso slaughterhouse, and the formation of a publicly supported agency, in cooperation with the Ivory Coast, to operate refrigerated transportation in the two countries.

Currently, meat exports are carried out by private butchers from Ouagadougou and Bobo-Dioulasso. Beef exports normally constitute over four-fifths of all meat exports, with Ouagadougou supplying about two-thirds and Bobo-Dioulasso the remainder of the quantity exported during the last decade (see Table 2.13 and Figure 2.4). Almost all of the chilled meat exports are directed to the Ivory Coast.[13] Meat exports are transported principally by rail in refrigerated cars provided by CODEPAG (a private company) and operated by the RAN (the railroad running from Ouagadougou to Abidjan which is jointly owned by the Voltaic and Ivorian governments). One of the major problems for meat exported in this way is the unreliability of the refrigeration equipment on the rail cars. Breakdowns occur frequently, resulting in substantial meat spoilage. At times these losses can be devastating for the exporter. One of Ouagadougou's largest butchers ceased operation as a meat exporter several years ago because of the tremendous losses he incurred when refrigerated cars malfunctioned twice and completely ruined two large shipments of beef. He has since turned to live cattle exports.

When breakdowns do occur, losses are not necessarily total. When the meat arrives in Abidjan it is inspected by the Ivorian veterinary service. Provided that it is not condemned, exporters may sell to other butchers meat that is unacceptable to the quality butcher shops; these butchers resell the meat in traditional urban markets. The prices offered by these traditional market retailers are considerably lower than those paid by quality butcher shops.

Referring to Table 2.13 and Figure 2.4, one can see that the level of chilled meat exports peaked during the late sixties and early seventies. For the most part, exports from Ouagadougou have dominated, though Bobo-Dioulassso declined as a result of a lack of capacity at the local slaughterhouse. Exports from Ouagadougou increased sharply at this point but soon began to fall, as mechanical problems plaguing the refrigerated railroad cars began to result in major losses for some exporters. Chilled meat exports have since continued to decline to the point where despite the hope of the Voltaic government, they are now lower than at any time since 1958.

TABLE 2.13.

CHILLED MEAT EXPORTS: UPPER VOLTA TO THE IVORY COAST, 1954-1976 (in metric tons)

Year	FROM OUAGADOUGOU Meat Exports	FROM OUAGADOUGOU % of Total Meat Exports	FROM BOBO-DIOULASSO Meat Exports	FROM BOBO-DIOULASSO % of Total Meat Exports	TOTAL MEAT EXPORTS
1954	138	80	35	20	173
1955	219	94	14	6	233
1956	56	75	19	25	75
1957	7	100	-	0	7
1958	54	44	68	56	122
1959	176	81	40	19	216
1960	306	72	119	28	425
1961	366	60	248	40	614
1962	437	52	409	48	846
1963	561	54	471	46	1,032
1964	506	49	528	51	1,034
1965	255	24	791	76	1,046
1966	177	18	829	82	1,006
1967	760	53	670	47	1,430
1968	1,112	66	580	34	1,692
1969	1,040	78	287	22	1,327
1970	850	71	339	29	1,189
1971	749	55	625	45	1,374
1972	565	59	399	41	964
1973	715	84	139	16	854
1974	582	66	296	34	878
1975	326	69	147	31	473
1976	138	65	74	35	212
TOTAL (23 yrs.)	10,095	59	7,127	41	17,222

SOURCE: Statistiques: Direction des Services de l'Elevage, Ouagadougou.

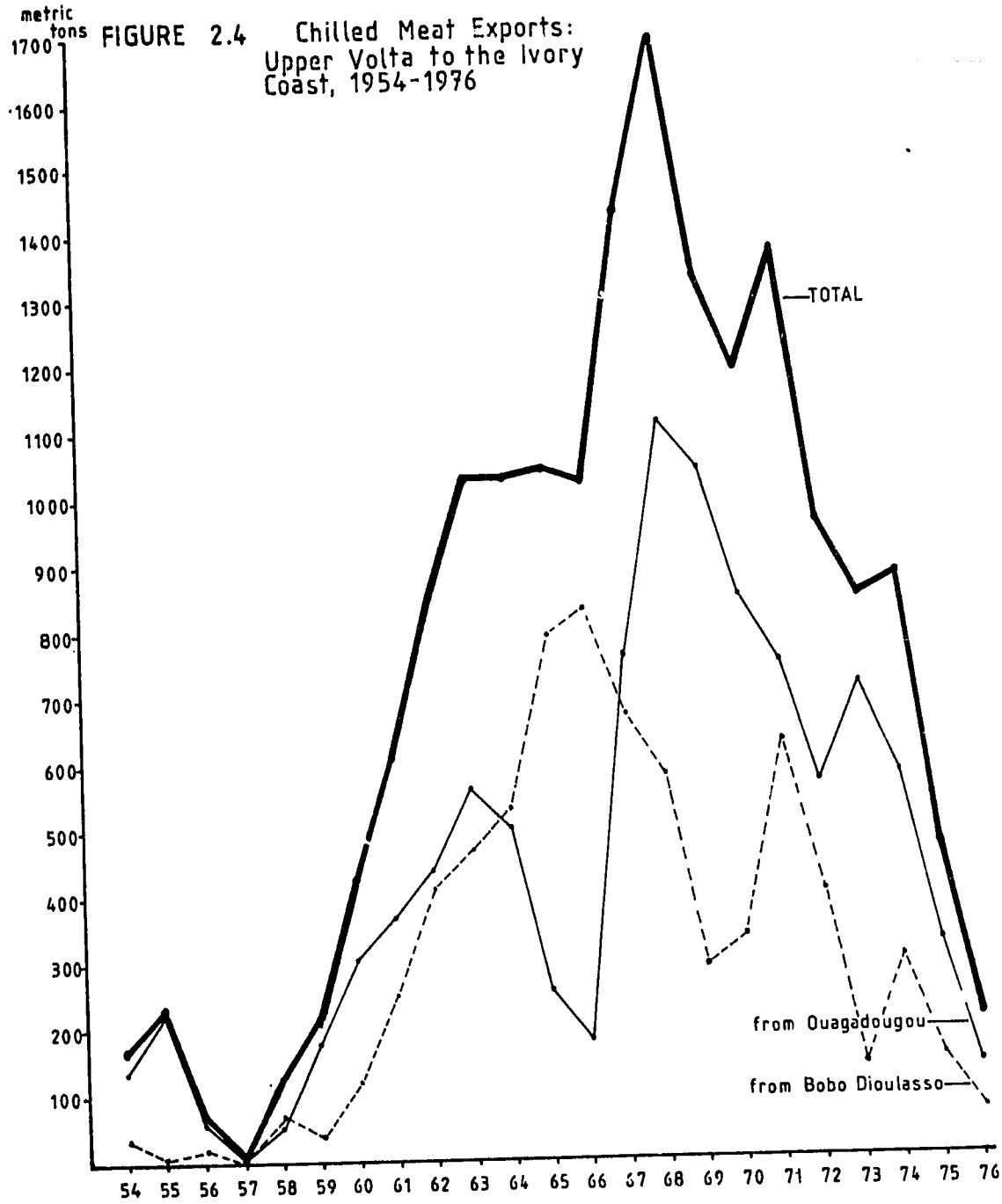


FIGURE 2.4 Chilled Meat Exports: Upper Volta to the Ivory Coast, 1954-1976

SOURCE: Statistique, Services de l'Elevage, Ouagadougou

FOOTNOTES TO CHAPTER II

[1]Déou and Seytenga are two examples of northern markets of importance both for imported and domestically produced cattle for which there are no records kept.

[2]Imports and transits were legally shut off in 1976 by the Voltaic government. In fact, cattle continue to cross the border clandestinely.

[3]Chapter 7 will provide a clear set of definitions for meat marketing agents most commonly referred to as "butchers." For purposes of this discussion, the term "butcher" will be used to identify anyone who commercially slaughters livestock or has animals slaughtered for him, whether he sells meat wholesale or retail or both. Individuals who cut and resell meat in traditional African markets will be referred to as "traditional retailers" while those who sell more identifiable cuts of meat in modern butcheries are here called "European-style retailers."

[4]The French word tas will be used throughout this report to identify meat sold in piles.

[5]Almost all fifth quarter parts are, in fact, considered edible and sold for human consumption. These include hooves, muzzle, and most organs. There is little waste from butchered animals in West Africa.

[6]It can also be noted from Table 2.6 that cattle exports fell by about 12 percent that year.

[7]The cattle export data in Table 2.6 show similar patterns.

[8]Even hides are valued as food in some places in West Africa, though not in Upper Volta.

[9]According to Staatz, Ivorian per capita consumption of fish rose from 18 to 25 kilograms between 1970 and 1975.

[10]During the course of the study a scale was introduced at the abattoir in Kaya. The butchers were indifferent to its use at first though after a while they became interested in having their carcasses weighed for sporting purposes -- to see who had the heaviest animal -- and not for any business purpose. The local livestock agent assigned to the abattoir proudly displayed one day a carcass scale he had discovered in a back room -- either furnished by the livestock service or the remnant of a previous study -- only to find that it was frozen tight by rust.

[11]Butchers objected to stunning of the animals since they felt this would violate Moslem law.

[12]A concession to the Moslem prohibition of pork.

[13]In 1968, 74 tons of meat were exported by truck to Ghana, most of this to a meat packing plant in Bolgatenga. The following year an additonal 55 tons were exported. The plant has since ceased operation and as a result, so have meat exports to Ghana.

CHAPTER III

A FRAMEWORK FOR EVALUATING THE EFFICIENCY OF THE LIVESTOCK MARKETING NETWORK

This chapter begins with a discussion of the importance of an efficient marketing system. It sets out three specific criteria of efficiency and discusses several "external" considerations as well as the role of government policy. The economic literature dealing with agricultural and livestock marketing systems is reviewed, focusing on the body which deals with market structure. The industrial organization model of market analysis is presented with special attention paid to its application to livestock distribution. Alternative effects of market power are examined followed by a discussion of several interesting and complicating issues. The chapter concludes with an explicit statement of objectives and hypotheses, and a summary of the data requirements.

Introduction

Analysis of marketing systems and their role in economic development of developing countries has traditionally taken a back seat to investigation of other issues such as agricultural production, industrialization, growth, income distribution, urbanization, and migration (Abbott, 1967, p. 364). In fact, agricultural marketing has an important impact on most of these other sectors. Even though marketing has relatively recently emerged as a field subjected to intensive study, it has been a long-time target of government intervention throughout the developing world. The objectives and motives behind such interventions are diverse but most often include: 1) claims of inefficient marketing practices (with varying degrees of substantiation); 2) a desire to provide urban centers with adequate and cheap supplies of food; 3) efforts to stimulate agricultural production through producer prices; 4) attempts to increase exports; and 5) cultural or political biases against those engaged in trade. A pattern emerges which shows a paucity of analytical investigations of marketing systems coupled with strong inclinations by governments to intervene for reasons not always grounded in good economics.

Unfortunately, such is the case in Upper Volta in regards to livestock and meat marketing. Hardly any of the few livestock marketing studies specific to the country or even the West Arica region were carried out by economists. The result is a smattering of information that is either descriptive or analytical only in its treatment of technological factors, accompanied by a dearth of economic analysis. Nevertheless, proposals for government interventions in the livestock and meat trade abound; some have already been implemented with unfortunate results. Most exhibit a lack of understanding of the economic objectives of a marketing system and less than clear comprehension of the economic underpinnings of the Voltaic livestock and meat marketing system. This chapter seeks to examine some of the theoretical elements necessary for such an understanding.

Criteria of Marketing Efficiency

An efficient marketing system serves as a link between producer and consumer. As such it is more than simply a delivery system. Efficiency of marketing systems may be judged on three interrelated criteria:

1. The system should handle and distribute goods at the lowest cost consistent with the technological and political conditions and in accordance with producers' and consumers' desires and ability to pay for marketing services.

2. The marketing system should direct commodity flows from all producers willing to sell to all consumption markets where prices reflect a margin consistent with the first criterion of minimum cost for handling and distribution.

3. Prices should serve the economic function of allocating resources to their most productive use such that true costs of production are reflected in consumer prices and that producer prices adequately convey consumers' willingness to pay.

There is a fourth category of largely "external" or social objectives upon which market performance may be judged. This involves goals of more general economic policy such as considerations of equity, employment, and the generation of government revenues. One would also want to consider the possibility of a marketing system failing to take into account social costs or benefits because of their external nature. In cases where a marketing system fails to meet any of the three criteria, where externalities are significant, or where it is seen appropriate to apply the goals of broader economic policy, it is the proper role of government to intervene in a manner that either corrects for the deficiency or effects the desired goal.

Objective 1: Low Cost Distribution. — An efficient marketing system can "maximize" the welfare of both consumer and producer by narrowing to a "minimum" the margin between prices paid by the consumer and those received by the producer. Such a system does not necessarily entail direct sales from producer to consumer, elimination of middlemen, or government marketing activities — though these may be reasonable goals in some cases. More likely, however, healthy competition among marketing agents will serve to reduce marketing costs to the minimum consistent with the existing technological, political, and legal conditions.

The objective of low cost delivery of goods and services can be broken down into two components. The first entails the concept of technical efficiency (X-efficiency). Marketing agents would select those methods of collection, transportation, grading, processing, and resale that make best use of available technology consistent

with prevailing factor prices. This final qualification is important because it allows for the wide differences in factor pricing that exist between industrial and developing nations. Thus, advanced marketing techniques which are rational in Europe or North America may be too capital-intensive for West Africa where capital costs are relatively high and labor rates relatively low.

Technical efficiency in marketing also means that all operations serve some economic function. This particular criterion is at the root of an important alleged imperfection of African marketing systems. That is the contention that there are too many transactions, small merchants, and brokers which impose themselves between the producer and consumer, adding little or nothing to the value of the commodity. Their role is alleged to be traditional or social, without economic justification. Nevertheless, they are rewarded for their "phantom" services and cause the gross margins between producer and consumer prices to be larger than is otherwise necessary. If, in fact, these arguments are true, it can be seen at once that the marketing system in which these accused market "parasites" operate cannot be efficient according to the criteria set forth above. On the other hand, consideration of factors such as the high availability of labor, diffusion of risk and the benefits of speculation to reduce spatial and temporal differences in prices might serve to justify the activities of some of these individuals. It is the obligation of the market investigator to search out such economic functions.

Another element of technological efficiency is the exploitation of economies of scale. Where bulk distribution serves to reduce the unit cost of marketing, one expects to find large sized enterprises. This leads to situations other than atomistic competition, the theoretical ideal set forth against which the marketing system is to be judged. It is still possible to maintain high standards of efficiency, however, given that certain other conditions are met (e.g. easy entry, free flow of information, etc.). To be considered efficient it is essential that firms operate in the range of scales which yield the lowest marketing costs.

The second component of the low cost delivery objective employs the concept of normal profit margins. Not only should marketing agents use those techniques which deliver the appropriate quantity and quality of commodities to the consumer at the lowest factor cost, but they themselves should be rewarded at just the rate necessary to keep them in business with a premium paid for risk bearing and innovation. Under such a system, long-run profits will approximate the going rate of return for capital. In addition, traders will be rewarded with incomes that tend toward the opportunity cost of their managerial skills. This does not mean that returns to capital and labor in marketing will not vary widely in the short run. Changes in supply and demand patterns, introduction of new technology, and government interventions will certainly lead to aberrations in profits. Additionally, some market participants will prove more skillful than others and show continued higher rates of return while incompetent managers will sustain losses until they are driven from the business.

Objective 2: Responsiveness to Production and Demand Conditions.-- A marketing system, especially one for agricultural commodities or livestock, must be capable of gathering the production of a multitude of small producers in widely varying quanitities and qualities, and assembling, processing, and redistributing the commodities so they reach consumers in the quantity and quality demanded. It must be flexible so as to be able to handle increased volume or varying grades as production and demand increase. It must be responsive enough to geographically redirect flows according to the dictates of supply and demand. The achievement of this objective is, to a large degree, dependent upon the existing physical marketing infrastructure which may be outside the control of the marketing agents. A good example of this is the transportation network. Where railroad lines are already operating near capacity, they may not be able to handle increased traffic. If freight rates are competitively set, one would expect them to be bid up and ultimately stimulate construction of increased capacity. But what if transportation charges are fixed by some other mechanism, as is often the case in the developing world where transportation networks are state controlled? Then the increased demand for transportation benefits those fortunate enough to secure some of the limited cargo space -- or more likely , results in black market bidding for space to the benefit of the administrators of the railroad. Even if freight prices are bid up in a legal and competitive manner, the additional capacity needed for the commodity in question may not be enough to justify the enormous fixed investment required to increase overall transportation capacity.

Major infrastructure improvements such as these often require government interventions when deemed socially beneficial. The marketing system for any particular commodity like livestock may be constrained from expanding until such changes are made. Still, the institutional infrastructure indigenous to the marketing system must be capable of responding to changes in supply and demand patterns where technological constraints do not exist. To be efficient, it should not be restricted by tradition alone from servicing new markets or adjusting to technological or political changes. In fact, marketing agents should be constantly seeking out new sources of supply ready to service new consumer markets, and adopting new technologies where available to best respond to the conditions of production and demand.

That this objective of the marketing system is of major importance in developing countries like Upper Volta should be evident from the fact that social and economic conditions dictate increased volumes of primary sector commodities to be marketed. As production increases, resulting in an increase of marketable agricultural surpluses; as urbanization continues and incomes rise, leading to increased demand for marketed foodstuffs; and as governments continue to encourage exports and integrate national economies into regional and world markets, leading to increases in international trade, the marketing systems of developing countries will be called upon to expand and adjust more and more. Should they not be equal to the task, interventions will be necessary to provide the needed services.

Objective 3: Pricing System that Efficiently Allocates Resources.--An efficient marketing system enables prices to serve their economic function of allocating resources in an efficient manner, directing inputs to their most productive use and consumer goods and services to those willing and able to pay for them. On the production side, when prices truly reflect consumers' willingness to pay for commodities, they serve as incentives

to production. Adjustments in demand should be reflected in changes in consumer and ultimately producer prices.[1] An increase in demand which results in the price of a commodity rising calls additional resources into the production of the good. Contrarily, decreases in demand and commodity prices should signal producers to decrease output and move resources into the production of goods and services that consumers value more. Jones remarks on this most important function of an efficient marketing system for agricultural commodities in developing nations:

> "An efficiently integrated and accurately responsive market mechanism is of critical importance for optimum allocation of resources in agriculture, for stimulating farmers to increased output, and for assurance of regular and low cost supplies of foodstuffs and raw materials to the other sectors." (Jones, 1971, p.22).

In order to achieve this objective of informing producers of consumers' desires through the price system, several conditions should be met. First, producer prices should reflect the willingness of consumers to pay for the commodity. Adjustments in consumer prices should be carried back to producers and not dissipated in the marketing network. Secondly, price information should be clear and easily attainable so that producers can plan accordingly. Thirdly, prices should be sufficiently stable in the short run to enable producers to plan their activities without fear of drastic changes in price. Drastic changes could lead to risk averse behavior and hesitancy to respond to changes in the long run. As already noted, an efficient marketing system should develop mechanisms which will serve to reduce short-run fluctuations in price. Where they fail, government may want to intervene and in some measure guarantee prices over the producers' planning horizon. Long-run price stabilization may have merit as well, as part of an incomes policy, though in this case there is greater risk of defeating the allocative function of prices.

The other side of the coin is the degree to which prices adequately portray the true costs of production and delivery to consumers. Once again, it is a question of how well the marketing system conveys the signal between producers and consumers. As conditions affecting production change, such as input costs or technology, they should be transmitted to consumers in the form of price adjustments. When prices respond in this way, the quantity demanded may shift and signal a reallocation of resources into or away from the production of that commodity. Once again, government may want to intervene to stabilize or subsidize consumer prices, especially where urban growth rates are high or where supplies are particularly susceptible to variations in external factors such as weather. When such price policies defeat the ability of the pricing system to signal secular adjustments in production costs, however, they again defeat the allocative objective of prices.

Other Considerations and Government Policy. -- A marketing system may be judged on other grounds, largely external in nature. These considerations fall into three main classifications: the external effects of production or consumption activities, the inability of the sector to procure adequate inputs or satisfy social wants which may be considered public goods, and the role of the system in advancing general goals of social or economic policy. Where appropriate, government marketing policy should be directed at these issues; at the same time, though, those government policies become an integral part of the marketing system and should be subject to the same criteria of evaluation as the unencumbered indigenous system.

The focus of these considerations may overlap to justify a single policy approach. For example, the construction of public abattoir facilities may be based on locational criteria (externalities), the public health aspect of slaughter (public goods), and the desire to modernize through increased use of advanced technology (broad policy goal). Also, in many developing countries the marketing system is perceived as a major instrument for implementing government policy such as revenue generation or foreign trade policy. The degree to which the operations of the market lend themselve to government intervention is thus an important consideration. Most often this criterion is consistent with those internal standards of efficiency. An efficient and well organized marketing system is most easily taxed, subsidized, or otherwise directed to respond according to broad social interest.

The range of government policies which may be enacted to effect change in livestock and meat marketing is quite broad. Some of those most commonly implemented are listed in Table 3.1. Policies are distinguished in the table in three ways. First, livestock production-oriented policies have important effects on marketing but are distinctive from direct marketing approaches. Second, policies are divided according to whether they are livestock-specific or more general in nature, perhaps having secondary effects on the livestock sector. Third, policies are divided (somewhat arbitrarily) among technological, economic, and political-legal categories. An efficient set of policies will be coordinated so that they accomplish the explicitly stated external goals and satisfy the internal criteria of marketing efficiency.

The Problem

It has often been asserted that West Africa's cattle and meat marketing system suffers from imperfections which prevent it from operating in a manner consistent with the competitive model and which thus necessitate a substantial reform of the entire system (SEDES, 1969; Bishop, 1972; Bary, 1971; and USAID, 1975). Several of the alleged shortcomings are:

1. an excessive number of middlemen and intermediate transactions between producers and consumers;

2. imperfect information flows between markets;

TABLE 3.1

GOVERNMENT POLICIES AFFECTING THE LIVESTOCK SECTOR

	Types of Intervention	
	Production Oriented	Marketing Oriented
Technological		
direct:	-Breed improvement -Animal health projects -Increased intensive forrage cultivation -Government ranching schemes -Range management	-Cattle trails and holding parks -Market infrastructure improvement -Slaughterhouse construction -Meat storage facilities -Meat processing
indirect:	-Water projects, wells and irrigation -Opening new land through disease control	-Road construction -Improved rail service -Improved communications -Grain storage by herders
Economic		
direct:	-Herder cooperatives -Improved availability and reduced costs of agro-industrial by-products -Head taxes on livestock	-Regulation of market place conduct -Livestock and meat price policy -Government marketing enterprises -Marketing taxes and duties -Trader or butcher cooperatives -Livestock demand generating projects (traction, herd reconstitution)
indirect:	-Policies affecting substitutes in production (cash crop programs) -Labor policies, urban employment	-Grain marketing policy -International trade policy (tariff reductions, customs unions and preferences) -Credit availability
Political		
direct:	-Land tenure and water rights -Taxation	-Licensing of marketing agents -Meat marketing health codes -Government marketing monopolies
indirect:	-Emancipation of slaves -Enforcement of legal contracts and laws regulating "entrustment" systems	-Foreign exchange control and trade policy -Enforcement of contracts, debt restitution, liability findings in damage cases

3. exploitative practices by traders wielding substantial market power;

4. imperfect credit markets;

5. transportation bottlenecks; and

6. a lack of marketing infrastructure including modern slaughter-houses, markets, scales, etc.

These criticisms are consistent with others voiced in regards to agricultural marketing systems in developing countries throughout the world. The sources of, bases for, and remedies suggested by these allegations are diverse. In general, though, they break down into those directed at the economic (and sometimes social) organization of the market and those directed at the technical failures of the marketing system. Though the distinctions are not always clearcut, the former most often lead to profuse railing against market middlemen while the latter are generally seen to be outside of their control. Although both types of market failures must be considered in order to design and implement an effective marketing policy, the remainder of the chapter focuses on the issue of the economic structure of the market.

Agricultural and Livestock Marketing in the Literature. -- Research on traditional marketing systems has yielded a number of studies on the market structure for a variety of commodities in many parts of the world.[2] Some of the earliest intensive work was done by Bauer (1954) and by Bauer and Yamey (1968). Their work covers a wide range of markets, commodities, and issues within the geographical context of the former British West African colonies. Jones (1972) compiled the work of four investigations on staple food crop marketing in West and East Africa. In a work focusing on first-buyer or potentially monopsonistic relationships Wharton (1962) examined rubber marketing in Malaya. Stifel (1975) also examined southeast Asian rubber marketing, but dealt with the entire vertical set of relationships rather than partial analysis at one level. A detailed analysis of the market structure for grain in India is presented by Lele (1971).

Besides their diversity in terms of the specific subjects of their attentions, the above works also represent a variety of approaches. Still, whether the focus is on monopsony power directed against impoverished producers or monopoly power used against urban consumers, a single or multi-staged system, agricultural or manufacture goods, domestic or international trade, two broad, common conclusions are apparent. First, the traditional marketing systems studied are either highly or "workably" competitive, yielding efficient results (as defined in the previous section) within the constraints imposed by government, technology, or resource endowments. Second, the government policies that were designed to correct the unsubstantiated imperfections in the marketing system are themselves frequently responsible for marketing inefficiency and other adverse effects on production and income distribution (Brown, 1978, p. 91; Harriss, 1979, pp. 1, 58-59).

One of the major criticisms of both agricultural and livestock marketing systems in underdeveloped countries has been that producers sell their prodcuts under disadvantageous conditions. Suggested causes of this situation include: the seasonal characteristics of production and demand; the inability of producers to make informed choices over marketing alternatives; monopsony power in the hands of market middlemen; and the institutional (both social and physical) deficiencies of the marketing system (Bauer and Yamey, 1963; Jones 1972; Abbott, 1967; Wharton, 1962). There is general agreement that producers' bargaining positions are strengthened to the degree that alternative marketing outlets exist, that they are known to the producers, and that producers are willing and able to seek out these options. These conditions suggest a careful examination of four features of livestock sales by herdsmen: first, the competitiveness of first buyer markets; second, the herder's access to market information; third, the technical, social, or economic conditions which might restrict herders from acting upon marketing alternatives; and fourth, the openness of marketing arrangements.

While various aspects of livestock marketing in West Africa and Upper Volta have been studied, critical economic evaluation of market structure and performance is lacking. Something of a blueprint for such of a study and an excellent primer on the subject of livestock and meat marketing in developing countries was prepared for the FAO (Fenn, 1977). Two major works perpared by French agencies provide a wealth of descriptive information on production and marketing in central West Africa (SEDES, 1969) and Upper Volta (SCET, 1972). A number of other studies and reports provide information and analysis of specific segments of the marketing chain. This includes some primarily anthropological views of marketing by herders (Dupire, 1968; Rupp, 1975), technical reports on production (Peretti, 1976), technical marketing studies (Bishop, 1972; Bary, 1971), and economic anthropology studies of butcher and trader relations (Cohen, 1963; Hill, 1968).

Using the SEDES study as his major source, Stryker (1973, p. 32) rejected the assertions that the West African livestock marketing system is inefficient and commended its performance:

> The commercial chain which starts with the herder or farmer and ends with the consumer is, in West Africa, highly complex, but efficient. It is capable of gathering cattle in small lots over a vast area and moving them hundreds of kilometers to the urban centers of consumption... [T] his is accomplished at very low cost.

Still, neither Stryker nor the others who have researched the issue of West African livestock and meat marketing efficiency used a framework which enabled a systematic analysis of market structure and comparison to the competitive or some other economic model as a standard of efficiency.

The Market Model. -- The framework for evaluating the Voltaic livestock and meat marketing system used here is based upon the Harvard model of industrial organization analysis set forth by Bain (1959), subsequently

developed by industrial organization economists (Scherer, 1970; Shepherd, 1979), and commonly used to evaluate market efficiency in both industrial (Adams, 1977) and agrarian (Lele, 1971) settings. This method examines the causal relationships from the basic conditions of supply and demand, through market structure and conduct, to market performance (see Diagram 3.1).

Independent analysis of the very complicated basic conditions is beyond the scope of this work. On the supply side, the economics of traditional livestock production and pastoralists' behavior is extensively covered by animal scientists, economists, and anthropologists (Dahl and Hjort, 1976; Delgado, 1978, and Eddy, 1979). Still, such important factors as long-run price responsiveness of supply are not well understood. Investigation of herders' livestock marketing behavior in this study sheds some light on some of the questions of short-run marketing behavior but not the broader issue of production economics.

Examination of market structure entails looking at both the functional organization of trade and the economic determinants of market power -- market share, concentration ratios, barriers to entry, vertical and horizontral extensions, and cost structures. Market conduct includes examination of pricing behavior, marketing patterns, collusion among market participants, willingness to adopt new technology, and the use of market power to exploit and reinforce anti-competitive market structure. Finally, the model requires an analysis of market performance, including profit margins, measures of technical and dynamic efficiency, responsiveness to changing basic conditions, employment, equity, and other socially relevant questions.

The standard against which the observed structure, conduct, and performance of the livestock marketing industry will be measured is the competitive model. Deviations from the model may be evidenced in a number of forms (monopoly or monopsony in the extreme) and for a number of reasons. Wharton (1962, pp. 28-29) enumerates the factors which bestow market power upon middlemen purchasing agricultural commodities from farmers. But market power exhibited anywhere in the marketing chain is likely to result in adverse economic consequences which can at once affect both producers and consumers. The theoretical benefits of competition in marketing are the achievement of those objectives of marketing efficiency noted earlier. Stated somewhat differently, they are: equity, technical efficiency, allocative efficiency, and dynamic efficiency. Where competition exists traders are forced to employ the lowest cost techniques and search out new technologies. Margins will be kept at the minimum consistent with continued service. Exploitation of consumers or producers by restricting output or price discriminiation is not possible. Excessive middlemen and other redundant labor could not be supported. However, this may not always be clearly evident.

The livestock and meat marketing system like most distributive industries has three characteristics which make it difficult to arrive at a single picture of market structure, conduct, or performance. The first relates to the vertical "depth" of the industry. Even when dealing with a commodity as specific as beef one is faced with a multiplicity of transactions and product transformations. The marketing chain is typically "long" as cattle and beef change hands from two to seven times from herdsman to beef consumer. The second difficulty lies in the geographic "width" of the industry. To the extent that cattle markets are regional or meat markets local, the structure, conduct, and performance may vary from "market" to "market". The third difficulty is that market power may be exerted on both the buying and selling side of any market, and at many stages. As will be shown below, the effects of monopoly and monopsony power are similar, namely restricted output and inflated margins; still, the opportunities for market power to be employed are increased. Thus, one must be prepared to look for evidence of market power at several stages of marketing, in different geographic locations, and on both sides of the market.

The Effects of Market Power. -- For the purpose of illustrating the effects of market power in a distributive industry the four general cases which delimit the possibilities are presented in simplified form. It will be assumed that sales of cattle by herdsmen and purchases of meat by consumers are competitive. These assumptions of competitive structure at the end points of the marketing chain are realistic in the context of Voltaic cattle production and retail meat marketing. It is also assumed that marketing costs are constant over the relevant range of exchange and that distribution (and butchering) takes place as a one-stage operation. In fact, while the former has some validity in certain aspects of livestock marketing and processing [3], the latter is far from realistic. The results are nevertheless instructive in illustrating the effects of market power on the quantity marketed, producer and consumer prices, and the gross margins. The relaxation of these assumptions as well as other complications are discussed later.

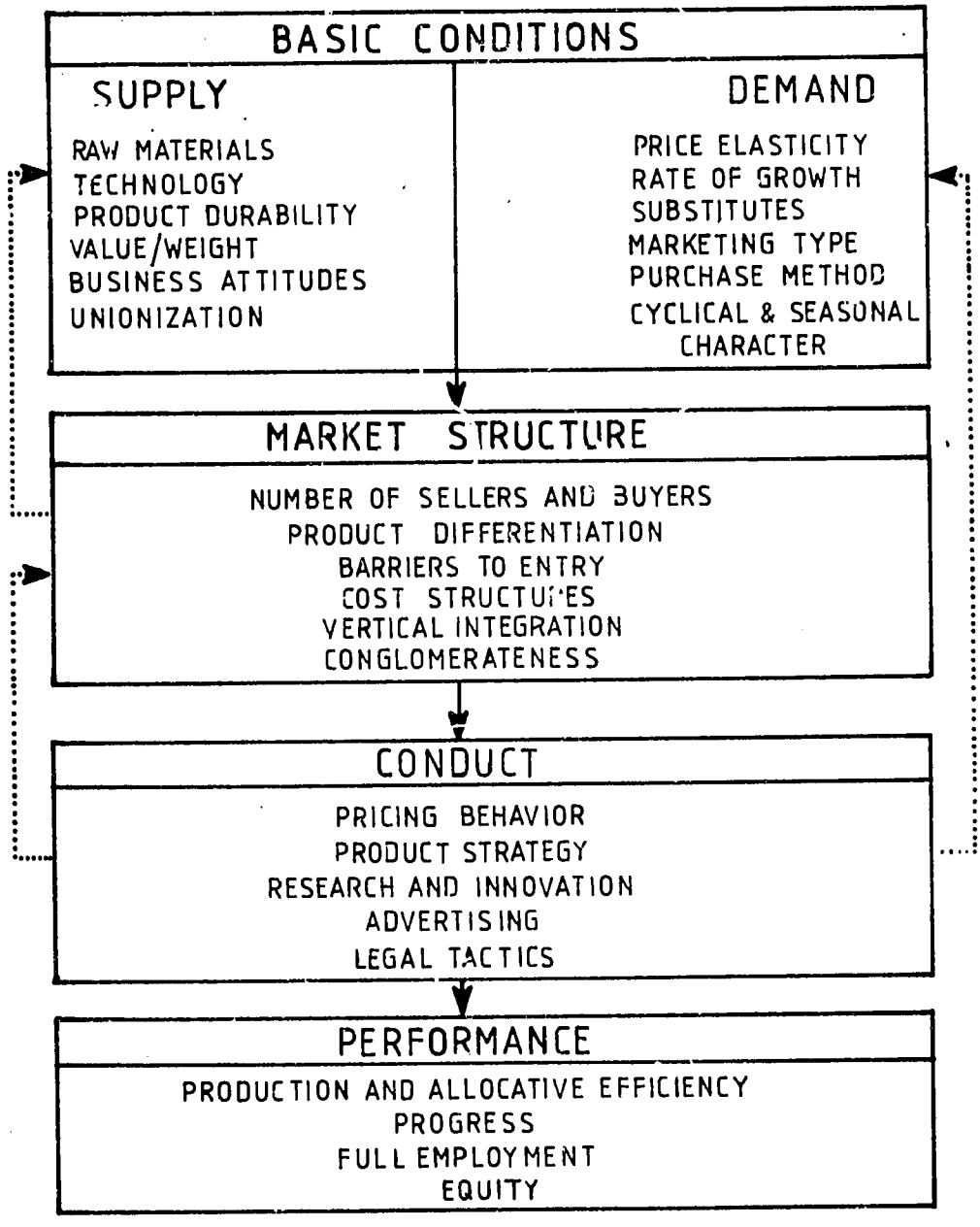
The four general cases are presented in Figures 3.1a through 3.1d[4]. They represent respectively a) perfect competition in the marketing system; b) monopsonistic purchases of cattle from herdsmen; c) monopolistic sales of beef to consumers; and d) the case of dual monopoly[5].

Figure 3.1a shows the results of a perfectly competitive marketing system. S_c represents the aggregate supply of cattle and D_b the aggregate demand for beef within a closed market. Corresponding to these primary supply and demand curves is a pair of derived curves which takes into account the lowest margin consistent with marketing and slaughtering costs, including all normal profits. Thus, S_b is the supply of beef where the vertical distance between it and S_c is the marketing margin, m. Similarly, D_c is the derived demand for cattle, differing from D_b by m also. Market equilibrium is achieved at output q where the price of cattle is p_c and the price of beef is p_b. The difference between the prices of cattle and beef is the marketing margin, m.

Economically, the result is filled with desirable properties. S_b is in fact the sum of the marginal cost curves for cattle production, marketing, and slaughter; thus price is equal to marginal cost fulfilling the condition for allocative efficiency. X-efficiency in marketing is assured by the pressures of competition. The absence of excess profits indicates that producers are receiving their full share of consumer expenditures and that consumer prices likewise adequately reflect the costs of production and marketing. Nothing interferes with the allocative function of prices.

Figure 3.1b presents the case where the marketing firm is a monopsonist in the factor market (cattle buying) but a competitor in the product market (retail beef sales). Such a case might exist where a cattle buyer

DIAGRAM 3.1 A MODEL OF INDUSTRIAL ORGANIZATION ANALYSIS



SOURCE: Scherer, F. M. Industrial Market Structure and Economic Performance, 1970, p.5.

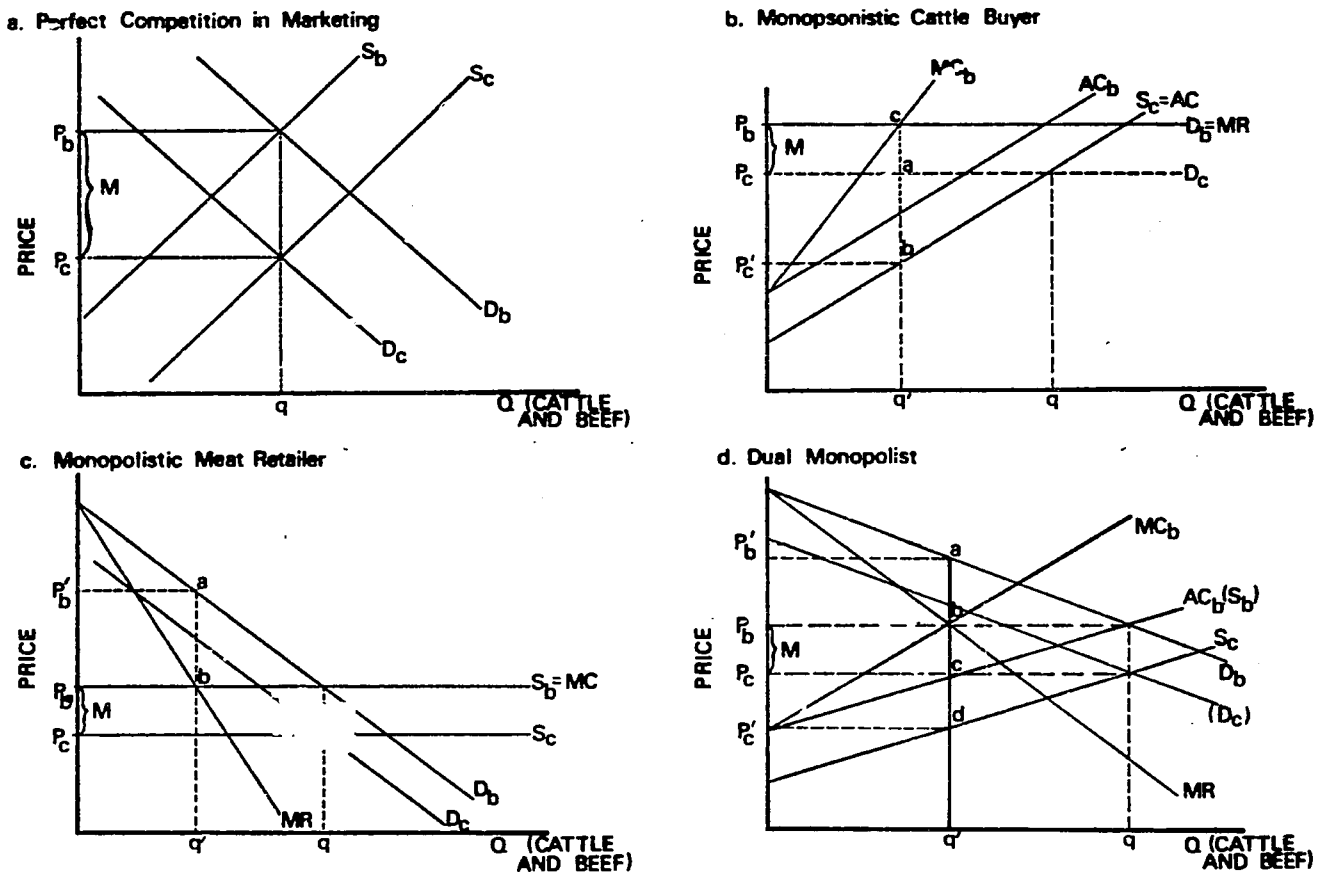


FIGURE 3.1

THE EFFECT OF MARKET STRUCTURE IN DISTRIBUTIVE INDUSTRIES

has market power in a subregion[6] but resells the cattle or meat in a national market. Alternatively, one might consider that it represents the case of a firm which holds the legal monopoly for marketing some primary commodity in a country and then resells competitively on the world market[7]. In this case S_c is once again the cattle supply curve describing the response of herders in the relevant market (the subregion in which the cattle buyer is a monopsonist). It is also the average cost curve of cattle for the monopsonist, AC_c. The monopsonist's average cost of supplying beef is AC_b (the old S_b) which lies above AC_c by the average -- and in this case constant --marketing cost, m. However, the monopsonist also has a marginal cost curve for the beef he delivers, MC_b, which lies above the average cost curve for beef, AC_b[8].

On the demand side, the firm is a competitor and thus a price taker with a perfectly elastic demand curve for beef, D_b, at the competitively determined price p_b. That price is also the firm's marginal revenue for each unit of beef sold. The profit maximizing monopsoist will buy cattle and sell meat where $MC_b = MR_b$ and thus at q'. He will purchase cattle in the subregion at a price p'_c and resell the beef at p_b. His costs being m per unit he makes excess profits equal to the area $p_c p'_c$ a b. Had cattle been purchased competitively in the subregion the output level would have been q with a corresponding cattle price of p_c. Traders would have been unable to maintain any monopsony profits because of competitive pressures. Thus the effects of monopsony power in cattle buying in the subregion in contrast to the competitively determined results are:

1. restricted output,
2. lower cattle prices paid to herdsmen, and
3. excess profits for the monopsonist.

Furthermore, the monopsonist does not have the competitive pressures which force him to utilize the most efficient marketing techniques. An inefficient monopsonist might well incur marketing costs greater than m, further reducing the profit maximizing levels of cattle purchases and prices[9].

Because the case of the monopolist who is a competitor in his factor markets is much more widely discussed in theory and is largely analogous to the monopsonistic example discussed above, it will not be discussed in detail here. The graphic representation is presented in Figure 3.1c. Plausible examples in livestock and meat marketing are less common than examples of the case of buying side power. This is because a large portion of the commercial butchering industry is located in cities and towns where competition among butchers is likely to be keen. In small towns and villages where the small size of demand is likely to suggest monopolistic butchering (because of economies of scale since the minimum efficient scale of slaughter is one animal!) there is likely to be some degree of market power on the cattle purchasing side as well. Still, one might consider the case of the small town butcher who competes in the cattle market with exporters and butchers from other towns but is able to exert monopoly power in his beef market. Alternatively, this case might represent the legally monopolistic importer of meat, buying on the world market at "competitive" prices and reselling domestically as a monopolist. The two relevant examples most closely resembling this case are AGRIPAC in Ivory Coast and the Meat Marketing Board in Ghana[10].

The results of the monopoly case are as in the monopsony case. Meat sales are restricted to q' and retail meat prices in the monopolist's market are raised to p'_b. The monopolist makes excess profits represented by the area $p_b p'_b$ a b. The incentive to operate efficiently is reduced below what it would be if the market were competitive.

The case of dual monopoly, where the marketing and processing firm is both a monopsonist and monopolist, simply compounds the undesirable properties of the two single-market power cases. Figure 3.1d gives the graphic illustration of the effects of monopoly power in both of the firms' markets. The dual monopoly output of q' is far below the competitive output of q. Cattle prices to producers are lower at p'_c than at the competitively determined p_c while consumer beef prices are raised above their competitive levels (p'_b and p_b respectively). The dual monopolist makes profits at the expense of both producers and consumers; his monopoly profits are represented by the area $p_b p'_b$ a b and his monopsony profits by $p'_c p_c$ c d.

The likelihood of such a case would appear even more remote than the presence of monopoly power on either side of the market alone. Still, several possibilities can be noted. The single butcher in a small town or village might have monopsony power in the purchase of old cows or other cattle which would not be desirable for export or trek to distant markets. At the same time this butcher might easily monopolize local beef sales if the daily demand is not much greater than the minimum efficient scale of slaughter. Or one could again consider the case of a government authorized monopoly such as a marketing board with monopoly power in purchase and resale markets. Lastly, this case is illustrative of the tendencies when several trading enterprises exist at one or several vertical levels and recognize their interdependence. In such a situation they can maximize their joint profits by colluding and behaving in a manner similar to the single dual monopolist. Whether they are able to do so and how they do so are the issues of greatest concern to economists studying oligopolistic industries.

Other Characteristics of the Model. -- This then is the simple picture. The possibilities that arise when the basic assumptions are relaxed or other complications interjected are limitless. Output may be less restricted and prices closer to competitive levels when market power is imperfect (as it almost certainly must be). But in a marketing system with numerous vertical stages, monopoly power at several levels can compound the undesirable effects, reducing output below even that found in the simple dual monopoly case. It is also likely to widen the gross marketing margin, reduce cattle prices to producers, increase retail meat prices, and diminish the responsiveness of the two to each other.[12] It would be pointless then to try to consider even a limited set of complicated vertical conditions before examining the actual structure of the marketing system. The approach that is used here is to be aware of the general properties of market power, investigate occurrences of market power, and then consider the conditions applicable to the specific case.

A related question involves an explanation of the number of vertical stages in the marketing system. One of the common complaints is that there are too many middlemen performing an excessive number of

intermediate transactions. The implication is that this situation is inefficient even in the absence of market power. Clearly, however, either the intermediary is performing a useful and desired service or he is not. In the first case the answer is resolved in an analysis of market power and vertical economies. Bauer (1963, chapter 2) justified multiple stage marketing by explaining the middlemen's functions of bulking and debulking, expanding geographical distribution, increasing turnover, and substituting low cost labor for expensive capital. The multiplicity of productive trading links has its danger in the increased opportunity for market power to be used.

Still, the second possibility exists that transactions take place which serve no useful function or which could be made more efficient by means of vertical integration. The question must be asked, then: why are they tolerated? Since they serve no purpose, competitive traders would be motivated to bypass those stages unless forced (by some power factor) to do otherwise. Even traders with market power should not be inclined to buy from or sell to someone who adds no value but reduces the possible profit of the monopolist. In any event, such a condition would be attributable (in large part) to slack management tolerated because of monopoly power at an adjacent stage of distribution. Thus excessive vertical stages are likely to be a consequence of market power[13] and not a separate issue.

Two factors which might also affect the impact of market power on market performance are cattle supply responsiveness and the nature of marketing costs. Though it is neither the intent nor the capability of this study to examine the supply responsiveness of traditional cattle raisers, the subject must nevertheless be considered in terms of its implications on the above analysis. Its importance can be seen at once if one considers that the ability to capitalize on market power is directly related to the inelasticity of supply or demand (Wharton, 1962, p. 27). Unfortunately, measures of price responsiveness of Sahelian cattle producers are not available. Studies elsewhere have suggested that herdsmen's sale decisions with respect to price are complicated by the store of wealth and capital goods nature of cattle (Doran et al., 1979; Jarvis, 1974). It is thus possible that some measures of supply will be inversely correlated to price. Even in the short run, target income hypotheses of cattle offtake suggest similar perverse relationships. The effect of such cases is to suggest that monopsonistic traders would expand output beyond competitive levels should they reduce cattle prices, a potential utopian situation for monopsony exploitation. Whether such extreme conditions actually hold can only be a matter of conjecture in the absence of empirical results specific to Sahelian pastoralism. Still, it is not unreasonable to assume that short-run cattle supply is relatively price inelastic and thus susceptible to monopsony exploitation.

The issue of marketing costs is more straightforward. Increasing costs of marketing will likely aggravate the restrictive tendencies of market power by widening the gap between average and marginal costs. On the other hand, the decreasing cost (economies of scale) case offers one of the few justifications for high trader concentration -- though not for trader market power. The problem is that the two are not easily separable and thus the benefits of technological scale economies may be easily offset by the restrictive and x-inefficient tendencies of market power. Where the minimum efficient scale almost requires monopoly, compensatory measures may be in order (herder selling cooperatives, for example).

One final issue of a theoretical nature which merits consideration is the possibility of price discrimination. A common method of extracting excess profits in imperfectly competitive markets, discrimination occurs when the buyer or seller is able to offer or charge different prices to a variety of buyers or sellers. It does not include situations where such differentials are justified by different marketing costs.[14] In its purest form price discrimination entails charging each customer a price equal to his reservation price for each unit. Thus, on the selling side, first degree discrimination transfers all consumer surplus from consumers to sellers. The result is that the monopolist no longer has the same marginal revenue function as when he sold all of his output at a common price. When first degree price discrimination allows each unit to be sold at the appropriate reservation price of the buyer, the firm's demand curve becomes the marginal revenue curve.

The results of price discrimination are threefold. First, prices will be distributed in some pattern above the marginal cost of the last unit sold. Thus, some prices may be above the simple monopoly price and some below. The number of different prices charged depends upon the ability of the seller to separate markets. Secondly, output will exceed the single-price monopoly output; in the case of first degree price discrimination the quantity sold will be the same as in perfect competition. Thirdly, profits are raised over the level achieved in the single-price monopoly case. This entails a direct transfer from consumer surplus.[15]

Is price discrimination bad? The answer is: not necessarily. In terms of output and static resource allocation, price discrimination is likely to be an improvement over single-price monopoly; indeed, it yields the same results as competition on those grounds when it is of the first degree. In terms of prices, it enables some consumers to purchase commodities under monoploy at prices below those that the monopolist would otherwise charge. On the supply side, it enables some producers to sell at prices above those that the buyer would accept under nondiscriminating monopsony. The major criticism of discrimination independent of its pure monopoly costs, is that it has adverse equity effects.[16] This is evident in the transfer of consumer or producer surplus to the market middlemen. Whether such transfers represent a social cost may not always be clear. It depends on who is doing the discriminating. Such transfers may be remedied through taxation and subsidy, though realistically only in an aggregate sense. Finally, where monopoly is entrenched, one must still consider the possible effects of increased output and improved allocative efficiency.

In conclusion, price discrimination is often a symptom of monopoly power, especially where marketing conditions are characterized by individual bargaining and heterogeneous commodities.[17] Where it occurs it is likely to relieve some of the static allocative efficiency disadvantages of monopoly but only at the cost of less certain prices and an aggravation of the equity problem inherent in monopoly, and these other problems are likely to have a negative impact on long-run resource allocation.

Hypotheses and Data Requirements

The performance and structure of the Voltaic livestock marketing system will be evaluated in light of the framework just presented. The methodology includes 1) a thorough description of market organization, 2) an investigation into the existence of those conditions likely to result in competitive marketing, 3) direct measurement of marketing efficiency through standards such as new margins, 4) investigation of the causes of established inefficiencies, and 5) suggestion of appropriate policy response to those problems.

The following specific hypotheses will be examined to establish the degree of marketing efficiency:

1. The structure of the Voltaic livestock and meat marketing system is competitive with an absence of factors which are likely to yield market power to participants at any level.
2. Information is readily available to both producers and traders, reducing the likelihood of inordinate bargaining strength.
3. There are no redundant middlemen or transactions.
4. Marketing margins are in line with transportation, handling, and slaughtering costs.

Data Requirements. -- There are six categories of information necessary to achieve the objectives of this study. They are:

1. General information on the marketing system.
2. Herder sales of livestock.
3. Market information.
4. Costs.
5. Trader, intermediary, and butcher histories.
6. Export information.

1. General information: An important requirement of any such investigation is, of course, as complete a knowledge as possible of the general organization of trade, location of producing zones, markets, slaughterhouses and other marketing infrastructure. It also involves accumulating much of the detailed information on production and marketing systems found in the first two chapters. Finally, it covers and understanding of government policy activity in the marketing system.

2. Herder sales information: The data required of herdsmen are those relating to the competitiveness of the purchases of their cattle, their access to market information, and their willingness, ability and actual efforts to seek out optimal market conditions. This entails collecting information on the nature and price of sales, motivations for selling, relationships with market participants, and some backgound information.

3. Market information: The organization and functioning of selected markets necessitates observation, direct interaction, and accumulation of quantitative information. The latter includes flows of trade (origin and destination of livestock), types of sellers, characteristics of cattle, and prices.

4. Costs: All costs associated with each stage of marketing and slaughter are required. These include transportation (both explicit and implicit), transaction costs such as brokers' commissions, official fees (taxes, licenses, duties), and slaughter costs.

5. Middlemen information: Many of the structural determinants of marketing can be ascertained only through direct communication with the market participants themselves. These include vertical integration, ease of entry, professional formation, and some cost information. Additionally, these interviews are required to corroborate independent observations of conduct and performance.

6. Export Information: Specific information on exports similar to that collected at markets is necessary to evaluate competitiveness, information flows, and cost of international marketing of cattle.

The following chapter describes in some detail the methods employed to collect this data and presents background information on survey participants which may be of independent interest.

FOOTNOTES TO CHAPTER III

[1]In terms of production incentives, there is clearly much to be said for the objective of reasonably stable producer prices, at least over a period of time adequate to cover planning, planting, harvesting, and marketing of most agricultural goods. In an efficient marketing system there are mechanisms such as storage and spatial arbitrage which should act to stabilize producer prices over this time period.

[2]Although a bit dated now, an idea of the breadth of coverage can be gathered from Abbott's (1967) overview of the development marketing literature.

[3]Only the existence of significant technological economies of scale will alter the analysis.

[4]The following discussion and figures draw heavily from Tomek and Robinson, 1972, pp. 118-124. In all graphs, the quantity of cattle and beef are expressed in common units.

[5]The phrase dual monopoly is used here to refer to a single firm which possesses monopoly power in both its factor and resale markets. It should not be confused with bilateral monopoly which typically refers to the case of a monopolist facing a monopsonist. The dual monopoly case has a unique profit maximizing outcome in theory while bilateral monopoly is "indeterminate with a vengeance" (Scherer, 1970, p. 242).

[6]Local monopsony in cattle buying is examined in Chapter 5.

[7]This should not be confused with a government marketing board which is assumed to not follow a profit maximizing strategy.

[8]Similarly, though not shown, the monopsonist has a marginal factor cost curve for cattle which lies above AC_c and is parallel to MC_b. (It is only parallel because of the assumption of constant marketing costs.)

[9]The monopsonist who does not minimize costs suffers a reduction in profits, however. There will be a direct relationship between the elasticity of cattle supply and the profits lost due to such x-inefficiency.

[10]AGRIPAC is an Ivorian parastatal firm which in fact shares a duopolistic position with DISTRIPAC for chilled and frozen meat imports into Ivory Coast (see Staatz, 1979, pp. 143-145). The Ghanaian MMB (originally the Cattle Development Board) has a legal monopoly to import both cattle and chilled or frozen beef into Ghana (Sullivan, 1979, pp. 51-54). In principle, like their marketing board counterparts on the buying side, these agencies are not supposed to operate as profit maximizers. Nevertheless, the pressures on government agencies to generate surpluses may cause them to reflect tendencies suggestive of profit maximizers in the same position. Thus, the analysis may be insightful even in these cases.

[11]As noted above, the cost of x-inefficiency is shared by the butcher and consumer. The greater the elasticity of demand, the less able is the butcher to pass on the increased cost of inefficiency. Since short and medium term agricultural supply are likely to be relatively inelastic while demand for beef is relatively elastic because of its luxury nature and substitutability, monopsonists are likely to have less incentive than monopolists to use cost efficient marketing techniques.

[12]The possibilities imaginable under the conditions of bilateral monopoly are without bound. Some are discussed in Scherer (1970, pp. 242-252) and several further references are found there. Probably the best that one can hope to say on the matter which is in any way general is that a multiplicity of monopolistic relationships in a vertically linked industry is likely to be most restrictive in terms of output when firms at each level collude only amongst themselves (horizontally) and behave as myopic profit maximizers in relation to firms across the market. Beyond that, whether countervailing market power will have the effects of expanding output and moving the appropriate prices toward competitive levels is highly indeterminate.

[13]In these cases market power may be broadly defined. Wharton (1962, pp. 28-30) specified seven different power factors which may facilitate monopsony gains. They are: legal power, illegal power, economic power, technical or natural power, cultural power, psychological power, and informational or educational power. That any of these factors may foster inefficiencies, either internal to the firm or in its relations with other firms, should be clear from the typical analysis of monopoly performance.

[14]Indeed, the charging of the same price in different markets where transportation costs vary is a form of price discrimination. The key element is usually the price-cost ratios.

[15]Price discrimination in the factor (cattle) market is analogous and perhaps even more likely. Buyers are able to effect a transfer of economic rent or "producer surplus" from herdsmen to themselves. In the case of first degree factor price discrimination the resource supply curve becomes the marginal resource cost curve.

[16]In fact, price discrimination is also likely to be used to secure and reenforce monopoly power. Such predatory pricing is not at issue here.

[17]The reasons these conditions are more likely to foster price discrimination are the cost of market information and the ability of the discriminator to separate markets. Where commodities are essentially uniform and sold in common units (hamburger by the pound) consumers can easily compare prices among sellers, even under bargaining conditions. However, where both qualitative and quantitative variations in commodities exists (the West African practice of selling meat by tas, unweighed piles of meat, fat, tripe, and bone) the cost of acquiring and comparing market information is raised. The observation that small tas typically sold at a lower price per kilogram than large tas (Herman, 1977, pp. 151-155) might be explained similarly, as butchers separate low-income/elastic demand markets (small purchases) and high-income/inelastic demand markets (large size piles).

CHAPTER IV

METHOD OF DATA COLLECTION

The previous chapter set out the data requirements for evaluating the performance of the livestock and meat marketing sector in Upper Volta. This chapter outlines the method which was followed in collecting primary data through field surveys. Throughout approximately fourteen months of field research, there were four types of surveys of varying durations: herder livestock marketing surveys, cattle market surveys, a meat price study, and an export survey. In addition, throughout the term of the field work, butchers, cattle merchants, and intermediaries were interviewed for market information and personal histories. Finally, the American investigator had the opportunity to actively participate in several marketing activities. The most interesting of these involved convoying cattle from Ouagadougou to Abidjan by train. Each of these aspects of the Upper Volta livestock marketing study will be presented in turn. A description of the trip from Ouagadougou to Abidjan is found in Appendix B.

In some cases the data requirements were more than met, while in others the information obtained fell woefully short of that necessary to evaluate the system according to the framework presented in Chapter 3. Such is the nature of most industrial organization analyses. In endeavoring to ascertain the marketing conditions faced by livestock raisers, merchants, butchers, and other participants in the marketing system, one absorbs information about production, culture, etc. To the extent that such information sheds some light on marketing decisions; it is presented in the chapters where it appears most appropriate.

Failures in data collection stemmed from two sources. The first is inherent in any marketing survey; some information is simply never made available to outsiders without extraordinary efforts. In most cases, those efforts were taken and were worthwhile. It is the feeling of the investigator and his Voltaic staff that much of the information gathered in this study is unique, the result of efforts of many months of winning over the confidence of herders and marketing agents alike. The areas of investigation were often very sensitive to the subjects. For both cultural and economic reasons, herders do not like to discuss either the numbers of livestock that they own or the amount that they receive from the sale of any of them. It should be equally obvious that merchants and butchers would want to keep to themselves any information that would lead to calculations of their profit margins. In general, all of the subjects were suspicious of the motives of anyone researching the marketing question; this was based upon the feeling that government and international agencies are intent upon upsetting the existing method of livestock marketing in favor of a more controlled marketing mechanism. To a large extent, they are correct in their fears; various government interventions took place during the course of the study which bore that out.[1] For this reason, the researchers did their best to separate themselves from those who supposedly threaten the activities of the market participants being studied. For instances when this failed, data are incomplete or unreliable. The investigator believes that in most cases the effort was successful.

The other limitation in the collection of data from primary sources stems from the inadequacies of the methodology used. In almost each phase of the study, weeks or months were spent trying out questionnaires and forms. Problems of language and culture necessitated the rephrasing of questions in order to obtain desired responses. As the study progressed, the investigator discovered that certain issues had not been confronted, while others turned out to be of little or no interest. Some of these issues will be discussed in this chapter and in succeeding analytical chapters. Other problems included the choice of enumerators, choices of villages and markets as research sites, and the selection of subjects for interviews. Such is the nature of field research in areas which are foreign politically, culturally, and linguistically to the individual designing the study.

In most cases, selection of research sites, subjects, and dominant issues for study were made with the intention of giving the broadest sampling possible that would yield results relevant to planners, foremost in Upper Volta, and to a lesser degree in other Sahelian and Entente[2] countries. In this regard there were budgetary and physical constraints which necessitated concentration on marketing activities in the central corridor of Upper Volta. This region was chosen for two reasons. First, it enabled researchers to establish contacts throughout a cross section of livestock systems and market types. Within a 200-kilometer radius of Ouagadougou one can find traditional pastoralism and northern livestock collection markets (Djibo), regions of heterogeneous livestock production activity and major livestock distribution markets (Kaya and Pouytenga), and a major meat consumption center and embarkation point for livestock exports (Ouagadougou). No other region in Upper Volta offers such diversity, though the usefulness of locating similar marketing research in both eastern and western Upper Volta is acknowledged. Second, by basing the study in Ouagadougou, the investigator was better able to coordinate his activities with the various agencies which effect livestock marketing policy, notably the government livestock service (Service de l'Elevage et des Industries Animales), ONERA, the customs office, the Ouagadougou slaughterhouse, the railroad (Regie Abidjan-Niger), the CEBV, and the CEAO. Much of the information appearing throughout this report was obtained from discussions with individuals working in one of these agencies or was culled from the array of documents they possess and which are difficult to find elsewhere. The investigator is indebted to personnel from these agencies for the assistance they extended in both setting up and carrying out the study.

Herder Livestock Marketing Surveys

This section outlines the data collection for three separate village-level livestock marketing surveys conducted in fourteen village areas in Upper Volta. The research sites are distributed around the major livestock markets of Djibo, Pouytenga, and Kaya. Over 300 cattle owners participated in the surveys, which were conducted between April 1976 and March 1977. Subjects in each region were interviewed eight times during an eight to ten-month period; in each interview they were asked questions regarding their livestock marketing activities. The first part of this section explains the choice of the data collection methodology. The second part offers a description of the research sites and sample members.

Survey Techniques. -- The producer level marketing survey had two overriding goals which suggested conflicting survey techniques: evaluation of herder offtake decisions and a description of herder livestock marketing. On one hand, the survey could be directed toward collecting detailed information on herder behavior and examining household production and consumption as well as livestock marketing patterns. An intensive study of a small herder sample could provide valuable insights into the herder's economic decision-making process as it pertains to livestock marketing, and it would help to answer many of the questions raised in the previous chapter regarding the role of traditional livestock production systems and offtake rates in determining livestock and meat supplies. However, such a study would necessitate a farm management-type survey and would severely restrict the size of the sample to be consistent with the budgetary limitations of this study.[3] This was unacceptable on three counts. First, the close supervision required to carry out an intensive survey of this kind would necessitate the concentration of research efforts in limited geographical zone, making it difficult to choose a sample representative of a cross section of livestock owners. Any findings that significantly differed from accepted theories of herder behavior could be vulnerable to charges that they were applicable only to the specific livestock raising population sampled. Second, the limited sample size would likely yield few marketing observations and limit any analysis of the composition of offtake and livestock prices according to type, sex, and age classification.[4] In this case, the value of the data and subsequently the applicability of the analysis to even the narrowly defined herder population critically rests upon the sampling technique and the random elements (noise) which affect herder behavior. It involves a high degree of risk. Third, applying all enumerator resources to a farm management survey would conflict with other important aspects of the study. No broad analysis of the livestock marketing system would be possible if the fieldwork were limited to a farm-level livestock marketing survey.

The alternative was to forego the intensive herder survey in favor of a more extensive sampling of livestock owners. Data collection would be limited to marketing information, without any systematic collection of detailed production and consumption data. In short, this option would not provide answers for all of the questions pertaining to herder behavior but would certainly provide reliable information on herders' marketing patterns. Because of the less critical need for continuous supervision of enumerators, surveys could be conducted in more than one research zone, thereby increasing the likelihood that the overall sample would be representative of livestock raisers throughout Upper Volta or perhaps even large segments of West Africa. The sample size could be large enough to expect substantial numbers of marketing observations across age, sex, type, and time variables. And because enumerators would have to meet with herders only monthly, they would have time to work on other marketing surveys: in livestock markets, at slaughterhouses, and with butchers, merchants, and exporters. Thus, the extensive survey option was deemed most consistent with the overall goals of the study.

Livestock marketing data was collected for 380 sample members in 1,991 separate monthly interview sessions. Ninety-six of the subjects were interviewed less than four times, leaving 284 regular sample members and 1,799 interviews for an average of 6.3 monthly sessions per subject.[5] During each interview subjects were questioned on several aspects of livestock marketing behavior. The questionnaire that was used can be found in its French form in Appendix A. Questions were posed in either Moré (the language of the Mossi people) or Fulfuldé (the Fulani native tongue), depending on the sample member's preference.[6]

Six categories of information were collected concerning sample members' marketing activities between interviews: personal information identifying the subject; description of livestock sold; characterization of the nature of sale and price received; opportunities to sell livestock; access to market information; and motivations and intentions to sell cattle. The questions were framed and interview conditions arranged in a manner that would be most likely to provide reliable information. Often this meant interviewing the subjects individually or in the presence of the village chief. Quite often the enumerators had the opportunity to compare the responses of some sample members to their actual behavior when they sold cattle in markets surveyed by the enumerator. Where responses are deemed likely to be biased it is noted below.

1. Personal Information. -- The enumerator recorded the name, age, ethnic group, and village of the subject for each interview. He also marked his own name, the date, and the distance from the major livestock market (Djibo, Pouytenga, or Kaya) to the site of the interview.

2. Description of Marketed Livestock. -- Subjects were first asked whether they had sold any animals since the previous contact. It is believed that most sample members answered this question accurately since they had been aware that it would be asked when they volunteered for the survey. Those least likely to relate the truth probably did not choose to participate in the first place. Additionally, with the exception of the large traders in the sample -- and there were only a few of those, all in the Pouytenga sample -- sample members sold few enough livestock during any interview period to be able to recall those sales accurately one or two months after the fact. Each month the enumerators prepared lists of the sample members' most recent replies to be sure that there would be no double-counting should the subject forget whether he had already given information

concerning any sale. Initially the interview was set up to include a question on the date of sale, but this question caused confusion during test surveys in Djibo and was dropped.

The enumerator next recorded the type and number of each animal sold. The choices listed on the questionnaire included calf, young bull, young steer, heifer, bull, steer, cow, sheep, goat, and other - which was to be specified. Sales of fowl were not recorded. For each animal sold, the enumerator asked its age in years or, if younger than one year, in months. The data collected on the ages of marketed livestock is believed to be very accurate, and the information on composition of offtake generated from this data is thought to be one of the unique aspects of the study.

3. Price and Nature of the Sale. -- Subjects were first asked to identify the buyer of their livestock unit by his profession. They were given the choice of answering "merchant," "butcher," "another livestock raiser," "other (to be specified)", "don't know because sold through an intermediary," and "don't know for any other reason." They were then asked where the buyer came from (his home), whether they had known the buyer prior to the sale, and whether they had ever previously sold livestock to the buyer, and if so, how often. The final question regarding the purchaser asked where the animal was to be taken, to the best knowledge of the seller.

Three other questions further identified the conditions pertaining to the selling act. Subjects were asked to specify the location of the transaction, the person who negotiated the sale or took the animal to market, and to indicate who was present during the sale.

The exact nature of the financial arrangements was determined by three more questions; the first asked the price at which the animal was sold; the second asked how much of the price was paid in cash and how much credit was extended and for what period of time; the third question concerned the possibility of direct exchange of goods in place of cash. For the latter case the subject was asked to identify the merchandise received and evaluate its cash value. This sum was then added to any cash receipts and considered as the price.

While the second and third set of questions were posed only to sample members who sold livestock during the preceding month, the next three sets of questions were asked of all subjects.

4. Opportunities to Sell. -- Since the level of market demand could be evaluated from information obtained from the livestock market surveys (described in the following section), two questions were asked to determine the subject's local opportunities to sell. He was first asked to estimate the number of livestock buyers in search of livestock who passed through his village or region during the previous month (this did not include buyers only attending local markets). These observations were broken down by whether the buyers were butchers or traders. In some cases, the subject was asked to identify the visiting traders so that comparisons could be made between villages. The second question asked whether the respondent had discussed the possibility of selling any of his animals with a potential buyer, but then had not sold to the buyer. The subject was asked to provide details of any such occurrence, including the reason why the sale was not consummated.

5. Access to Market Information. -- Sample members were simply asked to state whether they thought they were currently well informed of the general level of cattle prices in the major livestock market nearest them. Those who claimed to be informed were requested to evaluate the prices as being high, medium, or low, relative to their perception of some unspecified seasonal norm. Subjects were then asked to explain how they came upon the information concerning market prices.

6. Motivations and Intentions to Sell. -- Subjects were requested to state their reasons for selling the animal they sold. Unfortunately, this question was worded too broadly and had to be recast to identify two separate issues: why that particular animal was selected to be sold, and how the revenues from the sale were disposed. Unfortunately, in the process of readying the final draft of the monthly questionnaire, this question was left out. The omission was not detected until 2,000 copies of the questionnaire had already been printed. Though the enumerators were requested to ask the question anyway, they often forgot, so responses were scattered.

The final question asked of the subject was whether he intended to sell any livestock during the following month. The purpose was to compare the answer with observed behavior to determine marketing planning horizons.

Enumerators were instructed to note any other remarks made by the subject during the interview. This was a rich source of diverse background information: enlightenment regarding attitudes toward butchers, merchants, and government officials, and general gossip. The formal interview lasted between five and thirty minutes per subject depending upon the number of animals sold by the sample member during the period covered by the interview. More often, the subjects would spend several hours, if not the entire day, talking with the enumerator; this was especially true in the Djibo research zone.

A second, one-time, in-depth questionnaire was administered during the survey period. The purpose of this interview was to obtain background information on the subjects and their economic activities. A copy of that questionnaire can be found in Appendix A.

Selection and Description of Research Sites and Sample Members. --Each of the villages included in the survey was located close enough to one of three major Voltaic livestock markets to consider that market the villagers' dominant livestock market. This did not mean that herders might not sell their animals elsewhere, in smaller local markets or directly to merchants or butchers on site, but that the market was close enough for herders to reasonably consider taking their livestock and selling them there.

The three major livestock markets chosen were Djibo, Pouytenga and Kaya. The reasons for choosing these markets are discussed in the section on cattle market surveys. The regions they represented met the criterion

for incorporating a cross section of livestock-raising patterns in the herder survey. The Djibo region is a predominantly pastoral zone in the Sahelian region of Upper Volta. Kaya, located in the heart of the Mossi Plateau, is a predominantly sedentary region featuring both permanent Fulani villages and livestock-owning Mossi populations. Originally, the choice of Pouytenga was due more to its important cattle market than to any especially interesting livestock raising systems. It turned out that the sample selected included several small cattle merchants and displayed the interesting characteristic of relying heavily on the livestock entrusting system for cattle raising. This is similar to that described by Delgado (1977), and is not surprising since it is only approximately fifty kilometers from the region where he worked.

1. Djibo Villages and Herders. -- Djibo is the seat of a sous-prefecture in the ORD of the Sahel. It is located in the north central part of Upper Volta, approximately 200 kilometers due north of Ouagadougou. A dirt road from the capital is well maintained south of Kongoussi (114 kilometers north of Ouagadougou). Until recently, the road between Kongoussi and Djibo was in poor condition, impassable for most traffic during most of the rainy season. An alternate route through Ouahigouya is also in poor condition, though open most of the year, and adds almost 100 kilometers to the road distance between Ouagadougou and Djibo. The research zone, encompassing six villages (Damba, Bouro, Nassoumbou, Peteya, Soboulé, and Mondé Sô), is located north of Djibo (see Map 4.1), and is typically Sahelian: dry with a short intense rainy season, few trees, short scrubby growth, and sandy soils (see Peretti, 1976, pp. 32-38). There are no marked roads to the north of Djibo. Villages and Fulani camps are connected by tracks which are passable by car during most of the dry season.

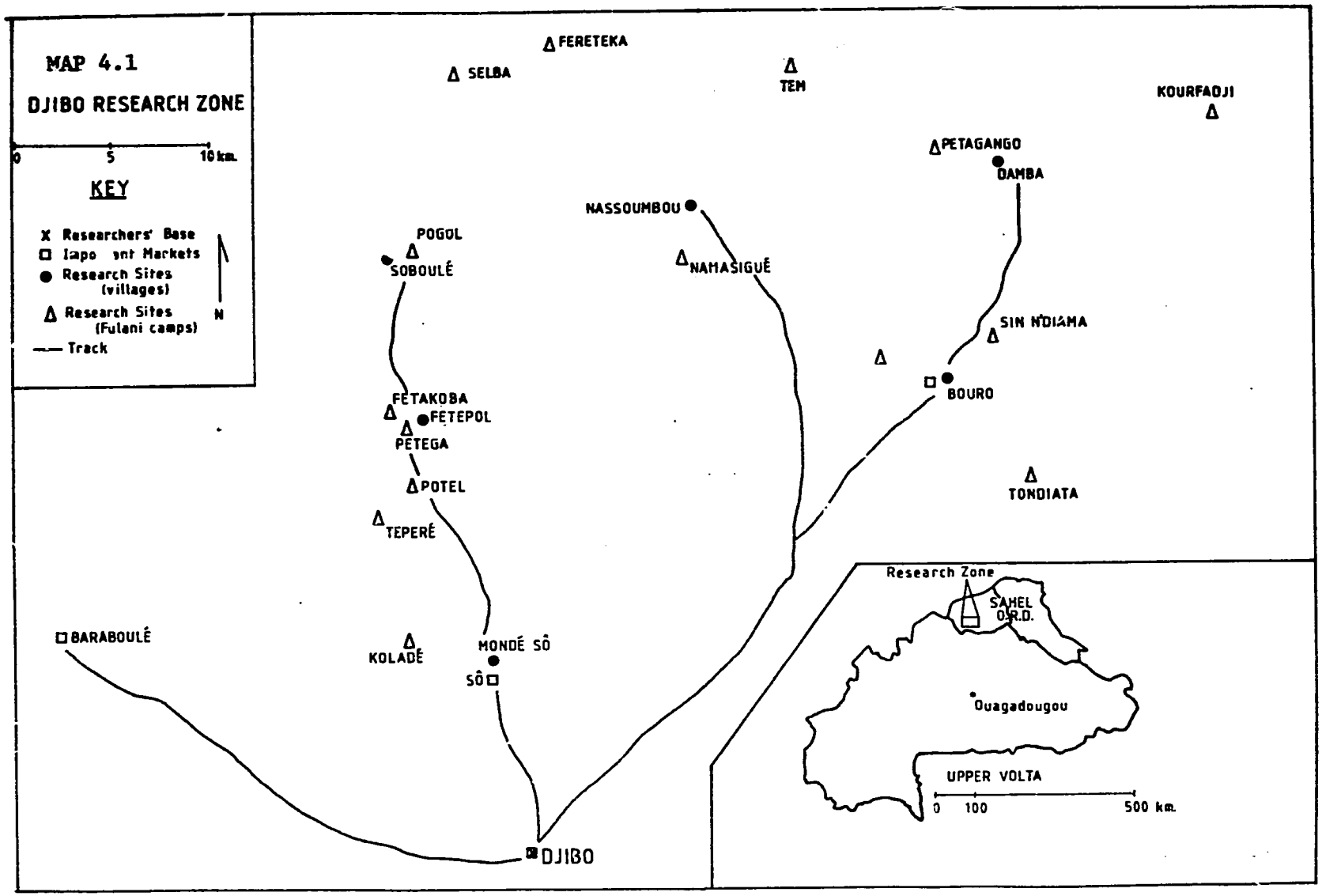
The population density in the Djibo administrative region is about ten persons per square kilometer. The density in the research zone is close to twice that (Peretti, 1976, pp. 22-24). Fulani (36 percent) make up the largest portion of the population.[7] Other pastoral groups (Tuareg and Bella) make up a very small percentage of the total population (2 percent). Sedentary populations are dominated by three groups; the Mossi are the largest of these and most recent arrivals to the region. They make up 18 percent of the population and principally occupy the southern strip of the region. Their northern migration from the Mossi Plateau has been in response to the population pressure in that region, and to what they saw as an abundance of available agricultural land in the southern Sahelian zone. The Foulcé are the oldest continuous inhabitants of the Djibo region and account for 17 percent of the population. The Sonrai are the group that was in power almost two centuries ago when the Djelgobé Fulani, who were to become the dominant political power in the region, made their entrance. The Sonrai today are only 2 percent of the population though they occupy some of the largest villages. Almost the entire population is Moslem (93 percent).

The relationship between the Fulani and the sedentary populations of the region is an interesting one. Though the Djelgobé Fulani hold the traditional authority in the region, the largest villages are occupied by the sedentary populations. The Fulani are found in both permanent and seasonal camps located on the periphery of these large villages. The Fulani rely on the sedentary population for some of their grain requirements and for many locally manufactured goods, and for purposes of government administration the Fulani are associated with the sedentary villages, though few Fulani actually live there. They do, however, spend much of their time in these villages, especially during the dry season, when they water their cattle at the wells which are often adjacent to the village. The villages serve as places of petty commerce and as meeting sites. After watering their livestock or while the young men of the family do it, adult Fulani males tend to spend much time in the village, either at the Mosque or under a straw awning, engaging in conversation with members of the village and other Fulani. The village is also a source of some inexpensive commodities. There is usually at least one small scale merchant maintaining a booth from which he sells cloth goods, small household items, batteries, candy, and above all, cola nuts. It was often under such circumstances that the research team had the opportunity to interview the survey subjects. During those times when the Fulani were dispersed in the many camps around the villages or on transhumance and many kilometers to the north, the enumerators had the more tedious task of trying to locate and interview each sample member individually.

The region immediately north of Djibo where the survey was based is served by four marketing centers. The most important of these is Djibo. In addition to a large traditional market which is held weekly, there are several small shops which sell a variety of manufactured goods, and an outlet of the national cereal marketing agency, OFNACER (Officer National des Céréales), where supplies of grain are available irregularly at fixed government prices. The livestock market in Djibo is relatively large and active, presenting stockraisers with the opportunity to sell animals to traders and exporters who move the animals on to southern markets.

The other three marketing centers of the region are Bouro (thirty-five kilometers northeast of Djibo), Sô (ten kilometers north of Djibo), and Baraboulé (thirty kilometers northwest of Djibo). All three are sites of important local markets which serve the populations in the surrounding villages and even draw buyers and sellers from the far north.[8] There are no improved roads but only unmarked trails between Djibo and these or any other villages to the north. The markets, which meet every three days, are serviced by many of the same merchants who operate in the traditional market in Djibo and by traders from nearby villages. Most of the northern populations are able to satisfy almost all of their consumption requirements in these markets and make the longer trip to Djibo only infrequently for major purchases or to sell their own goods or livestock. All three are also sites of livestock markets. In Bouro and Sô almost all of the transactions are for small ruminants while in Baraboulé there is some cattle marketing activity.

The investigator first arrived in Djibo in March 1976. The purpose of the study was explained to the sous-prefect and the local representative of the livestock service. Both gave their approval and volunteered to give any assistance that would be required. Preliminary discussions were held with the chef de canton and several residents of Djibo, including Paul Reisman, an anthropologist who had spent four years in the Djibo area, two of them living in a village that was ultimately selected as one of the survey sites.[9] They suggested several villages which they felt would be receptive to the type of survey that was to be carried out. In addition, the chef de canton offered to make his approval of the study public, and to directly convey this message to the chiefs of the villages in which the survey would be conducted. Since the Fulani chiefs are directly accountable to him, this action did much to assure cooperation from the herders who were selected to participate.


MAP 4.1
DJIBO RESEARCH ZONE
0
5
10 km.
KEY
X Researchers' Base
Iapo ent Markets
Research Sites (villages)
Research Sites (Fulani camps)
Track
N
FERETEKA
SELBA
TEM
KOURFAOJI
PETAGANGO
DAMBA
NASSOUMBOU
POGOL
SOBOULÉ
NAMASIGUÉ
SIN N'DIAMA
BOURO
FETAKOBA
FETEPOL
PETEGA
POTEL
TEPERÉ
TONDIATA
BARABOULÉ
KOLADÉ
MONDÉ SÔ
SÔ
DJIBO
Research Zone
SAHEL O.R.D.
Ouagadougou
UPPER VOLTA
0
100
500 km.

Preliminary visits were made to the villages of Bouro, Nassoumbou, and Sô, during which the Fulani chiefs were informed of the proposed study, and were provided with some additional background information which facilitated the selection of three additional research sites. Two months afterward, the investigator returned with the enumerator to complete the selection of villages and herders for the survey. Again with the aid of the chef de canton, three more villages were added: Damba, Petega, and Soboulé. During the first two weeks of May 1976, volunteers were recruited from each of the six villages.[10] The goal was to conduct the survey on a sample population of 150, consisting of approximately twenty-five herders from each village region. With the help of the village chiefs who encouraged participation, volunteers were selected based on their claims of being heads of households who owned and managed cattle herds, and on their willingness to participate. A schedule was then set up for conducting the first interviews. It was agreed that whenever possible, the chiefs would summon the subjects to a central location so that the interviews for each month could be completed within several days for each village. The herders were also asked to leave some indication of where they could be found, should they not be able to attend the interviews. During those occasions -- mainly during the rainy and harvest seasons -- young men of the villages volunteered to lead the enumerator to the various camps where the Fulani heads of household could be found.

The survey began in late May 1976 and continued through March of 1977, covering a period of ten months of livestock marketing activity for each herder and during which eight sets of interviews were held. The survey began with 134 subjects (see Table 4.1), all of whom were Djelgobé Fulani with the exception of the Fulani sample members from Souboulé, who were of Selli Fulani origin, and seven Rimaibé from Soboulé and Mondé Sô. The average age of the heads of households was forty-five with a standard deviation of six years. Age distribution was fairly uniform among the villages. [illegible] of the Fulani in the region practice a form of Islam; there were no exceptions to this among sample members. There were an average of 9.3 members per family, broken down as follows:

Family Member	Average Number per Household
wives	2.44
sons	2.09
daughters	1.72
grandparents	0.49
others[11]	0.78

All households but one engaged in agricultural activities in most years. With the exception of small household garden plots in which the women grew okra, the only crops planted by the sample members in the year of the study were millet and maize (see Table 4.2). The former is the staple crop, grown by every household. Corn is considered a secondary crop, and because of its relatively early maturation it serves as a "hungry-period" food (vivres de soudre), sustaining the family between the time its grain reserve has been depleted and the harvest of the millet crop. Most subjects complained that the maize harvests hadn't been successful in recent years because of the climatic conditions, and that as a result they were concentrating on millet alone. For this reason, only 10 percent of the subjects said they planted maize in 1976. Most of the labor applied to agricultural tasks was from the family unit; nine-tenths of the subjects said that they themselves work in the fields, and almost an equal number said that other family members also help. Almost a third claimed to have to use hired labor during periods of greatest labor requirements, but none used exclusively hired labor. Most of this labor was provided by local sedentary residents, who were largely Rimaibé. Another method of dealing with labor bottlenecks appears to be through collective invitations: under this system, labor isn't paid directly, but the household receiving the labor is indebted to provide the same service to those who help them. This type of reciprocity is, of course, limited by the fact that the agricultural labor constraints occur at the same time for all. Probably for this reason, only 16 percent of the subjects said that they used this system of engaging agricultural labor.

In less than half of the households, the head of the family actively participated in livestock raising activities (herding, watering, going on transhumance with the herd, etc.), while in all but one family, sons did the majority of the labor associated with the livestock raising. Only three herders claimed to entrust part of their herd to other Fulani. Two of these were families with only one son and the other was a Rimaibé household. The mean herd size of the sample members was 60.5 head of cattle (see Table 4.3); minimum herd size was eight, maximum size was 210, while the standard deviation in herd size was 41.2 (see Figure 4.1). Only three of the households whose herds were surveyed[12] had less than twenty head of cattle. Twelve households (14 percent) had more than 100 head, and three had 200 or more.

The following is a brief description of the six sample villages in the Djibo survey area:

a. Damba: The village of Damba is located fifty-five kilometers northeast of Djibo. The central village is populated by Sonrai. Fulani herder sample members live in three camps surrounding the village. The major camp is Dougai, the home of the Fulani chief who rules over the region of Damba and Bouro. The Fulani spend the dry season with their cattle near their fields. They water their animals at the Damba wells during the day, sometimes limiting the watering to every second day if the pasture conditions require longer treks to find adequate grazing (Reisman, 1974, p 25). During the growing season the households migrate to camps away from their fields and remain there until the harvest is completed. During this period, parts of the cattle herds are taken by the young men to transhumant camps in the north and northeast, where they graze on fresh pasture and take advantage of surface water. After the harvest the animals are allowed to browse the field stubble of both Fulani and sedentary farmers' plots. As long as pasture and water are available in the north, some herds remain there. By late February or March of most years, all of the herds return to the camps around Damba.

TABLE 4.1

DESCRIPTION OF DJIBO HERDER SAMPLE FAMILIES[a]

Village	Total Number of Subjects	Age of Subjects		Ethnic Group			Religion			Local[c] Origin	Mean Family Composition[d]					
		Mean	Std.Dev.	Fulani	Mossi	Other	Moslem	Christian	Animist		Total Fulani Herders	Wives	Sons	Daughters	Parents	Others[e]
Damba	20	44	7	100%	-	-	100%	-	-	100%	9.0	1.7	2.1	1.5	.6	1.1
Bouro	24	45	6	100%	-	-	100%	-	-	100%	8.8	2.2	2.4	1.5	.8	.9
Nassoumbou	24	47	6	100%	-	-	100%	-	-	100%	9.7	2.1	2.9	2.1	.8	.8
Petega	20	44	4	100%	-	-	100%	-	-	100%	10.0	2.6	3.1	2.1	.6	.7
Soboulé	24	44	6	89%	-	11%[b]	100%	-	-	100%	10.2	3.0	3.7	1.3	.5	.7
Mondé Sô	22	44	6	76%	-	24%[b]	100%	-	-	100%	9.9	3.1	3.1	1.8	.2	.5
Total Djibo	134	45	6	94%	-	6%	100%			100%	9.3	2.4	2.8	1.7	.5	.8

[a]From responses to questionnaires.

[b]Rimaibé

[c]Household head born in same or nearby village.

[d]Number of individuals living continually in household, dependent upon subject for food, and obligated to provide labor for family unit.

[e]Includes cousins, nephews and nieces, etc.

TABLE 4.2

AGRICULTURAL AND LIVESTOCK ACTIVITIES OF DJIBO HERDER SAMPLE MEMBERS[a]

Village	Percent of Households Which Grow Crops During Most Years	Average Number of Different Crops Planted per Family	Types of Crops Planted (% of families growing)				Labor Used for Agricultural Activities (% of families applying each type of labor)				Labor Used for Livestock Activities (% of families applying each type of labor)		
			Millet	Sorghum	Maize	Other	Head of Household	Other Family Members	Hired Labor[b]	Collective Invitation[c]	Head of Household	Other Family Member	Confided to Others[d]
Damba	100	1.1	100	-	10	-	90	90	30	10	75	95	10
Souro	100	1.0	100	-	-	-	100	74	32	11	53	100	-
Nassoumbou	100	1.0	100	-	-	-	95	91	14	5	86	100	-
Petega	94	1.0	94	-	-	-	94	87	19	6	6	100	-
Soboulé	100	1.44	100	6	39	-	72	89	49	44	22	100	6
Mondé Sô	100	1.14	100	-	14	-	86	95	24	19	5	100	-
Total Djibo	99	1.1	99	1	10	-	90	88	27	16	43	99	3

[a] From responses to questionnaires

[b] Labor paid directly in cash or in kind

[c] Labor from neighbors for which reciprocation is due

[d] Livestock entrusted to others for usufruct of milk or other direct payment in cash or food. Does not include loans of animals for breeding purposes.

TABLE 4.3

CATTLE HOLDINGS OF DJIBO HERDER SAMPLE MEMBERS[a]

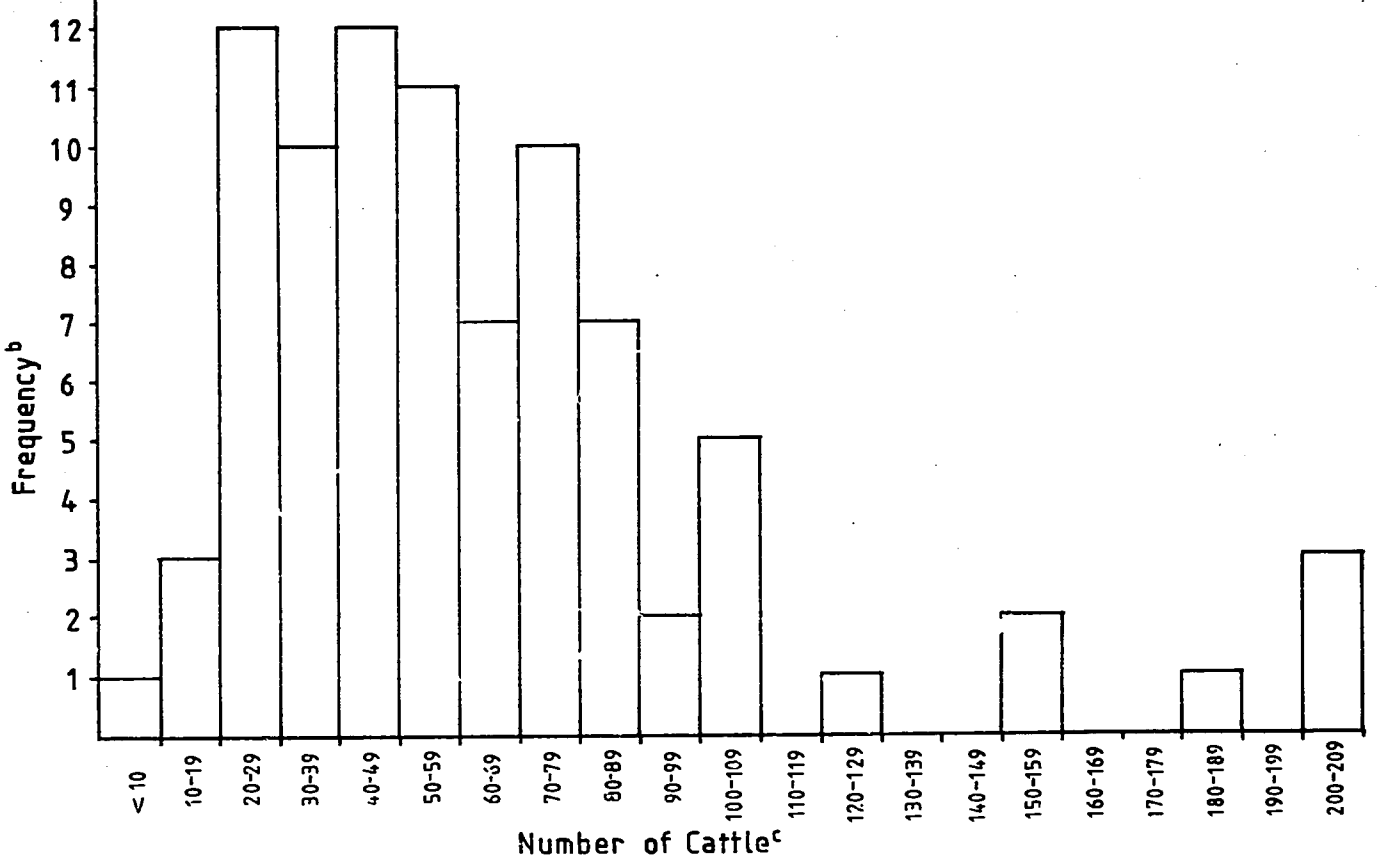
Village	Number of Households[b]	Minimum	Maximum	Total Cattle	Mean	Std. Dev.	Herd Size Frequency Distribution[c] <20	20-39	40-59	60-79	80-99	≥100
Damba	18	8	150	718	47.5	38.8	2	6	3	1	1	2
Bouro	11	15	70	415	37.7	17.5	1	4	4	2		
Nassoumbou	23	30	200	2,000	87.0	52.0		3	4	5	3	8
Petega	17	25	100	905	53.2	20.3		4	6	5	1	1
Soboulé	15	25	200	965	64.3	42.6		4	4	3	3	1
Mondé Sô	6	15	85	265	44.2	25.2	1	1	2	1	1	
Total Djibo	87	8	200	5,263	60.5	41.2	3	22	23	17	9	12

[a]From survey of cattle herded to wells and watered by household members.

[b]Number of households surveyed.

[c]Number of households in each herd size interval.

FIGURE 4.1 Frequency Distribution of Cattle Holdings of Djibo Herder Sample Members[a]



Footnotes:

a. From survey of cattle herded to wells and watered by household members.
b. Number of households appearing in each interval. Total = 87.
c. Mean = 60.5; Standard deviation= 41.18; Total cattle surveyed= 526.3; Min.= 8; Max.= 200.

Twenty subjects from Damba were select[illegible] participate in the marketing survey. None dropped out, and an average of eighteen were contacted during e[illegible] the eight sets of interviews.

b. Bouro: The village of Bouro is located thirty-one kilometers northeast of Djibo. The Bouro market is located two kilometers west of the central village. The population of the central village is given as 1,779, and the population of one of the adjoining Fulani camps in which thirteen sample members lived is reported at 371 persons (Peretti, 1976, Annex 2). The majority of the residents of Bouro proper are Rimaibé; there are also several Sonrai metal workers. Several sample members lived in the central village, but most of the twenty-four sample members lived on the outskirts and migrated to seasonal camps, similar to the pattern followed by the Damba herders. Those who remained in the central village year-round were older men and their familles.

Of the twenty-four sample members selected in May 1976, two did not complete the cycle of interviews and were dropped from the study. An average of 20.5 sample members were contacted during each interview set. If the eleven herds belonging to sample members were representative, the Bouro herders had the smallest number of cattle among the six Djibo area sample groups; the mean herd size was 37.7 head.

c. Nassoumbou: Located forty-four kilometers north of Djibo, Nassoumbou was the largest of the villages included in the Djibo area survey. The population of the central village is entirely Sonrai. It is the most active village in terms of commerce (excluding the market activity of Bouro and Sô) with several traders maintaining permanent stalls from which they sell merchandise and gasoline.[13] The sample members were all Fulani who lived in small camps on the outskirts of the central village; several of these camps as far as twenty kilometers away. Some of the camps are adjacent to small sedentary Rimaibé villages. During the rainy season and until the harvest is completed, most of the herds are taken north or northwest by the young men, though several household heads also participated in these long (thirty-five kilometers) transhumant movements. During the dry season both the herds and the families migrate to camps outside Nassoumbou or Tême (one of the Fulani camps attached to a Rimaibé village), where there are dry season wells. Although none were included in the sample, some Fulani remain along the Malian border during the entire dry season and only return to the farm in the rainy season.

Of the twenty Fulani recruited for the survey, two could not be contacted during much of the survey period. Additionally, because of the dispersed nature of the camps surrounding Nassoumbou, during the first three months of the survey an average of only seventeen of the sample members were contacted. Communications between the enumerator and the missing sample members improved, however, and an average of twenty-one subjects were interviewed during the last five sessions. All but one of the sample members' herds were surveyed. Herd size was larger than in any other region, averaging eighty-seven head per sample member; two sample members owned at least 200 head and at least six others had more than 100 head of cattle each. Only one subject owned less than thirty cattle.

d. Petega: This is actually a conglomeration of small Fulani camps, thirty kilometers northwest of Djibo. The population of the region, including a Rimaibé village (Fetepol) is 2,571 (Peretti, 1976, Annex 2). During the dry season the households and the herds are stationed in camps near the herders' fields, and use the wells outside Fetepol. Many of the family members remain there year-round while the cattle are taken north by the young men of the village. Unlike the first three villages, in which the majority of family chiefs actively participate in stock raising activities, only one of the household heads in the Petega sample said that he did so; the rest entrusted all of the tasks to their sons.

Twenty Fulani participated in the survey, and the mean number of monthly contacts was seventeen. One of the sample members died after the second interview, and that household was excluded from the sample.

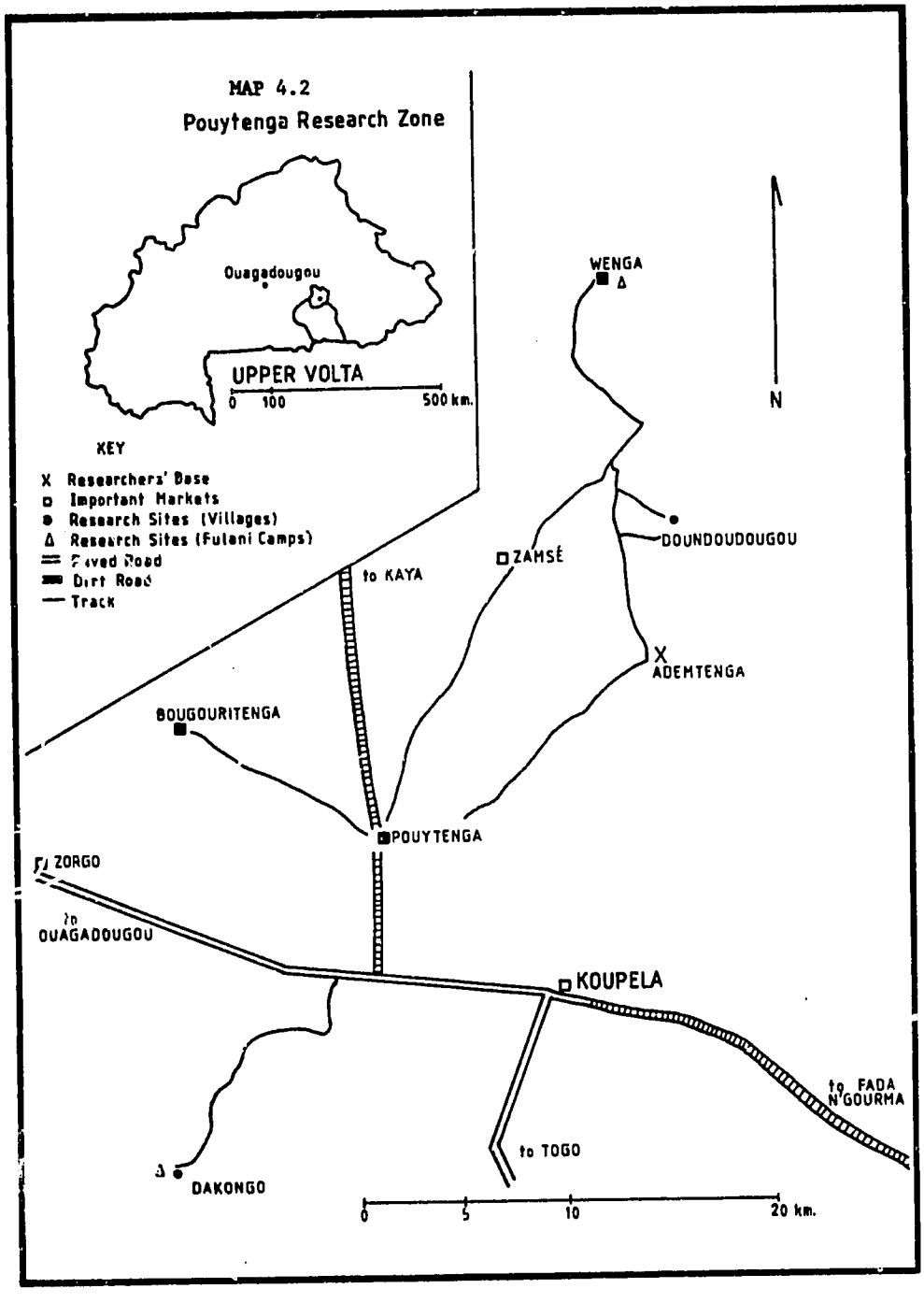
e. Soboulé: Soboulé is located ten kilometers to the north of Petega. The village itself is Rimaibé, with several Fulani Selli camps on the outskirts. The residents are under the authority of the chief of Petega, although there is rivalry between the different branches of Fulani residing in the two regions. The Fulani of Soboulé are more dispersed than those of Petega and were more difficult to contact; of twenty-four members, only ten were interviewed in the first month. After that, an average of twenty were contacted per set of interviews.

f. Mondé Sô: This is a very old village composed of both Fulani and Rimaibé, twelve kilometers north of Djibo. It is connected to a larger, totally Rimaibé village adjacent to the market of Sô. The enumerator responsible for conducting the herder interviews in Djibo reported that of all the villages in which he worked, relations between Fulani herders and sedentary populations were best in the Mondé Sô area. As in the other regions, the cattle are taken north following the early rain and are returned to the village after the harvest is completed.

The survey in Mondé Sô got started later and ended earlier than in the other villages, due to some administrative problems; this resulted in five sets of interviews instead of eight. Twenty-two subjects participated, with an average of twenty-one being interviewed each month.

2. Pouytenga Villages and Herders. -- Pouytenga is a small town in the sous-prefecture of Koupéla. The town, which is a major commercial center for both animals and merchandise, is located 137 kilometers directly east of Ouagadougou. All but seven kilometers of that distance is covered by good paved road. The town's market, which meets every third day, attracts buyers and sellers from Ouagadougou, Fada N'Gourma, Tenkodogo and Ghana, as well as nearby residents. Many of the town's residents depend upon the market activity for their livelihood.[14] While the town and the surrounding villages are predominantly Mossi, there are several Nigerien (Haussa and Yoruba), Ghanaian, and Gourmantché (eastern Voltaic) traders who live in Pouytenga. Almost no Fulani live in Pouytenga proper.

The research zone for the Pouytenga[15] village herder surveys encompassed four villages located on a northeast-southwest axis from Pouytenga (see Map 4.2). All are connected to Pouytenga by track though they are not equally accessible due to differing conditions of the tracks. During the rainy season, the village of Wenga is often cut off from Pouytenga by a branch of the Sirba river; to the south of Pouytenga, Dakongo is often


MAP 4.2
Pouytenga Research Zone
Ouagadougou
UPPER VOLTA
0 100 500 km.
KEY
X Researchers' Base
Important Markets
Research Sites (Villages)
Research Sites (Fulani Camps)
Paved Road
Dirt Road
Track
WENGA
N
DOUNDOUDOUGOU
ZAMSÉ
to KAYA
X
ADEMTENGA
BOUGOURITENGA
POUYTENGA
ZORGO
to
OUAGADOUGOU
KOUPELA
to FADA
N'GOURMA
to TOGO
DAKONGO
0 5 10 20 km.

difficult to reach due to the undeveloped state of the track. Access to the two other villages, Bougritenga and Doundoudougou, is relatively good, even during the rainy season.

Throughout the research zone there are pockets of Fulani settlements. Most of the Fulani are long time residents of the region, as described by Delgado (1978, pp. 35-36) for the Oueguedo Fulani outside of Tenkodogo, forty-five kilometers to the south. These Fulani are usually well integrated into the social, economic, and political systems of the region. They have developed complex systems of social and legal relationships with the Mossi and government officials that enable them to maintain permanent camps on the outskirts of some Mossi villages. Those Fulani who are recent arrivals to the region come into conflict with the sedentary population (even other Fulani) more readily than the well established Fulani. Most of these conflicts are over land use and grazing rights.

The Fulani herders in the region both cultivate and keep livestock. One of the most interesting relationships between herders and peasant farmers is that of cattle entrustment as described by Delgado (1978, pp. 39-41). Under this system, the Fulani herders of a region manage both their own animals and livestock owned by local peasants and townspeople; in return for this service the herders maintain rights over milk and manure and sometimes also receive direct payment in the form of grain or cash. It is the possibility of setting up such arrangements that often motivates sedentary village chiefs to extend invitations to Fulani to locate camps on the outskirts of their villages.

Most of the Fulani in the region follow either the completely sedentary or semi-sedentary mode of livestock raising (see Rochette, 1976, pp. 7-10). Under the former system the Fulani compound is occupied during the entire year by most of the household. During the growing season the cattle are either enclosed in thorn-bush corrals or watched by the young men of the family to prevent them from damaging crops. At times the herd and the young men might go on short transhumance to benefit from new pasture or surface water. The alternative method involves short migratory movements by the entire Fulani camp. The household moves away from the family's fields during the growing season and returns during the dry season. The amplitude of these movements is constrained by the requirements that the household's labor force be relatively close to the household's fields during the periods of high demand for farm labor. There is also some risk in vacating one's residence for very long in a region where political power is in the hands of others; the possibility always exists that the manure-rich fields of the Fulani will be claimed by a sedentary peasant. This risk is heightened when the land is left vacant for significant periods of time. For this reason, most of the Fulani in the research zone are sedentary, with seasonal migrations by the young men and the livestock.

Throughout the region there are small local markets which serve the villagers of the immediate region. Two of the villages included in the survey had their own markets (Bougritenga and Wenga). Other important local markets in or just outside the research zone include Zamsé, Yaongo, Zorgo, and Koupéla. In almost all of the local markets there is livestock marketing activity and meat sales from local slaughter. Many of the livestock merchants who buy animals in these markets resell them in Pouytenga. Many of the merchants who are active in Pouytenga also travel to the surrounding markets.

The investigator's Voltaic counterpart[16] arrived in Pouytenga with the enumerator in early July. After explaining the purpose of the study to the authorities, they contacted the local chef de canton and the local agent of the Livestock Service. Both were very helpful in suggesting villages which had many cattle owners and displayed enough commercial livestock activity to provide a large number of marketing observations. The initial list of villages included Wenga, Dakongo, Zamsé, Kanougou, Nabmayaorin, and Souka. Attempts were made to visit each village and discuss with the chief or other authorities, the possibility of conducting the survey there. Eventually, Bougritenga was substituted for Souka and Doundoudougou for Zamsé. It was also thought best not to include Kanougou or Nabmayaorin, since the enumerator would only be able to handle four villages and still survey the Pouytenga cattle market at the same time. The following week the American investigator and the enumerator returned to each of the villages that had been selected, and began recruitment of volunteers for the survey in much the same manner as had been done in the Djibo survey. Again, recruitment was based on the conditions of ownership of cattle and willingness to participate. The chiefs and the villagers were very cooperative and most anxious to participate.[17]

The survey began in late July 1976, and continued through March 1977, covering a period of nine months of livestock and marketing activity for each cattle owner recorded in eight monthly interviews. The survey began with ninety-six subjects, though several subjects were dropped when it was discovered that they didn't own any cattle. Two-thirds of the subjects were Mossi and the remainder were Fulani (see Table 4.4); in only one village were both ethnic groups represented. The mean age of the subjects ranged from 34 years in Bougritenga and Doundoudougou, to 45 years in Wenga. Most of the sample members were Moslem, but there were Christians and animists among the sample in every village except for Dakongo. Average family size was 11.4 persons per household, but it varied substantially from village to village. The Doundoudougou sample include several bachelors, which reduced the mean family size to 4.8 persons there. Fulani sample households are smaller than those found among the Mossi sample, evidenced by the mean household sizes of 8.5 and 12.5 in Dakongo (entirely Fulani) and Bougritenga (Mossi) respectively. It is interesting that almost all of the subjects, including all of the Fulani, were born in the Pouytenga region. The Fulani residents of Dakongo stated that they were originally from the area of Wenga. There were no Fulani subjects who migrated south from the Sahel as a result of the drought.

All households but one engaged in agricultural activities. (see Table 4.5). All planted both millet and sorghum and most also grew corn. The average household grew 4.3 crops, with beans (planted by 64 percent of the households), rice (34 percent), peanuts (30 percent), and cotton (19 percent) being the most popular cash crops. Most of the agricultural labor was provided by the household (see Table 4.6) though two villages (Wenga and Doundoudougou) used collective invitation extensively. Few households (8 percent) used hired labor.

Only in Fulani households did the household head care for the family's livestock himself. In 92 percent of the households livestock-raising activities were done by other family members, almost exclusively sons. One-

TABLE 4.4

DESCRIPTION OF POUYTENGA HERDER SAMPLE FAMILIES[a]

Village	Total Number of Subjects	Age of Subjects		Ethnic Group			Religion			Local[c] Origin	Mean Family Composition[d]					
		Mean	Std.Dev.	Fulani	Mossi	Other	Moslem	Christian	Animist		Total Fulani Herders	Wives	Sons	Daughters	Parents	Others[e]
Doundoudougou	10	34	16	-	100%	-	70%	10%	20%	90	4.8	0.7	1.4	0.6	.6	.5
Bougritenga	32	34	12	-	97%	3%[b]	75%	12.5%	12.5%	94	12.5	1.6	1.8	1.4	1.1	5.2
Wenga	33	45	11	55%	45%	-	67%	3%	30%	100	13.1	2.4	4.1	2.4	.4	2.9
Dakongo	8	44	14	100%	-	-	100%	-	-	100	8.5	1.6	3.5	1.8	.1	0.5
Total Pouytenga	83	39	13	31%	67%	1%	73%	7%	19%	96	11.4	1.8	2.9	1.8	0.7	3.3

[a]From responses to questionnaires

[b]Yarcé

[c]Household head born in same or nearby village

[d]Number of individuals living continuously in household, dependent upon subject for food, and obligated to provide labor for family unit.

[e]Includes cousins, nephews and nieces, etc.

TABLE 4.5

AGRICULTURAL ACTIVITIES OF POUYTENGA HERDER SAMPLE MEMBERS[a]

Village	Percent of Households Which Grow Crops During Most Years	Average Number of Different Crops Planted per Family	Types of Crops Planted (% of families growing)							
			Millet	Sorghum	Maize	Rice	Peanuts	Cotton	Beans	Others
Doundoudougou	100	5.0	100	100	80	30	50	90	50	-
Bougritenga	100	4.8	100	100	72	59	56	-	87	-
Wenga	94	3.7	94	94	67	18	6	21	45	6
Dakongo	100	3.5	100	100	87	-	-	-	62	-
Total Pouytenga	98	4.3	98	98	72	34	30	19	64	2

[a]From responses to questionnaires

TABLE 4.6

AGRICULTURAL AND LIVESTOCK ACTIVITIES OF POUYTENGA HERDER SAMPLE MEMBERS[a]

Village	Labor Used for Agricultural Activities (% of families applying each type of labor)				Labor Used for Livestock Activities (% of families applying each type of labor)			
	Head of Household	Family Members	Hired[b] Labor	Collective[c] Invitation	Head of Household	Family Member	Confided to Others[d]	Care for[e] Others' Cattle
Doundoudougou	90	100	-	80	-	80	90	-
Bougritenga	100	97	9	9	-	91	3	-
Wenga	94	94	12	61	18	97	27	24
Dakango	100	100	-	-	87	87	-	75
Total Pouytenga	96	96	8	37	16	92	33	17

[a]From responses to questionnaires.

[b]Labor paid directly in cash or in kind.

[c]Labor from neighbors for which reciprocation is due.

[d]Livestock entrusted to others for usufruct of milk or other direct payment in cash or food. Does not include loans of animals for breeding purposes.

[e]Herders for whom management unit is larger than ownership unit.

third of the households (50 percent of the Mossi households) entrusted some of their cattle to local Fulani herders, while 60 percent of the Fulani sample members said that they care for livestock owned by others.[18] The mean size of cattle herds for the Pouytenga herder sample was 14.0 head per household.[19] Fulani herd sizes (ownership rather than management units) were larger (16.38 head) and significantly different from Mossi herd sizes (10.96 head) at the one percent level, using a one-tailed t-test. Only one household in the entire sample claimed to own more than thirty-five head of cattle (see Table 4.7 and Figure 4.2) and only one reported owning less than five head. It should be remembered that the sample would not provide an unbiased estimate of cattle ownership for all Pouytenga area peasants, since the major criterion for selecting and retaining sample members was that they own cattle.

Information on small ruminant holdings was also collected. The descriptive statistics (see Table 4.8) show that the households owned an average of seven small ruminants, three goats and four sheep. The means for Fulani and Mossi households were not significantly different from each other at the 10 percent level, though the composition differed significantly. Of the 226 goats owned by sample members, only thirteen belonged to the twenty-six Fulani families.

One final descriptive measure of the Pouytenga herder sample is shown in Table 4.9. Whereas the Djibo herder sample consisted of individuals who engaged almost exclusively in livestock raising and cultivation, the southern herder samples included many persons who had other professional pursuits, largely butchering and livestock trading. The table shows the number of sample members who stated that they engaged in each of the four occupations, according to their own perceptions of the importance of each job. Without exception the Fulani sample members claimed to be, first of all, livestock raisers, and then cultivators with no other occupations. All other subjects but one claimed farming as their principal occupation. Thirty-six of the Mossi sample members stated that they were either butchers or livestock merchants, thirty-two of whom said they were both butchers and traders. All of these sample members came from Doundoudougou and Bougritenga.

The following briefly describes each of the four sample villages in the Pouytenga region:

a. Doundoudougou: The village of Doundoudougou is located approximately twenty-one kilometers northeast of Pouytenga. The village is entirely Mossi, and authority of the village chief extends over a region of about twenty-five square kilometers,[20] encompassing about 3,000 inhabitants.[21] All of the villagers farm, and benefit from the presence of an agricultural extension agent from the ORD. He is in charge of the agricultural development of the village and surrounding area. Farming techniques are still largely traditional, though several of the villagers own donkey plows. Sample members from Doundoudougou planted a wider variety of crops than sample members from any other village in the Pouytenga region. In addition, the village has a large communal garden which is under the supervision of the extension agent. The villagers grow a variety of vegetables, most of which are consumed locally.

Though many of the villagers owned small ruminants, few had any cattle. There are were several residents who engaged in commerce in the markets of Zamsé (seven kilometers to the west) and Pouytenga. All ten of the village's sample members fell into this category; five were combination butcher-livestock merchants, two were livestock merchants only, and three others dealt in other merchandise. The butchers and livestock merchants purchased animals in nearby villages and small local markets. The butchers slaughtered and sold meat in the Zamsé market while the traders resold most of their animals in Pouytenga. The merchants operated during most periods of slack farm labor demand; during the rainy season they spent most of their time working in their fields. The seven subjects who owned cattle apart from their livestock trade entrusted all of their holdings to Fulani herders in Wenga. Small ruminants were cared for by younger family members.

All ten of the sample members completed the entire cycle of eight monthly interviews.

b. Wenga: Located thirty-eight kilometers northeast of Pouytenga in the sous-prefecture of Boulsa, Wenga is a large village with a population of 632 persons in fifty-six households. The population figures do not include the Fulani, who were also included in the sample, but live in an encampment located five miles east of the village. Though there is a local market in the village, the activities of the sample members were limited to farming and livestock raising. Most of the Mossi families in the village claimed to be self-sufficient in grain; many said they sell a surplus, much of the local demand being provided by the Fulani population. Cotton, beans and peanuts are the most important cash crops of the village, and almost all were sold in the local market.

Many of the Mossi cattle owners entrusted their cattle holdings to the neighboring Fulani; however, most of the Mossi sample members kept some cattle in their compound. They reported buying cattle from the Fulani during the end of the dry season and keeping the animals for three to nine months, after which they were resold in the local market or in Pouytenga. During this time these cattle were fed agricultural by-products. Several of the sample members were very proud of this operation and reported that they always made a profit. Unfortunately, no substantive information was recorded concerning this activity, since the survey period began after the time when these animals were purchased (May-August), and because no production data was recorded on a regular basis. These claims suggest, however, that further investigation into this activity is needed.

The Fulani of Wenga are sedentary, although the cattle are taken on transhumance during the dry season in search of water and pasture. During the rainy season and until the fields begin to produce, the cattle are kept near the household compounds; afterwards the animals are taken away from the fields but are kept near the village. When the harvest is done the cattle are allowed to browse on the field stubble of both Fulani and Mossi plots. Unlike the Mossi, who supplement their compound cattle's diet with agricultural by-products, none of the Fulani said they give their cattle any supplemental feed.

Of the forty sample members initially selected, seven were eliminated from the sample when it was discovered they didn't own any cattle. The sample was approximately evenly divided between Mossi and Fulani subjects. The survey was delayed one month because of the inaccessibility of the village during the rainy season;

TABLE 4.7

CATTLE HOLDINGS OF POUYTENGA HERDER SAMPLE MEMBERS[a]

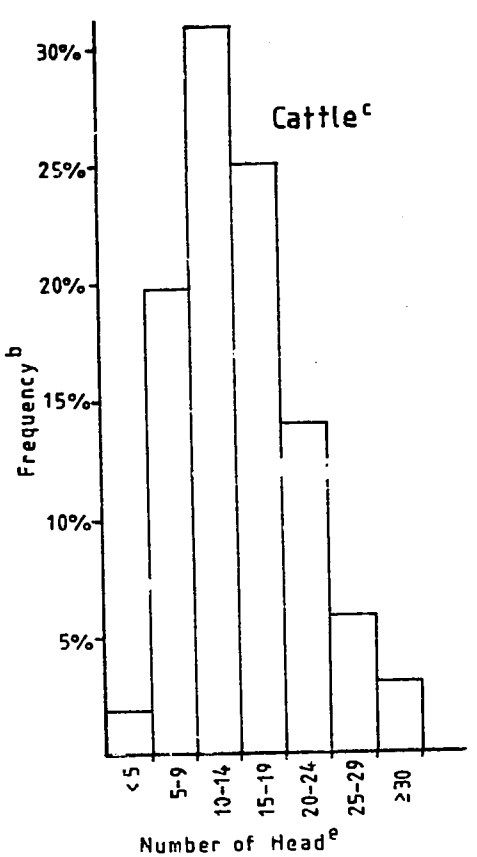
Village	Number of Households[b]	Cattle Held per Household					Herd Size Frequency Distribution[c]							
		Minimum	Maximum	Total Cattle	Mean	Std. Dev.	< 5	5-9	10-14	15-19	20-24	25-29	30-34	> 35
Doundoudougou	7	5	20	90	12.9	7.0		2	2		3			
Wenga	33	5	51	479	14.5	8.6		8	9	10	4	1		1
Bougritenga	24	4	30	306	12.8	5.9	1	4	11	6		1	1	
Dakongo	8	15	30	176	22	4.9				2	3	2	1	
Total Pouytenga	72	4	51	1,051	14.6	7.7	1	14	22	18	10	4	2	1

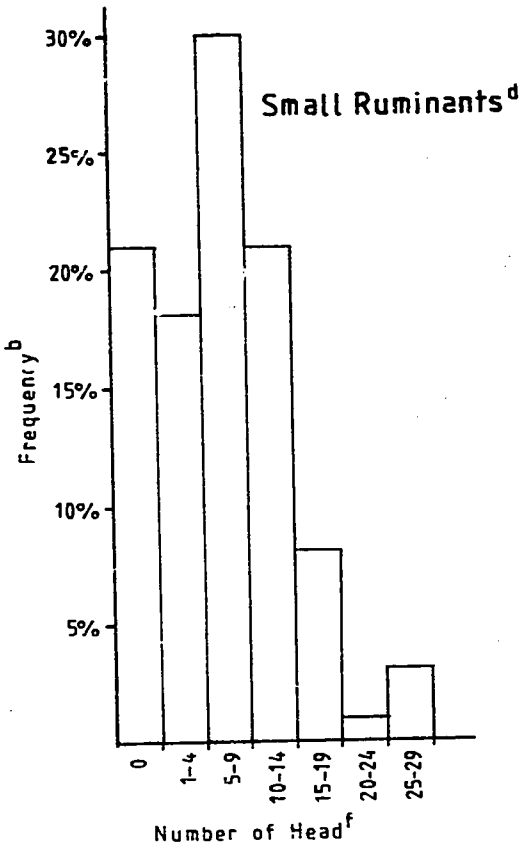
[a]From responses to questionnaire and verification by other villagers.

[b]Number of households responding to the question.

[c]Number of households in each herd size interval.

FIGURE 4.2 Frequency Distribution of Livestock Holdings of Pouytenga Herder Sample Members[a]





a. From direct questioning of cattle owners
b. Percent of households owning that number of cattle
c Total households= 72

d. Total households = 76
e. Mean= 14.6; Total number of cattle=1051
f. Mean= 6.0; Total number of small ruminants= 535

TABLE 4.8

SMALL RUMINANT HOLDINGS OF POUYTENGA HERDER SAMPLE MEMBERS[a]

Village	Number of Households[b]	Goats Held per Household					Sheep Held per Household					Total Small Ruminants Held per Household				
		Minimum	Maximum	Total	Mean	Std.Dev.	Minimum	Maximum	Total	Mean	Std.Dev.	Minimum	Maximum	Total	Mean	Std.Dev.
Doundou-dougou	5	5	15	48	9.6	3.6	5	10	38	7.6	2.3	10	25	86	17.2	5.5
Wenga	33	0	15	127	3.8	3.7	0	10	142	4.3	2.8	0	25	269	8.2	6.0
Bougri-tenga	30	0	7	49	1.6	2.1	0	10	86	2.9	3.2	0	17	135	4.5	4.8
Dakongo	8	0	2	2	0.3	0.7	0	10	43	5.4	3.0	0	10	45	5.6	3.2
Total Pouytenga	76	0	15	226	3.0	3.6	0	10	309	4.1	3.3	0	25	535	7.0	7.3

[a]From responses to questionnaires and verification by other villagers.

[b]Numbers of households responding to question.

TABLE 4.9

PRINCIPAL OCCUPATIONS OF POUYTENGA HERDER SAMPLE MEMBERS[a]

Village	n[b]	Livestock Raiser					Farmer					Butcher					Livestock Merchant				
		1[c]	2[d]	3[e]	4[f]	T[g]	1[c]	2[d]	3[e]	4[f]	T[g]	1[c]	2[d]	3[e]	4[f]	T[g]	1[c]	2[d]	3[e]	4[f]	T[g]
Wenga	32	18	14	-	-	32	14	17	-	-	31	-				0					0
Doundou-dougou	10	-	5	1	1	7	10	-	-	-	10	-	3	2	-	5		4	2	1	7
Bougri-tenga	32	1	8	6	13	28	30	2	1	1	32	-	5	20	4	29	1	17	1	8	27
Dakongo	7	7	-	-	-	7	-	7	-	-	7	-				0					0
Total	81	26	27	7	14	74	54	26	-	-	80	-	8	22	4	34	1	21	3	9	34

[a]From responses to questionnaires.

[b]Number of household heads responding.

[c]Principal occupation.

[d]Secondary occupation.

[e]Third occupation.

[f]Fourth occupation.

[g]Total engaged in that activity.

the interviews commenced in early September 1976 and continued until March 1977. An average of thirty-two sample members were interviewed monthly.

c. Bougritenga: The village of Bougritenga, the site of an active local market, is located eighteen kilometers northwest of Pouytenga. Many of the families of the village engage in commercial activity in both Bougritenga and Pouytenga. All of the residents and sample members are Mossi. Among the thirty-two sample members, twenty-nine are part-time butchers and twenty-seven engage in livestock trade. This can be contrasted with the sample members from Wenga, also a market village, who were exclusively farmers and livestock raisers. The predominant economic activity was agriculture; all but two of the subjects stated that their principal occupation was farming. However, 40 percent of them said they are not self-sufficient in grain, while the rest claimed that they rarely had a surplus which they sold. Sample members rarely confided their cattle to others; in most cases the cattle holdings were cared for by teenage sons who worked together with other young men from the village. The cattle were not actually collectively herded, but the cooperation of the herders allowed the young men to free themselves during certain periods for agricultural work. There were no transhumant migrations. Two of the thirty-two sample members participated in the survey on a very limited basis, and eight others did not volunteer until the second round of interviews. An average of thirty subjects were contacted during the final seven months of the survey.

d. Dakongo: The Mossi community of Dakongo is located approximately twenty-five kilometers southwest of Pouytenga. The research site is a Fulani camp of about fourteen households several kilometers west of the Mossi village. The Fulani migrated to the region from various camps north of Pouytenga in 1974, because they thought that the water and pasture conditions were better in the Dakongo area. They were granted "temporary" rights to land for farming and pasture. Each household makes a token rent payment of 500 francs to the Mossi chief, and also gives him milk from time to time.

All of the Fulani households planted millet, sorghum, and maize; some also grow beans. None are self-sufficient in grain, however. They receive some grain from the Mossi, for whom they herd, and purchase the rest of their grain in Dakongo, Zorgo, or Pouytenga from livestock revenues. Though milk is sold by the Fulani women to peasants in neighboring villages, none of this revenue was used to purchase grain, according to the sample members.

Besides their own holdings of cattle, which averaged twenty-two head per household, the sample members also keep cattle for Mossi residents of Dakongo and for townspeople in Pouytenga and Zorgo. Most of the owners from the two towns are reputed to be butchers, livestock merchants, and civil servants. The Fulani herders are allowed to keep the milk and use the manure as they see fit. They cannot sell the cattle unless directed to by the owner, even if the animal is sick or injured. Some of the cattle owners occasionally give the herders grain or cash, especially if most of his holdings are males.

The Dakongo Fulani are more mobile than their Wenga counterparts. During the dry season the Fulani camp migrates en masse to a camp along the Dougoula Mondi riverbed.[22] The region, called Yeryendé, is a meeting place for the Fulani of the Koupéla-Tenkodogo-Zorgo region.[23] The area along the riverbed is largely unpopulated because of poor soils and disease. During the dry season water is available in lowland areas through shallow dug wells. While the household remains in the dry season camp, the young men migrate with the herd in search of remaining pasture. At the first sign of rain near Dakongo the Fulani move back to begin planting; the young men and herds may remain along the river until their labor is required on the family farm.[24]

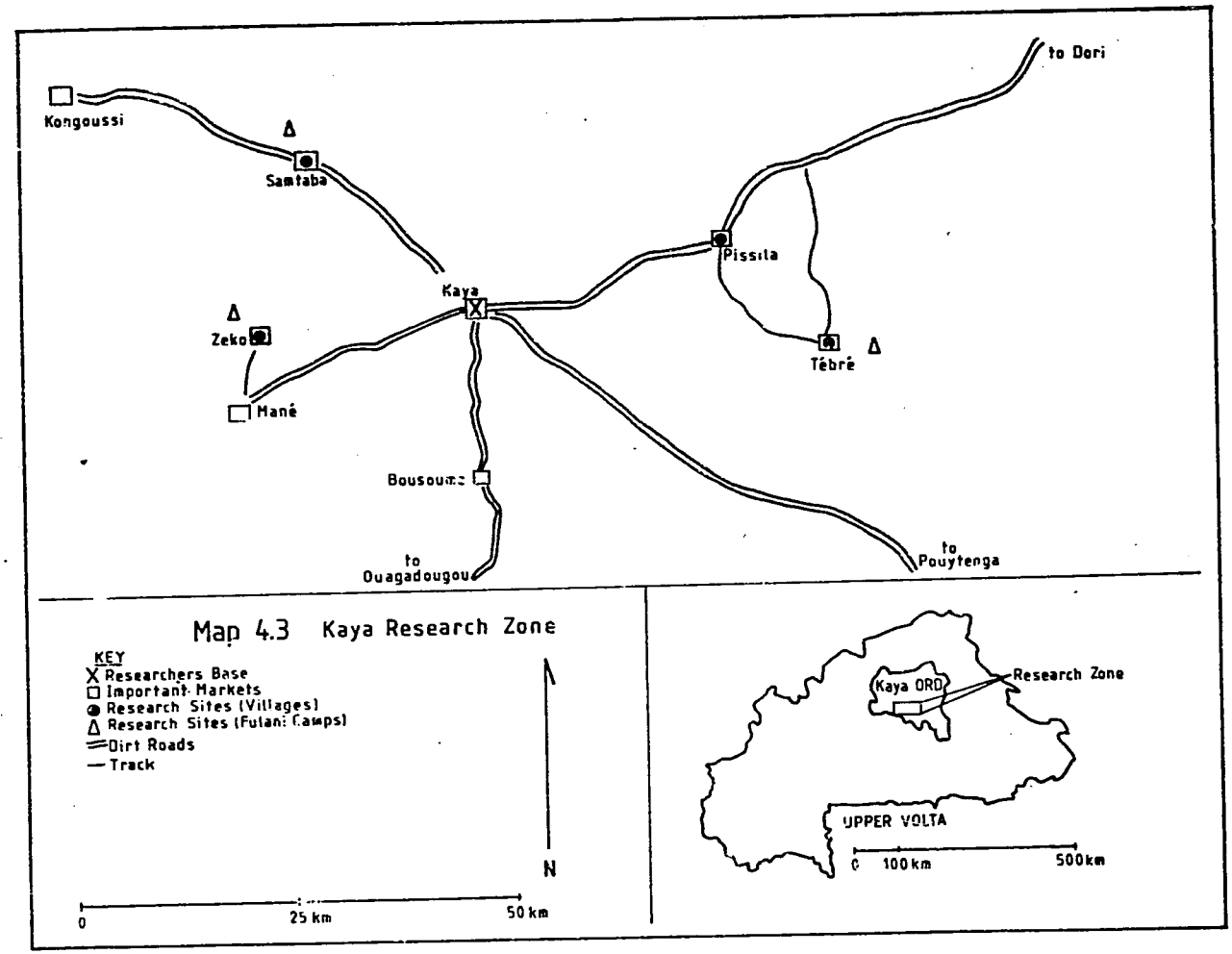
Though all households in the Fulani camp outside of Dakongo were initially contacted and solicited for the survey, only eight participated on a regular basis. The other six dropped out of the survey by their own volition.

3. Kaya Villages and Herders. — Located 105 kilometers northeast of Ouagadougou, Kaya is the seat of the prefecture of the Northern Mossi Plateau. It is linked to the capital by an improved dirt road. The city is the fifth largest in the country with a population of nearly 20,000.[25] The region is predominantly Mossi, with a scattering of Fulani and Yarcé settlements and some Fulcé villages in the extreme north. The research zone (see Map 4.3) was located in the two sous prefectures of Kaya and Pissila and included four villages: Samtaba, Pissila, Zéko, and Tébré. It had many of the same characteristics of the Pouytenga research area: Fulani camps attached to Mossi villages; extensive use of the livestock entrustment system; a diverse agricultural base including cash crops of rice, peanuts, cotton, beans, and some garden vegetables; an extensive system of small village markets and several dominant urban markets, including Kaya and Pissila.

The investigator arrived in Kaya with the enumerator in early July, concurrent with the inititation of the Pouytenga study by the Voltaic counterpart and the Pouytenga enumerator. Formal contacts were made with government administrators in Kaya and they were informed of the purpose of the study. Because the villages in the survey were more dispersed than in the other two research zones, there was no single traditional authority who could be contacted for help in selecting villages. Instead, the investigator relied on the director of the district office of the government Livestock Service. He offered the services of his personnel and helped in the selection of villages. In each of the four village regions the survey was welcomed by both village chiefs and livestock owners.

The survey began in early July. In early September the enumerator had to be replaced and one month's worth of data was lost; as a result, the Kaya data covered only seven months of interviews. The change of enumerators proved to be a blessing in disguise, since the second enumerator was well liked by the subjects and regional authorities.[26]

The survey began with an abundance of subjects. Over 150 persons volunteered to participate, though many of these were quickly eliminated when it was discovered that their cattle holdings were limited to an occasional boeuf de case. Only half of the volunteers were retained in the sample and participated throughout the course of the survey; almost three-quarters of these were Fulani, and the rest Mossi (see Table 4.10). In only one village (Tébré) did Mossi make up as much as half of the sample. Almost the entire sample population was Moslem, and



Map 4.3 Kaya Research Zone

TABLE 4.10

DESCRIPTION OF KAYA HERDER SAMPLE FAMILIES[a]

Village	Total Number of Subjects	Age of Subjects		Ethnic Group			Religion			Local[c] Origin	Mean Family Composition[d]					
		Mean	Std.Dev.	Fulani	Mossi	Other	Moslem	Christian	Animist		Total Fulani Herders	Wives	Sons	Daughters	Parents	Others[c]
Samtaba	18	43	9	83%	17%	-	100%	-	-	100%	19.4	2.0	4.4	4.1	1.3	6.6
Piessila	18	45	10	89%	11%	-	100%	-	-	94%	16.7	2.4	3.8	3.3	0.7	5.4
Zéko	15	40	7	80%	20%	-	87%	-	13%	100%	15.5	1.7	3.5	3.1	1.1	5.2
Tébré	23	41	11	48%	48%	4%[b]	70%	-	30%	100%	12.9	1.7	2.6	2.5	0.8	4.4
Total Kaya	74	42	10	73%	26%	1%[b]	88%	-	12%	99%	15.9	1.9	3.5	3.2	1.0	5.3

[a]From responses to questionnaires.

[b]Bagré Moaga

[c]Household head born in same or nearby village.

[d]Number of individuals living [illegible]tinually in household, dependent upon subject for food, and o[illegible]gated to provide labor for family unit.

[e]Includes cousins, nephews and nieces, etc.

all but one of the sample members were born in the survey region. Mean family size was 15.9, and ranged from 12.9 persons per household in Tébré to almost twenty in Samtaba.

Only a handful of sample members did not cultivate (see Table 4.11). Households plant an average of almost five different crops with millet, sorghum, and maize being the most popular, followed by beans, peanuts, cotton, and rice. Many households also keep small gardens. Most cultivation activities are performed by family members (see Table 4.12) -- only in Pissila is collective invitation or hired labor a major means of engaging farm labor.

Few of the sample members (18 percent) care for their livestock themselves; most use a combination of other family members -- primarily for small ruminants and small cattle herds -- and the entrustment option. A total of 66 percent of the sample members, including many Fulani, use the latter alternative. One-quarter of the sample stated that they care for cattle belonging to others.

The mean size of the cattle herds (ownership) was 17.1 head, ranging from a village mean of less than 8.0 in Zéko to almost 24.0 in Pissila (see Table 4.13). One sample member from Pissila owned more than 320 head, the majority of which he entrusted to distant relatives outside of Djibo. Of cattle kept locally, the largest ownership unit is fifty-five head. Mean herd size for the Mossi households in the sample was 13.7 head, contrasted to just over 21.0 for the Fulani subjects; the difference between the two means is not significant at the 10 percent level.

Small ruminant holdings were quite a bit larger than those found among the Pouytenga sample members (see Table 4.14). The mean size of goat holdings was 6.7 per household, while sheep holdings averaged just under 10.0 head per household. Total family holdings of small ruminants averaged 15.9, again with Pissila sample members owning, on the average, the largest number, with 20.4 small ruminants per sample member. Mossi small ruminant holdings are slightly larger than Fulani holdings, though the difference is not statistically significant. It is interesting to note that the livestock holdings of the Kaya sample members were more widely distributed in terms of numbers owned per household than those belonging to the Pouytenga sample. This can be seen by comparing the coefficients of variation (the standard deviation of the sample divided by its mean) for cattle and small ruminant holdings in each sample (see Table 4.15), and by comparison of Figures 4.2 and 4.3, which show the frequency distribution of livestock holdings among sample members.

Kaya sample members engaged in occupations other than farming and cattle raising, although not to the degree found in the Pouytenga sample. Table 4.16 shows the number of sample members in each village who fell into each category, and the importance attached to that occupation by the subject. One-quarter of the subjects considered themselves livestock merchants, and 15 percent said that they were part-time butchers. One-quarter of the subjects considered themselves livestock merchants, and 15 percent said that they were part-time butchers. None of the subjects engaged in both occupations, and for all the sample members, these professions were secondary to their livestock and farming activities.

The following briefly describes each of the four sample villages in the Kaya region:

a. Pissila: Pissila is a small town thirty-two kilometers east of Kaya on the road to Dori, with a population of approximately 4,000.[27] It is the site of a major regional market, with a relatively active livestock and butchering trade. The sample members live both in the city and in small villages on the outskirts of town. There is no Fulani encampment outside of Pissila, per se, as for the other villages in the sample, and there were no transhumant movements among the sample members.

One-half of the sample members responding to the question of occupational rank said that they engaged in livestock trading. These sample members had larger herds than the non-traders; these were also the individuals who reported entrusting most of their cattle to others.

Twenty-three individuals were recruited for the survey from Pissila, and eighteen participated regularly in the interviews. The mean number of contacts was seventeen.

b. Samtaba: This Mossi village is located twenty-nine kilometers northwest of Kaya, on the road to Kongoussi. There is a small regional market in the village which attracts merchants and peasants from surrounding areas, including Kaya. A Fulani camp is located north of the village several kilometers away. The Fulani did not like to come into the village except on market day; thus interviewing them was difficult, since their compounds were fairly wide-spread and difficult to find. For that reason, only eighteen of the original thirty-two sample members participated regularly throughout the survey, and the average number of contacts for each of these subjects was less than six out of seven possible interview sessions.

c. Zéko: A village similar in composition to Samtaba, Zéko is located twenty-eight kilometers by road and track west of Kaya. A small village market mostly attracts only local villagers and some merchants from neighboring towns such as Mané, ten kilometers to the south. There is very little livestock activity in the Zéko market, except small ruminants and some old cows sold to the local butchers. The Fulani camp is located several kilometers north of the town. Most of the village's cattle are kept by the local Fulani; many Fulani entrust parts of their own herds to others while keeping other cattle themselves. The reasons for this were not clear.

Though thirty persons volunteered for the survey, only fifteen turned out to be willing to meet with the enumerator regularly. Even among these sample members, there was a high absenteeism rate for the interview sessions; many missed two or more interviews. Additionally, the change of enumerators in September resulted in only six months of interviews for the Zéko sample, as opposed to seven months for the other Kaya samples.

d. Tébré: Tébré is located approximately fifty-three kilometers from Kaya by road and track, twenty kilometers southeast of Pissila. The village is predominantly Mossi, with a Fulani camp to the east. The village market met the same day as the Kaya market; because of the conflict, the enumerator was not able to observe the Tébré market activity regularly. Livestock marketing appeared to be limited because most of the region's livestock merchants attend the Kaya market regularly. Since the market days conflicted, the enumerator could go to Tébré on its market day only once a month; it was on these days that the villagers were most willing to be interviewed, or at least arrange for meetings on other days. For this reason, of the sixty subjects who volunteered to participate in the survey, only twenty-three were incorporated into the sample on a regular basis.

TABLE 4.11

AGRICULTURAL ACTIVITIES OF KAYA HERDER SAMPLE MEMBERS[a]

Village	Percent of Households Which Grow Crops During Most Years	Average Number of Different Crops Planted per Family	Types of Crops Planted (% of families growing)							
			Millet	Sorghum	Maize	Rice	Peanuts	Cotton	Beans	Others
Samtaba	94	3.4	89	67	72	-	11	-	39	28
Pissila	100	5.3	100	100	100	6	44	22	89	60
Zéko	100	4.7	87	93	80	7	53	47	73	40
Tébré	87	5.2	87	83	87	22	39	30	65	39
Total Kaya	95	4.7	91	85	85	9	36	24	66	33

[a]From responses to questionnaires.

TABLE 4.12

AGRICULTURAL AND LIVESTOCK ACTIVITIES OF KAYA HERDER SAMPLE MEMBERS[a]

Village	Labor Used for Agricultural Activities (% of families applying each type of labor)				Labor Used for Livestock Activities (% of families applying each type of labor)			
	Head of Household	Family Members	Hired Labor[b]	Collective Invitation[c]	Head of Household	Family Member	Confided to Others[d]	Care for Others' Cattle[e]
Samtaba	78	89	11	33	6	78	42	33
Pissila	94	89	22	67	11	89	50	33
Zêho	100	100	-	7	40	67	60	7
Tebré	78	65	-	9	17	91	34	22
Total Kaya	86	84	8	28	18	82	66	24

[a]From responses to questionnaires.

[b]Labor paid directly in cash or in kind.

[c]Labor from neighbors for which reciprocation is due.

[d]Livestock entrusted to others for usufruct of milk or other direct payment in cash or food. Does not include loans of animals for breeding purposes.

[e]Herders for whom management unit is larger than ownership unit.

TABLE 4.13

CATTLE HOLDINGS OF KAYA HERDER SAMPLE MEMBERS[a]

Village	Number of Households[b]	Cattle Held per Household					Frequency Distribution[c] Herd Size								
		Minimum	Maximum	Total Cattle	Mean	Std. Dev.	< 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	> 40
Pissila	18	6	320	725	23.8[d]	13.9[d]		1	1	8		3		2	3
Tébré	22	2	200	541	16.2[e]	14.4[e]	3	6	3	2	2	1	2		3
Zéko	13	1	40	101	7.8	10.3	6	4	2						1
Samtaba	16	5	50	300	18.8	12.7		4	3	4		2	1	1	1
Total Kaya	69	1	320	1,667	17.1[d,e]	14.0[d,e]	8	15	9	14	2	6	3	3	8

[a]From responses to questionnaire and verification by other villagers.

[b]Number of households responding to the question.

[c]Number of households in each herd size interval.

[d]Excludes one household with 320 cattle.

[e]Excludes one household with 200 cattle.

TABLE 4.14

SMALL RUMINANT HOLDINGS OF KAYA HERDER SAMPLE MEMBERS[a]

Village	Number of Households[b]	Goats Held per Household					Sheep Held per Household					Total Small Ruminants Held per Household				
		Minimum	Maximum	Total	Mean	Std.Dev.	Minimum	Maximum	Total	Mean	Std.Dev.	Minimum	Maximum	Total	Mean	Std.Dev.
Pissila	18	0	60	162	9.0	14.2	0	70	205	11.4	16.1	4	77	367	20.4	21.0
Tébré	22	0	30	159	7.2	7.9	0	40	236	10.7	11.2	0	60	395	18.0	16.6
Zeko	15	0	13	58	3.9	3.7	0	10	54	3.6	3.6	0	22	112	7.5	6.2
Samtaba	17	0	30	102	6.0	7.0	0	60	170	10.0	14.0	0	90	272	16.0	20.4
Total Kaya	72	0	60	481	6.7	14.2	0	70	665	9.7	12.4	0	90	1146	15.9	17.6

[a]From responses to questionnaires and verification by other villagers.

[b]Number of households responding to question.

TABLE 4.15

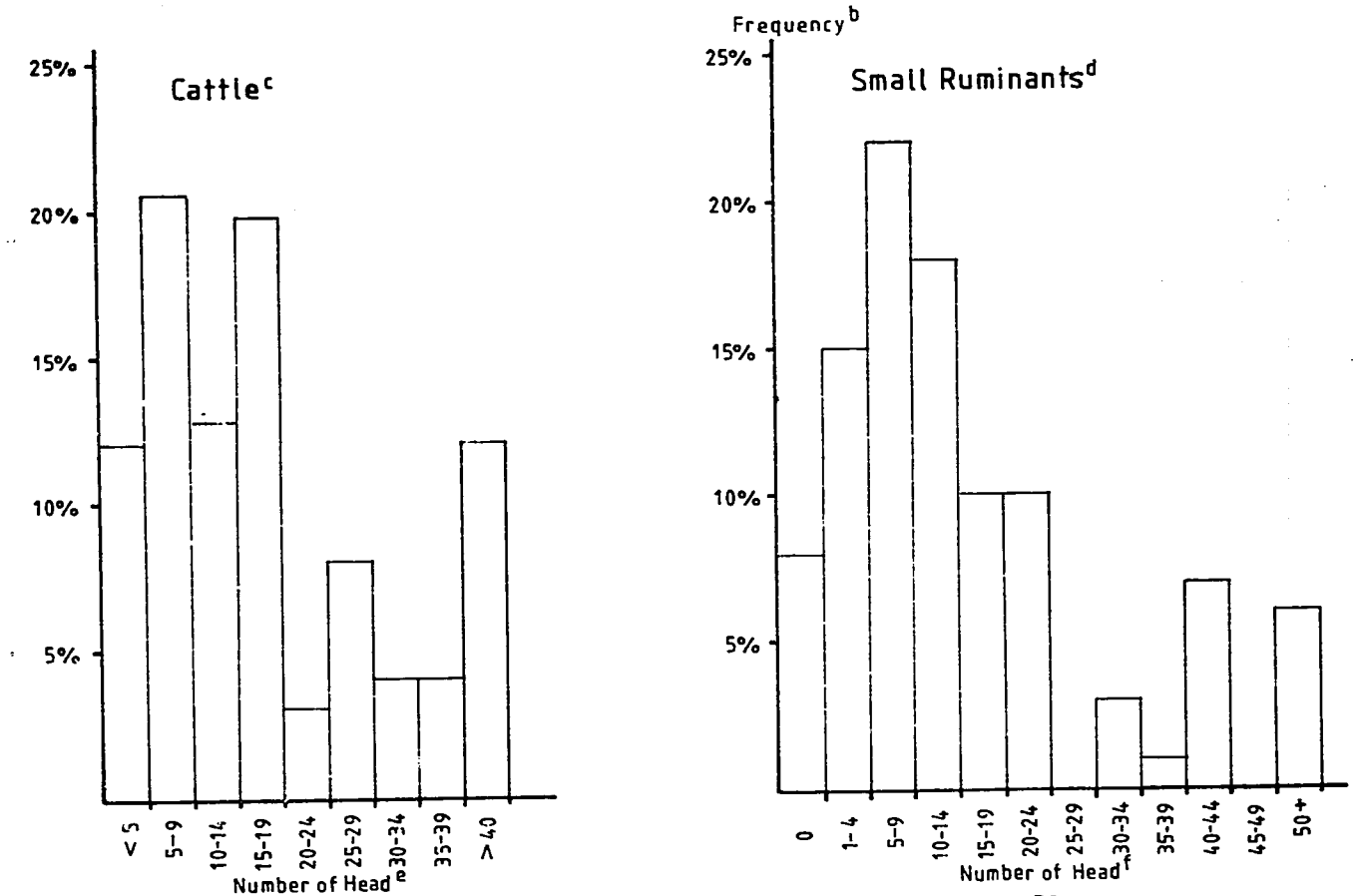
COEFFICIENTS OF VARIATION $\frac{s_i}{\bar{x}_i}$ OF LIVESTOCK HOLDINGS

	n	Cattle	Small Ruminants
Djibo Sample Households	87	0.681	-
Pouytenga Sample Households	72	0.527[a]	1.037
Kaya Sample Households	69	0.819[b]	1.217

[a]For 76 households.

[b]For 72 households.

FIGURE 4.3 Frequency Distribution of Numbers of Livestock Holdings of Kaya Herder Sample Members[a]



a. From responses to questionnaires
b. % of households owning that number of small ruminants
c. Total households = 69

d. Total households = 72
e. Mean = 17.1, Total number of cattle = 1667
f. Mean = 15.9, Total number of small ruminants = 1146

TABLE 4.16

PRINCIPAL OCCUPATIONS OF KAYA HERDER SAMPLE MEMBERS[a]

Village	n[b]	Livestock Raiser					Farmer					Butcher					Livestock Merchant				
		1[c]	2[d]	3[e]	4[f]	T[g]	1[c]	2[d]	3[e]	4[f]	T[g]	1[c]	2[d]	3[e]	4[f]	T[g]	1[c]	2[d]	3[e]	4[f]	T[g]
Samtaba	18	17	-	-	-	17	1	16	-	-	17	-	-	-	-	-	-	1	9	-	10
Piassila	18	18	-	-	-	18	-	18	-	-	18	-	-	2	-	2	-	-	9	-	9
Tébré[h]	23	23	-	-	-	23	-	20	-	-	20	-	-	-	-	0	-	-	-	-	0
Zéko[i]	15	13	-	-	-	13	2	13	-	-	15		2	8		10	-	-	1	-	1
Total Kaya	74	71	-	-	-	71	3	67	-	-	70	-	2	10	-	12	-	1	19	-	20

[a]From responses to questionnaires.

[b]Number of household heads responding.

[c]Principal occupation.

[d]Secondary occupation.

[e]Third occupation.

[f]Fourth occupation.

[g]Total engaged in that activity.

[h]In addition one subject is a cola nut merchant, another sells general merchandise, and a third is a weaver, all listed as third occupation.

[i]Includes one tailor and one dyer, both third occupations.

Cattle Market Surveys

Four cattle market surveys were conducted concurrently with the village level surveys. The purpose of the surveys was twofold: first, they were to generate data on cattle flows and prices which would be informative in and of themselves and also lend themselves to the broader evaluation of market performance. Secondly, the surveys were the basis for describing and analyzing market organization and conduct. This section will detail the specific methodological format that was followed and will briefly describe the four markets that were selected for observation.

Survey Techniques. -- One of the advantages of the village level survey methodology was that it allowed the enumerators to divide their time between the herder surveys and data collection on other livestock marketing activities. After administering the questionnaires, their major responsibility was the preparation of a report on the market activity in the major cattle market in their region. Enumerators attended as many of the market meetings as was possible with their village survey obligations. Since most Voltaic livestock markets are held either every third day, or once a week, it was not too difficult to arrange schedules that allowed most market meetings to be surveyed.

At each market, the enumerator was responsible for recording five categories of information: the number, origin, and seller of animals presented for sale, a description of the animals sold, cattle prices, buyers and destinations of purchased animals, and general remarks. To accomplish this, the enumerators had to familiarize themselves with the regular market participants, especially the intermediaries who handled most of the transactions. They were trained to be able to identify the different breeds and sexes, and to estimate cattle ages and weights. It was imperative that they arrive at the cattle market early, before any market activity began, so that they could collect the necessary information on the groups[28] being offered for sale. They remained in the market until all official activity had ceased. While the market was in progress, they circulated, noting relevant information in small notebooks for later transcription onto the market report forms (a copy of the form on which the information was recorded is found in Appendix A).

1. The Number and Origin of Cattle Offered for Sale.--For each group appearing in the market, information was recorded on the number and origin of cattle, the number and origin of the sellers or owners, and the type of sellers or owners. This information was entered in the first column of the market report form. The total number of cattle and the different groups was recorded at the top of the form.

2. Description of the Cattle Sold.--For each sale of an animal, the enumerator marked down the sex, estimated age, and estimated weight of the animal. To estimate the age, the enumerator tried to obtain the information from the seller. When the seller didn't know, a method of estimation using the appearance of the animal's horns was employed. This system was developed after consultations with local livestock agents and butchers. During the course of the survey, a test was arranged to determine the accuracy of this method against actual ages as stated by herders. For a sample of twenty cattle (six cows, eight uncastrated males, and six castrated males) owned by five herders in the Djibo region, the mean of the differences between ages estimated by the "horn" method and ages given by the herders was 0.1 years, with a standard deviation of 1.07 years. The largest deviation in either direction was two years. Since the mean of the differences is not statistically significant from zero, the implications are that the estimation method used produced unbiased estimates, usually accurate within one year.

Getting information on animal weights was more difficult. None of the markets surveyed had scales available for weighing cattle. The only alternative was to estimate the liveweights.[29] One of the enumerators had been an agent for a livestock merchant and had considerable experience in evaluating cattle weights; he had often delivered cattle to a buying station in Paga; Ghana, where cattle are purchased by liveweight. He used his expertise to train the other enumerators in methods of cattle weight estimation. Later, when scales were installed in Ouagadougou, the opportunity arose to test his skills. A sample of thirty-two cattle were weighed after he had estimated their liveweight. The mean of the differences between his estimates and the actual liveweights was 7.84 kilograms, with a standard deviation of 20.3 kilograms. This indicated a slight positive bias, or tendency toward overestimation of liveweights.

Another test was performed to measure the bias of the other enumerators' weight estimations. Live and carcass weights were known for 140 cattle weighed at the Ouagadougou abattoir betweeen February 28 and March 11, 1977. Dressing fractions were computed and the results applied to the carcass weights of cattle slaughtered in Ouagadougou, Kaya, and Pouytenga in order to obtain expected values for the liveweights of those animals.[30] The sample was broken down according to sex and weight strata, and the appropriately determined dressing fraction used for each. The computed liveweights were then compared with the enumerators' estimated liveweights and the means of the differences were tested against the hypothesis that they significantly different than zero; in other words, biased. The results are summarized in Table 4.17.

Though the figures must be regarded cautiously because they measure estimates against expected liveweight values and not known liveweights, they are impressive, nevertheless. They show that the enumerators in Ouagadougou and Pouytenga were remarkably accurate in their liveweight estimates. For those two, the biases are slight, often statistically insignificant. In addition, the standard deviations range between 20 and 30 in all but one case (those Pouytenga cattle which weighed over 150 kilograms in carcass weight, of which there were only five observations). The implications are that these two individuals were usually able to judge liveweight to within twentyfive or thirty kilograms. The results for the Kaya enumerator were not as encouraging, since he showed a large positive bias and wider variance in his estimation errors. It would appear that his estimates of liveweight are approximately forty to seventy kilograms in excess, on the average, with a high probability of larger errors.

TABLE 4.17

DIFFERENCES OF ENUMERATORS' ESTIMATED LIVE WEIGHTS FROM COMPUTED LIVEWEIGHTS (Standard Deviations in Parentheses)

Cattle Type	Enumerator 1 (Ouagadougou)	Enumerator 2 (Pouytenya)	Enumerator 3 (Kaya)
All Cattle	0.84081 (25.773)	0.18820 (28.922)	40.482[a] (34.079)
Males	1.5878 (27.920)	-12.534[a] (27.647)	48.322[b] (46.238)
Females	- .84428 (20.306)	6.5495 (27.504)[a]	39.796 (33.019)[a]
Carcass weight less than 100 kg.	-2.5225 (20.270)	1.8973 (21.509)	39.590[a] (30.215)
Carcass weight between 100 and 150 kg.	- .41995 (21.549)	- .36264 (26.480)	73.869[a] (44.682)
Carcass weight greater than 150 kg.	1.6524 (21.549)	14.085 (39.906)	no observations

[a]Statistically significantly different from zero at .01 level.

[b]Statistically significantly different from zero at .05 level.

It is unfortunate that no measure of expected bias or deviation could be calculated for the enumerator in Djibo. This will be considered in later chapters, when demand equations are estimated using the estimated weight information. In general, though, it appears that the estimated liveweights are useful pieces of information and that the enumerators performed admirably.

3. Cattle Prices. -- The bargaining process that takes place between buyers and sellers (often intermediaries) in Voltaic cattle markets is almost always open. Money also exchanges hands openly in the market. This made the collection of data on market prices easier to obtain than had originally been anticipated.[31] The enumerators circulated throughout the market and recorded prices as they saw negotiations terminate in sales. In those cases where the enumerator was not present at the time of sale, the intermediary was consulted regarding the price. The intermediaries rarely failed to report readily the price they had negotiated for their clients. Where possible, corroboration was sought from the buyer or seller.

4. Buyers and Destinations. -- Enumerators made an effort to acquaint themselves with the regular buyers frequenting the market in which they worked. Those regular buyers were then assigned a numeric or alphabetic code which could be used to determine the market activity of each. The usefulness of the data was ultimately diminished, for three reasons. First, in two of the markets the enumerators did not code consistently, thus no calculations could be made of the market activities of specific buyers across market days. Secondly, in markets such as Ouagadougou, buyers often buy cattle together, one acting as an agent for several. The result is that activity tends to be less concentrated than the data show. Finally, coding errors rendered much of this information useless, and the errors were noticed too late to be corrected without a significant expenditure of time and money.

The data that did prove useful related to the profession of the buyer and his stated destination and method of transport for the animal. Thus, each sale of an animal which was recorded shows whether the buyer was a butcher, trader, livestock raiser, or government purchasing agent, and whether the purchase was by an individual or a group. Additionally, the record shows whether the animal was to be slaughtered locally (and in some cases the probable destination of the meat), slaughtered elsewhere, shipped to another market in the country, exported, or where it was taken to be raised or fattened. The enumerator also recorded the total number of butchers and traders who were active in the market, whether they bought an animal or not.

5. General Remarks. -- These observations took two forms. The first included information of a general nature concerning the market conditions, holidays which effected unusual market activity, and unusual situations which might be of interest for explaining market organization or conduct. Examples of three of these remarks are given here (translated from enumerators' French):

> a. Djibo, December 1, 1976: Today's market showed very little activity because tonight is the evening before the Moslem holiday of Tabaski. None of the regular buyers from Ouagadougou or Kaya were present in the market. The only buyers were two cattle merchants from Djibo and several local livestock raisers. As a result, only fourteen of the sixty-six cattle presented for sale were actually sold.
>
> b. Djibo, February 2, 1977: Today the market courtiers tried to raise to 500 francs the commission they charge for selling an animal. They say that that is the amount received by intermediaries in other markets. The buyers, however, refused to pay more than the normal fee of 250 francs. The intermediaries appealed to the percepteur of the market but he claimed that he had no authority in the matter. The courtiers say that they will continue to try to raise the fee and will appeal to the sous-prefect for permission to enforce the new rate.
>
> c. Ouagadougou, February 11, 1977: Today marked the third appearance in the last two years of trader X from Yatenga. The merchants and butchers were very hostile toward him and none of the intermediaries would deal with him. During his first two visits to the market.....he had broken many of the rules of etiquette in the market including trying to sell his cattle without any intermediary.....(The note goes on to explain the exact conditions under which his cattle were eventually sold).

The second type of remark concerned the sales of specific cattle. Enumerators noted cattle in poor health, cattle which were obviously boeufs de case (identifiable by ropes attached to their nostrils), and other conditions which may have affected the selling price of the animal.

Market Sites. -- The four cattle markets that were surveyed are Ouagadougou, Djibo, Kaya, and Pouytenga; the latter three, of course, being the major markets for the three village-level survey sites. There were several reasons for selecting these markets. They represent four of the most active cattle markets in Upper Volta; this can be seen in Table 4.18. Though the table reflects the official statistics, which are known to be far from exact (especially those for Bobo-Dioulasso, which undoubtedly undervalue the level of cattle marketing activity in that city's markets, for reasons explained in the footnote to the table) it is clear that the four markets chosen for the survey are among the most important in Upper Volta.

The Djibo market was especially interesting. It is one of Upper Volta's major marchés de collecte, or primary cattle markets, in the pastoral zone. This allowed observations of large numbers of herders selling directly in cattle markets. The Djibo market was also attractive because of its location near the Malian border; the issue of cattle inflows from Mali and Niger was broached in Chapter 2. The inclusion of Djibo presented the possibilty of measuring the number of cattle still entering Upper Volta illegally from Mali. The cattle traders and herders who bring cattle into Upper Volta clandestinely often go no farther than the nearest major market,

TABLE 4.18

NUMBER OF CATTLE OFFERED FOR SALE ANNUALLY IN VOLTAIC MARKETS

Market	Year									
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Djibo	-	-	-	13328	13197	15210	9787	6949	9403	54495[b]
Ouagodougou	30480	32160	26207	28026	31078	43537	40364	35490	25278	-
Kaya	27199	32111	24482	31922	33794	29102	33973	21181	14950	16832
Pouytenga	22013	26420	18508	27042	28327	25779	37589	22440	24175	47508
Bobo-Dioulasso[a]	11567	18716	15000	28614	26867	21372	6177	9782	n.a.	n.a.
Dori	9888	6314	7150	2225	7595	4629	3658	3762	4086	3298
Markoye	47241	28664	22770	21467	24354	23935	18579	13359	6387	5262
Youba (Ouahigouya)	3725	6427	4587	8347	5530	4232	4383	6065	2808	6030
Diapaga	6085	6350	4374	688	2883	2570	6193	29	110	583

SOURCE: Statistiques: Direction des Services de l'Elevage, Ouagadougou, Haute Volta.

[a]The figures for Bobo-Dioulasso are curious since market entries are considerably exceeded by recorded slaughters in the Bobo-Dioulasso Abattoir and most butchers purchase cattle at the city's cattle market. There are, however, two separate cattle markets in Bobo-Dioulasso (as is explained below) and the numbers recorded may reflect only one of these markets.

[b]Questionable figure. Most likely should be 5495.

and are well known to the intermediaries and other market participants in those markets. The intention was to use their knowledge to identify these cattle and then describe the volume and characteristics of such entries.

Aside from their size, the three other markets had characteristics which made them attractive from the point of view of research. The cattle markets in Ouagadougou, Kaya, and Pouytenga can all be typified as marchés de regroupements, or redistribution markets; this means that many of the transactions take place between traders. Accurate reporting of marketing activity, especially concerning origin and destination of cattle, would serve to identify more precisely the major cattle flows within Upper Volta. It would also enable evaluation of market power held by traders operating along the various trade vectors. The selection of Ouagadougou and Pouytenga was also motivated by the fact that those two cities are major embarkation points for cattle exported to coastal markets. The location of marketing surveys in those two cities allowed the enumerators to look at export herds and obtain a good deal of cost information from exporters and convoyeurs. The market surveys themselves could shed light on the question of where export herds are formed, in the north by long-distance traders who by-pass intermediate markets, or at the points of embarkation by traders who specialize in exports alone. Finally, the inclusion of Ouagadougou enabled the collection of data in the country's largest meat consumption center. In the Ouagadougou cattle market, butchers compete with exporters for slaughter cattle; it was interesting to observe how cattle are distributed between the two. To what degree are the locally slaughtered cattle made up of "skinny" cows? Is it simply the market price mechanism which determines the distribution of available quantities of cattle during seasons of short supply? These are some of the questions which the Ouagadougou market survey sought to answer.

In general, then, the four markets selected for the cattle market surveys presented a broad range of market types, cattle suppliers, and a variety of demand.

Slaughterhouse surveys

In the three market research sites in which there were regular local slaughters, three to four - month carcass-weighing surveys were instituted. These surveys gave a reliable base from which to calculate unit prices of both live animals and meat. As noted in the previous section, one of the major deficiencies of the market surveys was their inability to record exact animal weights. The carcass weighings allowed accurate comparisons of prices per unit of weight between markets and among animal types, sexes, ages, etc. These comparisons were, of course, limited to cattle slaughtered locally and could not be made with the same precision for live cattle which were exported and could not be weighed. Also, the survey was part of the study of the components of retail meat prices. The original statement of goals and methodology can be found in Appendix A. What is presented here is a summary of that statement.

The goal of the study was to separate the various components of costs and margins attributable to the different activities and agents in the marketing chain between the purchase of live animals in the cattle markets and the retail sale of beef in the urban markets of Ouagadougou, Kaya, and Pouytenga. A sample of cattle was selected prior to slaughter (every day in Ouagadougou, once every three days in Pouytenga and Kaya). The sex, estimated age, and estimated weight of these cattle were recorded by the enumerator. Butchers were asked the price of the animal, including commissions to intermediaries and fees paid to herders for tending the cattle before slaughter but excluding slaughter charges and other butchering costs. The carcasses were then weighed immediately following slaughter.[32] All the information was later transcribed into notebooks or onto carcass weighing forms, an example of which can be found in Appendix A.

Adjustments had to be made for the weight data in Pouytenga, since the carcasses there were weighed with the tail and hooves still attached, while in Ouagadougou and Kaya carcasses were dressed in the standard way. To correct for this, the hooves and tails of a sub-sample of cattle in Pouytenga were weighed. The resulting figures were then correlated with cattle age, sex, and gross carcass weight, and an estimator of hoof and tail weight was developed based on those variables; expected hoof and tail weights were then calculated for the cattle in the overall sample. The computed weights were subtracted from the recorded carcass weights to give an approximation of net carcass weight comparable with the data from Kaya and Pouytenga.

For each animal, a price per kilogram was calculated. The final sample included 680 cases from Ouagadougou, 233 cases from Kaya, and 206 cases from Pouytenga.

Retail Meat Price Survey

The logical extension of the slaughterhouse surveys was a retail meat price survey carried out in Ouagadougou between November 1976 and March 1977. The high cost of the scales needed for the survey and time constraints on enumerator's time precluded similar studies on a regular basis in Kaya and Pouytenga. Occasional purchases of retail meat were made in those two cities, and the meat carried back to Ouagadougou and weighed one day afterward. Attempts were made to adjust for shrinkage in those cases.

In the Ouagadougou study, a calendar of meat purchases was set up to provide observation on a variety of beef cuts and organ parts (see Appendix A). The most important part of the survey was the observations on meat piles (tas), which accounted for between one-third and two thirds of retail sales, according to retail butchers. Three sizes of tas were purchased weekly. The day of the week was rotated to avoid any bias that might have been exhibited by butchers in that regard. Three samples of each size tas (25-franc, 50-franc, and 100-franc) were purchased. Halfway through the survey the 25-franc tas samples were replaced with purchases of 100-franc boneless tas, when it was determined that the latter were more important in terms of total sales.

The purchases were made by a young African who posed as a houseboy to avoid the bias which would naturally have resulted, had the American investigator or a well-dressed African made the purchases. The tas were weighed and then separated into component parts of skeletal meat, bone, fat, and offals,[33] which were also weighed. All information was then recorded on a form, an example of which can be found in Appendix B.

Other meat varieties were recorded, somewhat less regularly. They include: filet, faux filet, cuts of meat with bone, cuts of meat without bone, hooves, muzzle meat, tail, bosse (hump from zebu cattle), tripe, brain, liver, kidney, tongue, and heart. In the case of organs which are always sold whole (brain, tongue, etc.), observations of price and approximate size (large, medium, small) were made weekly, though actual purchases were limited to two or three throughout the period of the survey. As with the tas, the purchases were weighed, and where appropriate, divided into skeletal meat, bone, fat, and offal. The information was then recorded on the same form.

Export Surveys

Two types of export surveys were employed during the study. The first involved recording information on export herds departing from the four survey regions. The second involved collecting information from returning convoyeurs concerning time en route and losses through mortality and forced sales.

The export reports recorded for departing herds involved interviewing exporters and convoyeurs; this information, which was similar to that recorded in the cattle market surveys, was recorded on a form which can be found in Appendix A. After noting the date, origin of the herd, and the destination, the enumerator marked down the preassigned code of the exporter. He then recorded the number of owners and convoyeurs. Where possible, he surveyed the herd himself to determine the composition of the herd according to sex, age, and estimated weight. The exporter was questioned concerning the price he paid for the cattle and his expenses. The exact itinerary and method of transportation between each point were also recorded.

The reports from Ouagadougou were primarily from information obtained at the Ouagadougou train station. The enumerator recorded information on almost every herd exported from Ouagadougou by train between August 1976 and February 1977, the peak exporting season. As noted before, the enumerator in Ouagadougou had previously worked as an agent for one of Ouagadougou's most important cattle merchant families. Because of his familiarity with all of the major exporters shipping through Ouagadougou, he was able to obtain very complete information on most expeditions.[34]

In addition to the regular reports from the train station, the Ouagadougou enumerator and the three enumerators from the other research sites recorded similar information for exports to other destinations, primarily Ghana and Togo. These reports were irregular and depended upon enumerator availability at the time of departure for the export herds.

The other type of survey was made through interviews with ninety-seven convoyeurs returning from taking cattle to Abidjan. They were questioned on the date of departure (all of which were already noted in the export reports), date of arrival in Abidjan, number of cattle loaded in Ouagadougou (also confirmed by export reports), number unloaded in Abidjan, number of cattle dying en route, number of dead cattle sold, number thrown out without compensation, and the number of emergency sales of live animals. This information was then used to compute mortality and forced sale losses for cattle exported by train from Ouagadougou to Abidjan. Similar reports were also made for eighteen herds transported to other destinations on foot. An example of the form used can be found in Appendix A.

Butcher, Trader, and Intermediary Interviews

Throughout the course of the field work, the investigator conducted interviews with forty-one market participants. The interviews covered the professional activities of the subjects, as well as personal information used to compile a profile of typical butchers, cattle merchants, and intermediaries. The interviews followed a structured form where possible (a copy of the questionnaire can be found in Appendix A) but often involved lengthy social visits from which information was culled for later transcription onto questionnaires. Many of the interviews took more than one visit to complete, and several are incomplete because of the subject's reluctance to sit through the tedious questioning.

The areas covered by the interviews include:

1. Personal information.
2. Other economic activities.
3. Entry into the profession.
4. How animals are purchased.
5. Slaughter information (for butchers).
6. Terms of resale (for traders and intermediaries).
7. Costs for each profession.
8. Relationships with other market participants.
9. Histories of market activities.
10. Attitudes toward proposed government market interventions.

Investigator Observation and Participatory Activities

The several structured surveys that collected a wide range of data on livestock marketing were complemented by the direct participation of the investigator in most of the market activities for which data was collected. The information obtained in this manner proved invaluable for understanding the organization of cattle markets and for verifying much of the data collected by the enumerators. In a personal marketing situation where prices are determined by face-to-face negotiation by the buyer and seller, it is crucial to be able to observe the relationships which apply throughout the marketing system. The investigator had the opportunity to spend time in all of the markets surveyed. Time was also spent in the stalls of retail butchers in Ouagadougou,

Kaya, and Pouytenga, watching the activities of the butchers and their apprentices as they made up tas for customers, adding pieces of meat and offal for regular customers, giving short tas to customers who had not paid their debts, and exchanging meat with other butchers who had run short. The investigator trekked cattle with convoyeurs for short distances, observing the efforts of the drovers as they tried to keep the cattle out of fields and limiting the water intake by the cattle before they were to be loaded on the train to Abidjan.

Butchering and meat wholesaling and retailing cannot be fully understood unless directly observed. It took weeks and often months before the investigator understood the economic function of each of the participants involved in the livestock marketing system, and an equal amount of time before the confidence of the market participants could be won. Even then, the equilibrium between investigator and market participants was tenuous. The poor relations between the original Kaya enumerator and local butchers, traders, and intermediaries threatened to disrupt the survey in that city. Only through the sincere efforts of the new enumerator, and the willingness of the investigator to observe even the most detailed aspects of marketing and butchering at various hours of the day, was the good relationship regained.

In Ouagadougou, a European employee of the abattoir began meat export operations of his own in January, 1977. The butchers felt threatened by this competition, and immediately assumed that the investigator had the same intentions. Relations were strained for several weeks, resulting in poor data which had to be deleted. Their confidence was restored later that month when they heard of the investigator's intention to participate in one of the most arduous of all of the marketing tasks, the convoying of cattle on the train to Abidjan. Whether they were amused by this effort or impressed by the resolve to gather the most exact information possible, the reaction was one of openness as market participants began volunteering information and presenting themselves at the investigator's home to be interviewed whereas before they were reluctant to submit to the interview ordeal.

Throughout this monograph, attempts will be made to substantiate assertions about market structure, behavior, and performance with data collected formally by the study. It should be remembered, however, that some aspects of market organization and conduct cannot be described by statistics alone, and where possible, an effort has been made to interject some of the subjective observations of the members of the research team.

FOOTNOTES TO CHAPTER IV

[1]Three examples will help illustrate the distrust traders and butchers have of government regulation of livestock marketing activities: 1. In July and August, 1975, the government attempted to open the newly constructed mechnized slaughterhouse on the outskirts of Ouagadougou. For reasons that ranged from opposition to the method of slaughter on religious grounds to fears that several hundred apprentices would be misplaced and slaughter costs increased, the butchers refused to move their operations from the old abattoir; 2. A FED financed program to furnish livstock markets with modern equipment was carried out between 1974 and 1976. The equipment included fencing, cattle chutes, scales, and administrative quarters. In every market surveyed by the investigator, market participants declared their opposition to any move to use the new facilities. The pervasive belief among traders was that this is the first step in a government plan to take over livestock marketing; 3. The CEBV has a system of livestock passports which are supposed to be completed by all exporters and delivered to government livestock agents. The idea of centralizing the collection of information on commercial livestock traffic is meritorious, though its implementation by means of another piece of paperwork to be filled out by traders was poorly conceived. Traders already have at least five pieces of paperwork to fill out (license, sanitary permit, export authorization, certificate of origin, customs papers, and transportation papers), each accompanied by a fee. The suspicion among traders is that though the livestock passport is currently free, it will not remain so for long.

[2]The Entente includes Benin, Ivory Coast, Niger, Togo and Upper Volta.

[3]In his farm management survey in Upper Volta, Delgado used approximately fifty-two enumerator man-months to survey sixty Mossi and Bisa households, forty-one of which produced complete and reliable enough data to be retained in the final sample. Even ignoring the differences between the Mossi/Bisa and Fulani lifestyles which would undoubtedly make a Fulani study more taxing in terms of enumerators' time, the same sample-to-enumerator ratio would have permitted a full year's survey of less than forty households, given the budgetary limitations of this study.

[4]Assuming an average household herd size of forty cattle and the prevailing national offtake rate of about 12 percent, a forty-household sample would yield less than 200 observations on cattle sales over a year-long period, or about sixteen observations per month. If one uses sixteen age-sex categories (age intervals of 1, 1-2, 3-4, 5-6, 7-8, and 9+, sex classifications of bull, steer, and cow) there would likely be gaping holes in the data, a high probability that the findings not be representative, and little chance of getting statistically significant results from data analysis where the number of observations in each "cell" is so small.

[5]For analysis of livestock prices, composition of marketed animals, etc., all cases were included. For purposes of examining herder revenue, only regular respondents were included.

[6]All three of the enumerators working in villages were trilingual (French, Moré, and Fulfuldé) and two of them also spoke Dioula, West Africa's language of commerce.

[7]Unless otherwise noted, the source of all information on human demographics in the Djibo region were obtained from unpublished records at the Djibo Sous-Perfecture or from personal communications from the personnel of the Sous-Prefecture.

[8]In conversations with several Fulani who inhabit regions in the extreme north along the Malian border it was learned that many of these individuals regularly travel fifty or more kilometers by camel or on foot to get provisions in one of these three small markets but rarely continue the additional ten to thirty kilometers to do their marketing in Djibo.

[9]In addition to the discussion with Reisman, the investigator also found his book dealing with his study of Fulani social behavior very helpful (Reisman, 1977).

[10]As noted, the Fulani of the region do not live in large sedentary villages, but rather in relatively small camps surrounding the major villages. All of the sample members fit this pattern, and thus the use of major village names rather than the individual names of the numerous camps in which they actually dwell is a simplification. The justification of this is found in the fact that the Fulani "belonging" to a sedentary village are socially and economically attached to each other and to the sedentary residents (Riamibé, Sonrai, Foulcé, etc.) of the village.

[11]Others include members of the extended family living in the household on a permanent basis.

[12]Getting information on herd size and composition was perhaps the single most difficult aspect of the herder surveys, especially in the Djibo region. Direct questioning is unreliable and usually met with obvious

fabrications or quiet refusal to answer. The fact is that it is socially unacceptable even to ask a Fulani herdsman such questions, and for those reasons the enumerators were asked to discreetly obtain the information. It was found that the most reliable method of obtaining such data was by observing the herder or his sons at the well during the dry season (February and March in this case) and try to count the number of head that the household watered. Where possible, subtle questions were raised regarding the whereabouts of any other parts of the family's herd. While this method of data collection is quite obviously imperfect, it was the only alternative available for estimating the size of the herd management unit if not ownership unit without risking the complete alienation of the sample members. Since few herders claimed to entrust any cattle to others, and since no household members were said to be on transhumance during the herd survey period, it is believed that the figures collected are a good approximation of the household ownership units. Unfortunately, it was almost impossible to collect herd composition data for cattle, or any sort of data for goat and sheep herds.

[13]The gasoline is sold to the few residents and passing traders who own small motor bikes. With the exception of the military, local government officials, and researchers, there is no vehicle traffic north of Djibo.

[14]No exact figures could be obtained concerning the breakdown of economic activity by the townspeople. Both the local tax collector and the livestock agent concurred that there was not a single family living in Pouytenga proper which did not have someone engaged in either merchandise or livstock marketing or related activities, with the sole exceptions of the civil servants and the chef de canton.

[15]Unlike the other two research zones around Djibo and Kaya, the villages included in the Pouytenga area survey are not all part of the same administrative region; they are controlled by three separate regional governments. Though this complicated some of the administrative formalities, it posed no significant problem since all four villages are linked to Pouytenga economically (by the importance of the market) and by the Livestock Service station in Pouytenga, which serves the entire region.

[16]The idea of having the American investigator team up with a local counterpart was initially a requirement for all of the Entente Livestock Project field studies. Ultimately it was decided to forego this approach on a full-time basis, because of budget constraints and the difficulty involved in finding available qualified personnel. The author was fortunate in having arranged for one of the staff of S.A.E.D. (Société Africaine d'Etude et de Developpement), Drabo Goussina, to participate in the design and organization of the field work.

[17]The investigator later learned that one of the reasons for the high rate of response for volunteers in the Pouytenga and Kaya regions was the belief by the villagers that such surveys are usually preliminary to development projects. Each villager hopes to make a good impression in order to be considered for the next stage. Where it was discovered that this misconception may have been prevelant, a meeting was arranged with the village chief and the subjects to re-explain the purpose of the study.

[18]These results can be contrasted with Delgado's for Mossi and Bisa in the Tenkodogo region. He found that the non-Fulani peasants never kept their own cattle (they entrusted them to local Fulani) but used family labor for sheep and goats. Casual observation by the investigator shows that some Mossi peasants in Wenga and Bougritenga did keep some cattle themselves, mostly milk cows and boeufs de case (cattle in the family compound fed a daily ration consisting of farm crop residue or agro-industrial by-products).

[19]The difficulty of getting herd sizes for Fulani herders was discussed in the section in the Djibo herder sample. Obtaining herd size data in Pouytenga and Kaya was complicated by the fact that many of the cattle managed by the Fulani belong to others while a large share of the cattle owned by the Mossi sample members are entrusted to Fulani herders. Because of this, the survey method of observing herders while they water their cattle at village wells which worked well in Djibo was not functional in the case of the Pouytenga and Kaya samples. On the other hand, livestock ownership is a delicate subject among both Mossi and Fulani. Delgado cites three reasons why such information would not be readily offered to investigators (Delgado, 1977, p. 14): (1) The size of the family herd is often considered a family secret to be passed on from father to son, (2) Livestock holdings are taxed and peasants feel that information given to investigators might result in their paying higher taxes, and (3) Such information could lead to jelousy and claims on "lending" capacity among villagers. The solution to this problem presented itself to the investigator and his enumerator when a sample member was responding to a question on herd size in front of his village chief. After answering that he owned a small number of cattle, the subject began arguing with the chief. Ultimately the subject changed his answer and the chief's brother --who also served as the village secretary -- verified that the new figure was correct. Once this villager had made his holdings known, he was anxious to assist others in stating the truth. This methodology, when applied tactfully, resulted in what appeared to be realistic responses from the sample members.

[20]By the author's own estimation.

[21]According to local tax records.

[22]This movement took the enumerator by surprise. Normally, one or more of the sample members would meet him in the Pouytenga market and they would make arrangements for holding the monthly interviews. In February he didn't see any of the sample members in Pouytenga and then couldn't locate them at the Fulani camp outside of Dakongo. It took him two days to track them down in their new dry season camp.

[23]Delgado reports the same findings for the Fulani of the Ouegado canton west of Tenkodogo (Delgado, 1977, pp. 62-64).

[24]Delgado states that this critical labor peak comes during the end of June or early July when the fields must be weeded.

[25]Personal communication from Kaya sous-prefecture personnel.

[26]This enumerator remained in the region (after the survey was completed) to work for an international donor agency.

[27]Personal communication from the personnel of the Pissila sous-prefecture.

[28]The work "group" is used in place of "herd" to distinguish between a collection of cattle grouped together in a market and sold by a common intermediary or group of intermediaries and a collection of cattle organized in a common ownership or management unit.

[29]Scales had been ordered as part of market equipment program carried out by the government. In several of the markets the scales arrived in the market cities during the course of the study. Except in Ouagadougou, they remained crated or otherwise inaccessible during the duration of the study. In Ouagadougou they were available beginning February 28, 1977, the exact day the survey was scheduled to end. Certain butchery animals were weighed between February 28 and March 11, 1977. The alternative of using cattle tapes to estimate weights based on measurements of girth was not used for two reasons. First, the vast assortment of cattle types (breeds, sexes, feed condition) makes such estimation inexact. Though the relationships are known they depend upon subjective selection of a coefficient that varies by 13 percent (Memento de l'Agrinome, 1974). Additionally, none of the enumerators were willing to measure the cattle.

[30]Because of the dearth of cattle slaughters, no carcass weighing was done in Djibo. Thus, it was not possible to apply the same test for the enumerator there. It might be worthwhile to note that he was thought the best trainee among the three novices trained by the experienced enumerator.

[31]Original skepticism concerning the ability of the investigator or enumerators to record accurate price information stemmed from a comment by Dwight Bishop (1972, p. 25), "Bargaining between the producer and the broker and the broker and the buyer is done in great secrecy so that neither the seller nor the buyer knows how much the middleman is getting....". Frankly, the experience of this investigator found that not to be the case in the four markets surveyed.

[32]In Kaya and Pouytenga no regular weighing of carcasses took place before the practice was instituted by Entente Livestock Project personnel. In Ouagadougou, the Abattoir Frigorifique weighs carcasses as a matter of course, and these weights are recorded in notebooks by abattoir personnel. To the best knowledge of the investigator this information has never been utilized for any purpose other than the computation of monthly weight averages by the livestock service.

[33]In Ouagadougou, tas are rarely sold with meat and offal combined. Offal is purchased separately, and several observations of offal were included in the survey.

[34]The enumerator in fact acted as a bookkeeper for many of Ouagadougou's cattle exporters. These traders willingly provided him with the necessary information so that he could give them a written accounting of total expenses. When he prepared the statement he would make two copies.

CHAPTER V

ANALYSIS OF LIVESTOCK SALES BY HERDSMEN

This chapter sets forth the major empirical findings of the research arising from the herder livestock marketing surveys. It begins with a description of the composition of marketed livestock, on which hinges the Stratification Policy discussed in Chapter 1. The next section examines the seasonality of herders' livestock sales and contrasts the data with the conventional suggestion that the timing of sales puts herdsmen at a disadvantage in terms of animal quality and bargaining power. The third section looks at the other characteristics of livestock sales by herders to see if evidence of inequality of bargaining strengths could be found there. The final section presents a model of price variation for cattle sold by herdsmen, employing variables on both marketing and animal characteristics. The model is estimated using data from the herder survey. The discussion of the results points to a conclusion supportive of the hypothesis that such sales most often take place in an environment competitive enough to substantially limit the exploitation of market power by marketing agents against herdsmen selling livestock.

The Composition of Marketed Livestock

The question of the composition of sales by herdsmen is especially important in light of the government's intention to implement the Stratification Policy. That entails the formation of a "breeding zone" in the Sahel, in which pastoralists would be encouraged to sell off their stocks of male cattle at a young age so they could be grown out and fattened in the south under more intensive production systems. Table 5.1, however, shows that such a flow of young male cattle seems already to be the case. Three-quarters of all cattle sales by the Djibo area herdsmen were male. Of these, almost two-thirds were sold in their first two years and over four-fifths were sold by four years of age. Given that zebu cattle raised under a system of extensive stockraising don't reach maturity until six years, in general, this would indicate a tendency for the northern pastoralists to sell off young males with significant potential for fattening. This pattern is quite consistent with the traditional Fulani emphasis on milk and animal reproduction as opposed to meat production.

The data collected for cattle sales by southern livestock owners shows a significantly older age distribution. In constrast to the predominantly young male cattle sold by Djibo area herdsmen, less than 2 percent of the Kaya sample's sales were of male cattle two years or younger. The Pouytenga sample sold virtually no cattle in that age bracket. In both southern samples, the vast majority of male cattle were sold between five and eight years of age. While this evidence does not in itself prove that the young cattle sold by northern herdsmen are bought, grown out or fattened, and then sold by southern stockraisers, it does seem to indicate that an indigenous "stratification" system is already in effect.

Table 5.1 also indicates a difference in the sales patterns of females in the three regions. Djibo area herdsmen only sold females at extremely young or old ages. The surprisingly large number of heifers sold can be attributed to the demand and subsequent high prices generated by a herd reconstruction program in Niger. Once cows approach reproducing age in good health, northern Fulani herdsmen are reluctant to sell them. The Fulani herdsmen also tend to cull their cows at old ages. Both Djibo and Kaya area Fulani sold substantial numbers of cows from thirteen to sixteen years old, for an average culling age of 12.05 years. The predominantly Mossi cattle owners in the Pouytenga region appear to cull their cows at much earlier ages; eleven was the oldest reported age at which cows were sold in that region.

Another interesting comparison may be made between sales of cattle and small ruminants (goats and sheep). Table 5.2 presents the data for the Djibo sample, comparing number of sales and revenues from cattle and small ruminants. It shows that although cattle account for less than one-half of the total number of sales, they make up more than 86 percent of total revenues from animal sales. In spite of the fact that almost twice as many goats as sheep were sold by the sample, lower average prices for goats resulted in their contributing only slightly more revenue than did sheep.

Seasonal Variations in Sales

The question of seasonality of agricultural production and the timing of sales and purchases of agricultural commodities by farmers is widely covered in the literature. Most attention is focused on food crops and the economic pressures on farmers in poor countries which cause them to sell off production immediately following harvest when prices are low, and often require them to buy the very same commodities during the pre-harvest period at significantly higher prices (Jones, 1972, p. 15; Abbott, 1976, p. 367). The supply and demand conditions which give rise to this situation are explained by the gestation period and storability of the crop and the seasonality of peasants' cash needs. It might seem that the characteristics of livestock production would not make temporal marketing patterns of livestock as crucial as in the case of staple food crops; however, suggestions that herdsmen are vulnerable to adverse seasonal market conditions have been advanced (Dupire, 1968, p. 357; Rupp, 1975, pp. 72, 120).

The factors which work on the seasonality of livestock sales are: the variations in the condition of the animals and the risk of holding livestock over different seasons (analogous to gestation and storability in the food crop case); the cash needs of the producer and his proximity to markets; and the seasonality of demand. The assertion that herdsmen do not sell their livestock at a seasonally opportune time is based on the view that herders' cash needs outweigh all other considerations and result in sales of livestock during periods of low prices. This section examines the seasonal patterns of livestock sales by Voltaic herdsmen.

Figure 5.1 shows the seasonal variations in livestock sales and revenues for the Djibo herder sample between April 1976 and February 1977. Cattle sales exhibit a very smooth pattern which can be characterized by

TABLE 5.1

SEX AND AGE STRUCTURE OF CATTLE SOLD BY SAMPLE MEMBERS
(Percent of animals sold in each region)

	Djibo[a]		Kaya[b]		Pouytenga[c]	
Age	Males	Females	Males	Females	Males	Females
<2	46.3%	6.7%	7.7%	2.7%	0.1%	-
3-4	14.9%	0.6%	11.7%	3.7%	1.2%	0.1%
5-6	8.9%	-	26.7%	2.7%	26.5%	5.5%
7-8	3.5%	0.3%	29.0%	2.7%	36.1%	17.5%
9+	1.0%	17.8%	7.0%	6.3%	2.5%	10.4%
TOTAL	74.6%	25.4%	82.0%	18.0%	66.5%	33.5%

SOURCE: Field Research, May 1976 - February 1977.

[a]Total of 315 cattle sold over 9 months.

[b]Total of 300 cattle sold over 7 months.

[c]Total of 805 cattle sold over 8 months.

TABLE 5.2

COMPOSITION OF LIVESTOCK SALES BY DJIBO SAMPLE MEMBERS

CATTLE

	No. of Sales[a]	% of Total livestock sales	% of Total cattle sales	Revenues[b]	% of live-stock revenues	% of Cattle revenues
Young males (≤ 4)	192	29	62	3,015,580	43	51
Mature males (≥ 5)	40	6	13	1,498,522	22	25
Total Males	232	36	75	4,514,522	65	76
Heifers	22	3	7	552,405	8	9
Cows	57	9	18	897,120	13	15
Total females	79	12	25	1,449,525	21	24
Total Cattle	311	48	100	5,963,627	86	100

SMALL RUMINANTS

	No. of Sales[a]	% of Total livestock sales	% of Total S.R. sales	Revenues[b]	% of live-stock revenues	% of S.R. revenues
Goats	221	34	65	541,892	8	55
Sheep	121	19	35	444,433	6	45
Total S.R.'s	342	53	100	986,325	14	100
Total livestock sales	653	Total livestock revenues		6,949,952		

SOURCE: Herder Survey

[a]Number of head

[b]CFA Francs

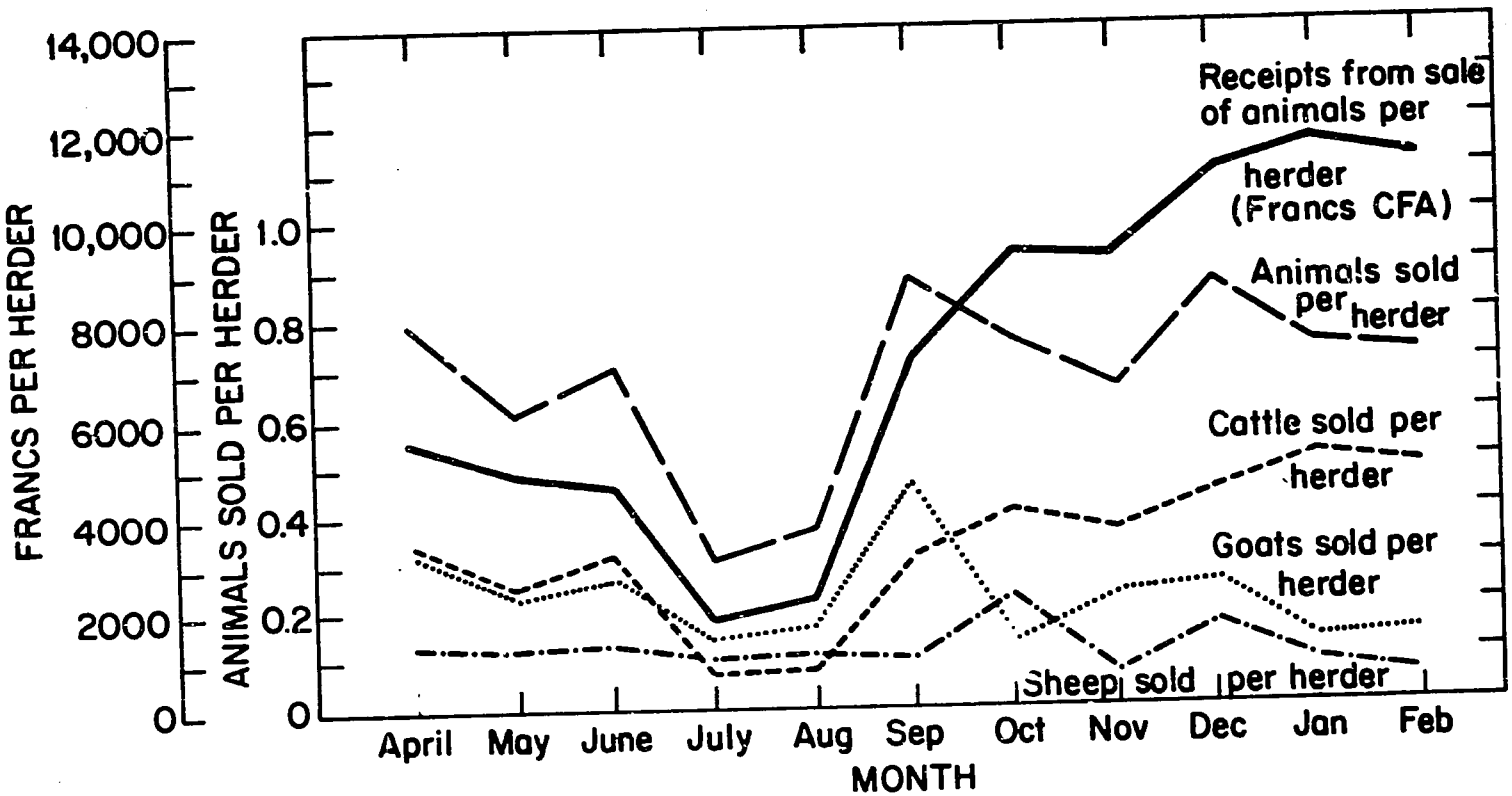


FIGURE 5.1 SEASONAL VARIATIONS: ANIMAL SALES AND REVENUES PER HERDER: DJIBO HERDER SAMPLE, 1976-77

three seasons. Sales are falling during the end of the dry season and into the early rainy season (April-July) with a small upturn in sales in June. The period of heaviest rain (July and August) results in a severe decrease in sales. Cattle sales then increase almost continuously during the end of the rainy season and through the end of the year, tapering off from January to February.

Figure 5.2 which presents the seasonal variation in several Voltaic cattle markets for the period 1970-1976, shows that the pattern found for the Djibo herder sample is indeed reflected in market entries over a long period of time and in other regions. In all four markets shown (Djibo, Kaya, Ouagadougou, and Pouytenga) sales are lowest during the early rainy season (May-July) and then increase rapidly to a peak near the end of the year. There are inconsistent patterns during the dry season (January-May), though in most cases there appears to be a modest peak between March and May.

Returning to Figure 5.1, one notes less of a definite seasonal pattern in the case of small ruminant sales. The level of goat sales is depressed during the rainy season months of July and August and increases in September. It falls precipitously, however, in October, increases in November when cattle sales are falling off, and falls again in January when cattle sales are rising. Sheep sales are remarkably stable throughout the year, with modest peaks in October and December. The rainy season has no depressing effect on sheep sales.

These patterns can indeed be explained by the factors mentioned above. Figure 5.3 shows the assumed effects of various factors upon livestock sales. Those above the month bar are positive effects on supply or demand expected to increase the level of sales. Conversely, those below the time line have depresssing effects on quantity sold.

1. The Condition of Livestock: Livestock put on weight and are in best physical condition following the rainy season and throughout the harvest season. To best take advantage of this one would suppose that herders would sell more livestock during this period. As the livestock's condition worsens throughout the dry season, herders would attempt to hold off sales of their "skinny" cattle, waiting for the rains, when these animals will start gaining weight again.

2. Risk and Salvage Sales: There are instances when herdsmen will sell off animals in poor condition. This occurs when an animal is viewed as too much of a risk to carry through the dry season. Ideally, these animals would be culled when in best condition, say October through January. Still, herdsmen find themselves selling some cattle during the period of greatest risk because of misjudgements they may have made. Thus the positive sale effect, "Emergency Sales," in April and May on Figure 5.3.

3. Herders' Cash Needs: This is the motivation for sale most often discussed in the literature. In the case of the Djibo herdsmen (and applicable to herdsmen throughout the country) the most important needs are for cereals, taxes, household goods, and ceremonial or holiday obligations.[2] Cereals transactions are strongest during two periods: after the harvest (November through January) many herdsmen attempt to purchase millet at what they perceive as low post-harvest prices to make up the anticipated shortfall in their own production for personal consumption. The other major period of grain purchases occurs during the so-called period of soudure, between planting and harvest, when households which run short of grain must purchase supplies to carry them through their own harvest. It should be noted that both of these periods coincide with the time when animals are in good condition.

Payment of taxes is usually required in the late fall, though in some villages it is put off until January or February. Once again this period coincides with the time when livestock are in good condition.

In general, purchases of household goods may be viewed as discretionary expenditures which may be timed so as to maximize the terms of trade between the source of income (livestock) and the object of purchase. There is no a priori reason to suppose that these needs would occur so as to subject the herdsmen to unfavorable terms of trade. There does seem to be an obligation to make many of these purchases, especially clothes and European-manufactured cooking ware, during holidays. This leads to an increase in livestock sales around the period of the major Moslem holidays, Ramadan, Tabaski, and the Prophet's Birthday. Because the Moslem calendar follows an uncorrected lunar cycle which shifts approximately eleven days each year relative to the solar calendar, Moslem holidays have no fixed season and will fall at different times of the year over a thirty-three-year period. During the survey period, Ramadan was in September, Tabaski in early December, and the Prophet's Birthday in March.

4. Proximity to Markets: During the rainy season and into the fall, large parts of the cattle herds are taken away from the villages on their transhumance to northern pastures. One expects this to have a positive effect on sales prior to the movement (May and June) and a negative effect when the herds are removed from market opportunities (July through October).

5. Seasonal Variations in Demand: The seasonal variation in demand is evidenced in three ways. First, northern primary markets like Djibo are almost inaccessible to southern traders during the rainy season. Second, the peak export season runs from September through March. Third, before the Tabaski season, many cattle traders move to sheep trade, thus depressing the cattle demand temporarily and boosting sheep trade, thus depressing the cattle demand temporarily and boosting sheep sales. All of these fit the pattern found in Figure 4.

Comparing the theoretical patterns resulting from these five factors (Figure 5.3) with the actual pattern of sales of Djibo area herdsmen (Figure 5.1) and the seven years' straight averages for four major markets (Figure 5.2) one finds almost perfect correlation. The next step is to look at prices to determine whether there is any definite pattern, especially one that would indicate a disadvantageous selling pattern.

Figure 5.4 presents the average monthly prices of six categories of cattle for the period of May 1976 to April 1977 in the Djibo cattle market. While there is no dominant pattern which would indicate clear-cut seasonal movements in price, several observations can be made from the graph. The prices for mature bulls and heifers indicates increasing trends over the survey period. The price of young males is remarkably stable over the entire year. The prices of mature steers, cows, and male calves show the strongest variation over season. Generally, prices are lowest sometime during the rainy season, rise during the period from August through October, fall again around November, and rise again at the end of the year. The price of steers fell dramatically from January to February. A similar decline is observed for cows between February and April. It is somewhat surprising to see the prices of mature males rise over the same period. If there is any pattern to be discerned

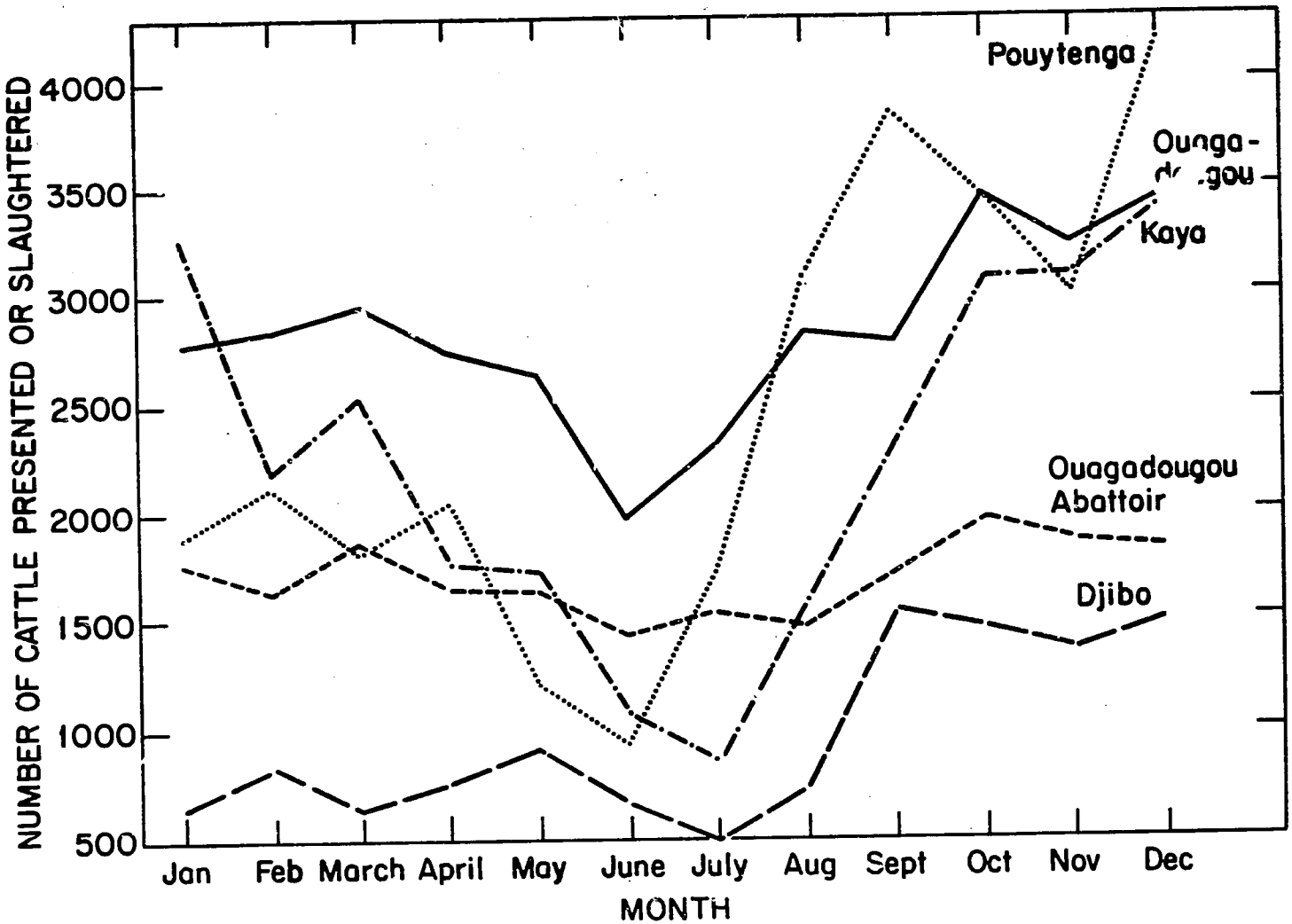
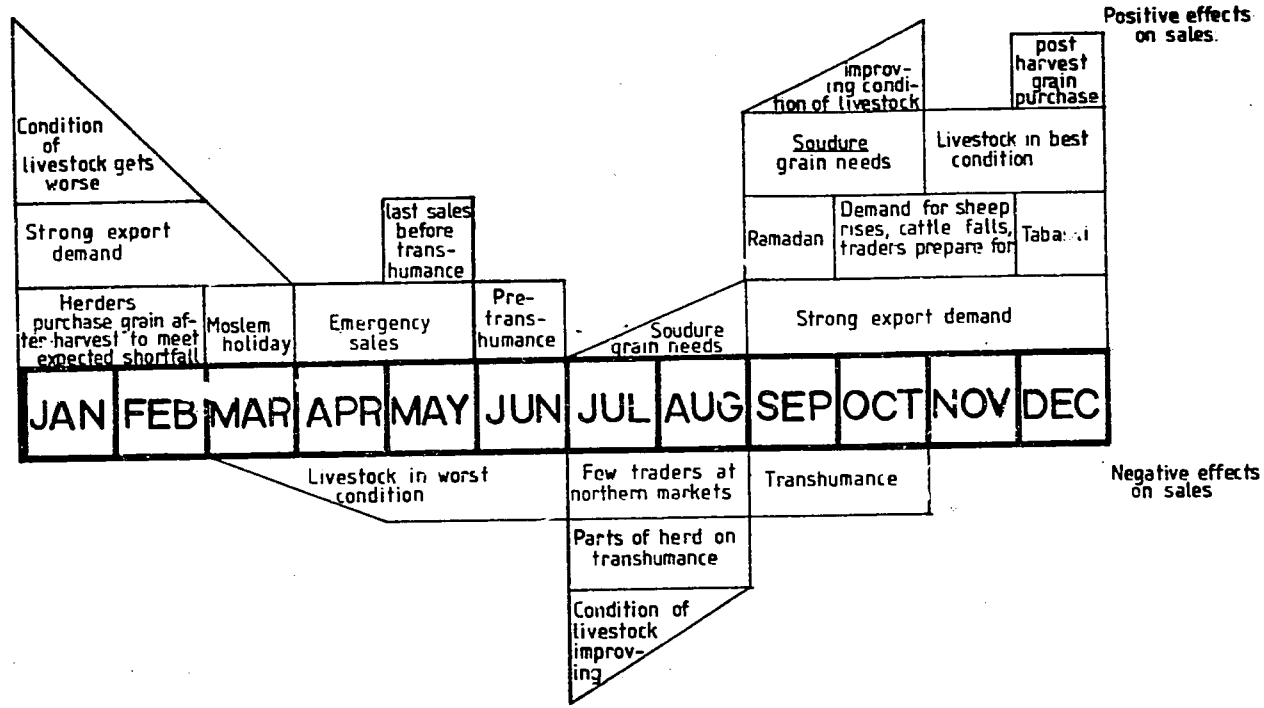


FIGURE 5.2 SEASONAL VARIATIONS: MARKET ENTRIES AND SLAUGHTERS, 1970-76

FIGURE 5.3 Theoretical Pattern of Livestock Sales, 1976-77



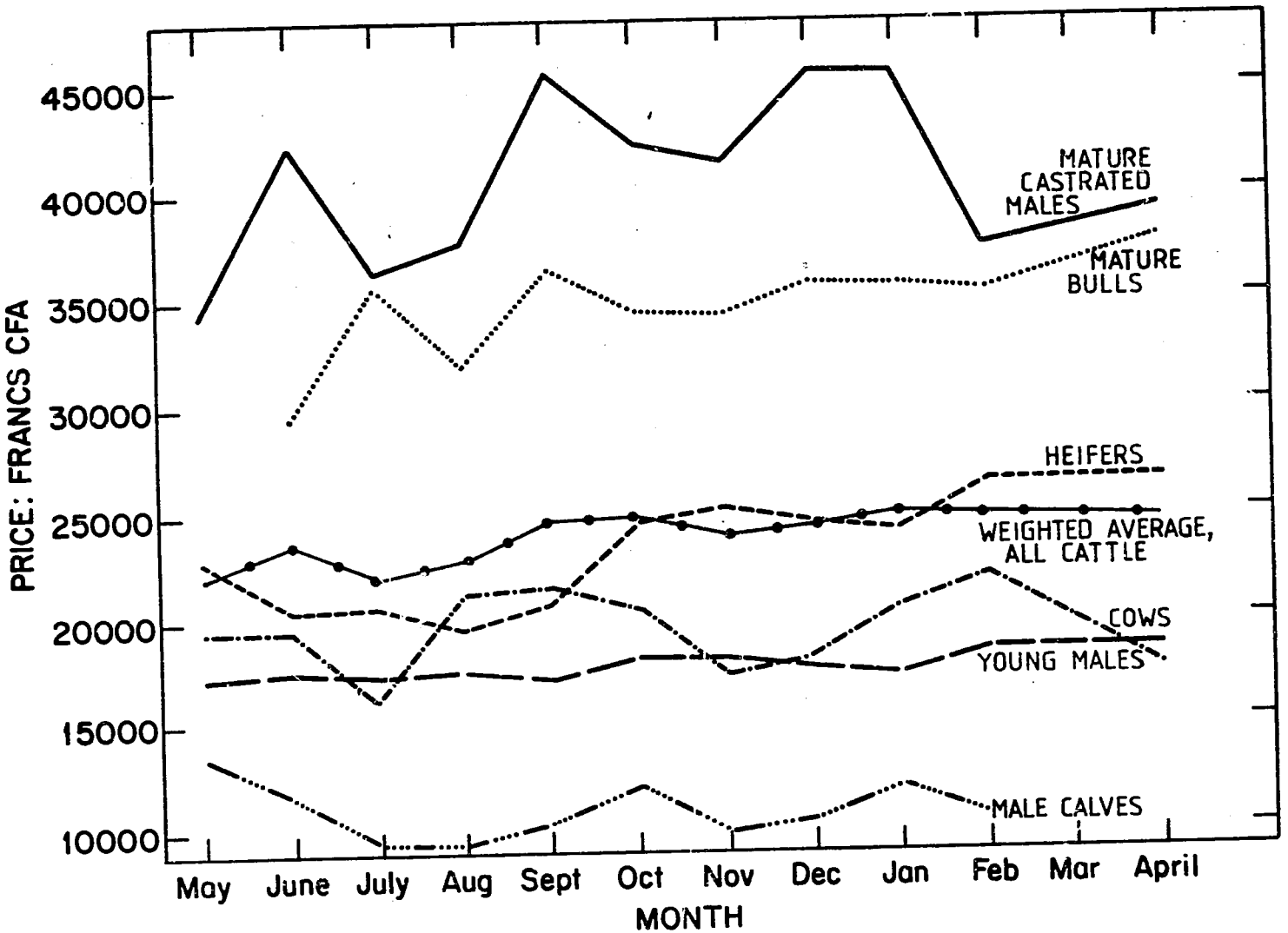


FIGURE 5.4 MONTHLY AVERAGE CATTLE PRICES: DJIBO CATTLE MARKET, MAY 1976-APRIL 1977

from the data, it is one of peaks near September and January with troughs during the rainy season and around November.

While the data on herder's livestock sales and cattle prices don't appear to warrant any strong conclusions, they certainly seem to favor the view that herdsmen are rational in timing of sales over the view that they sell during periods that are unfavorable to them in terms of price. The modest price peaks (October and January) correspond very well to periods of increasing cattle sales. Periods of lowest price (July to August and November) occur when sales are slumping. The pattern of herders' sales seems best explained by the factors presented earlier in this section, all of which indicate temporal sales strategy which would be difficult to improve upon.

Market Conditions Faced by Herdsmen

Bauer and Yamey theorize that exploitation of producers by middlemen is made difficult if one of two conditions hold: 1) if there is competition among traders seeking to purchase agricultural commodities at the farm level, or 2) if viable marketing alternatives are available to the producer and he is informed of these options (Bauer and Yamey, 1954). This subsection looks at conditions under which Voltaic herdsmen sell their cattle, the applicability of the Bauer and Yamey model, and the effects of various factors on herders' bargaining position.

The belief that herders' interests are protected by competition in the marketing circuit is based on the view that traders will compete with one another in the purchase of agricultural commodities at the farm level, thus assuring producers of a fair price, i.e., one that is consistent with commodity prices in consumption markets and the costs of marketing, transport, and processing.[3] Such conditions may not always exist. Production may be so dispersed that certain localities may not be able to support trading operations by more than one or a few traders. "Natural" monopsony or oligopsony occurs. Or, traders may otherwise be able to effect varying degrees of monopsony power, through collusion, institutional arrangements, or with tie-in selling obligations.[4]

Whatever the cause of the noncompetitive market conditions faced by the producer, the second set of conditions could still ensure him of a reasonable price for his product. If he knows of viable marketing alternatives, say to sell in a market further away, then he should be willing to bypass the first middleman if the price differential is not consistent with the producer's valuation of the service. In order to maintain his position, the middleman is forced to offer a price which includes a margin no greater than the value the seller places on his service.[5] Any price lower than that would encourage the producer to sell elsewhere.

In looking at the marketing behavior of Voltaic herdsmen, four questions were emphasized:

1) What are the marketing alternatives which face the herdsmen?
2) Does the herder have access to market information which enables him to make an informed decision.
3) What social or economic relations restrict sellers from exercising free choice among marketing alternatives?
4) To what degree are marketing arrangements open and prices explicitly agreed upon?

In answering the first question, the study examined the places in which animals were sold, other markets which herdsmen said they had visited or in which they would consider selling their cattle, and the buyers to whom livestock were sold. For the second question, herders were asked about their knowledge of ivestock prices, seasonal price trends, and general conditions prevailing in markets further down the marketing network. The factors which seemed relevant to evaluating constraints to free choice in marketing options are the use of credit or exchange in livestock transactions and the occurrence of exclusive dealing arrangements between herdsmen and traders (or intermediaries). Finally, the fourth question was evaluated by looking at the mechanics of trade: do herdsmen sell in front of witnesses? How are intermediaries used? Do herdsmen negotiate themselves? And are prices explicitly agreed upon in the case of direct exchange?

Marketing Alternatives. -- The choice of marketing strategy was found to vary with the type of animal sold, and the region. Table 5.3 summarizes the conditions under which the herder sample sold its livestock. In all three regions, it was found that herdsmen had four choices in deciding where to sell: 1) in the village or in the bush, outside of any formal market; 2) at a village or local periodic market; 3) at the major regional market; or 4) at a major market further down the marketing chain. Though the results show that the vast majority of all livestock was sold in organized markets, no herders ventured further than the major market in their region.[6] Most herdsmen cited the inconvenience, length of trip, and high costs involved in moving cattle long distances as well as unfamiliarity with markets and intermediaries as the reasons for eschewing the admittedly higher paying alternative of selling cattle further down the marketing chain. Notably, some of the herdsmen pointed to the small number of animals they sell at one time (or even in a year) as the limiting factor in considering distant markets, indicating an awareness of the economies of scale in cattle marketing.

The pattern of sales exhibited in part I of Table 5.3 seems to indicate that herders are balancing the costs of taking livestock to different markets against the higher prices livestock bring where buying is competitive. The bush sale entails little cost but affords the herdsman limited options; prospective buyers are limited to other herdsmen or farmers, itinerant merchants who pass infrequently, or, in case of emergency sale make up a significant portion of both cattle (14.7 percent) and small ruminant (17.6 percent) sales. In Kaya, few cattle (4.3 percent) but a fair share of small ruminants (12.7 percent) were sold outside of formal markets. Pouytenga area herdsmen sold negligible amounts of livestock away from markets.

The cost of taking an animal to market is largely a function of distance. The benefits derived from going to various markets depends, of course, on the nature of demand. Local markets usually offer greater opportunities to sell small stock as opposed to cattle. The smaller cash requirements needed to enter the small ruminant trade result in an abundance of petty merchants in local goat and sheep markets. Also, demand for cattle by butchers in local markets is usually quite limited. These butchers usually prefer to slaughter small ruminants here because the demand for meat is limited and goats and sheep offer the butcher greater control over volume.

There are some local markets where one does find significant demand for cattle as well as for small ruminants. This occurs where the system of local periodic markets is strong, well organized, and where the

TABLE 5.3

SALE CONDITIONS FOR HERDER SAMPLE

	Djibo		Kaya		Pouytenga	
	Cattle	Small Ruminants	Cattle	Small Ruminants	Cattle	Small Ruminants
I. Location of Sale						
A. Regional Major Market[a]	83.4%	14.0%	22.0%	5.2%	92.0%	84.2%
B. Local Village Market	1.0%	68.4%	72.8%	82.1%	7.0%	15.6%
C. Outside of Market	14.7%	17.6%	4.3%	12.7%	1.0%	0.2%
II. Buyers						
A. Trader	75.9%	76.0%	74.8%	63.9%	68.7%	66.2%
B. Butcher	0.3%	0.9%	7.0%	18.8%	25.9%	27.6%
C. Sold through Intermediary	83.0%	46.5%	79.0%	50.1%	95.1%	89.2%
D. Other[b]	13.3%	13.5%	17.5%	17.4%	5.3%	6.2%
III. Nature of Exchange[c]						
A. Cash	96.0%	96.0%	98.0%	98.0%	100.0%	100.0%
B. Credit	1.0%	4.0%	3.0%	6.3%	0.0%	0.0%
C. Exchange for merchandise or animals	4.0%	1.0%	1.0%	0.0%	0.0%	0.0%
IV. Sold in Front of Witness	91.0%	63.8%	84.5%	58.8%	99.1%	98.8%
V. Sold by						
A. Herdsman	83.6%	79.6%	93.1%	87.8%	98.7%	93.8%
B. Other[d]	20.4%	16.4%	6.9%	12.2%	1.3%	6.2%

Sources: Field research, May 1976 - February 1977.

[a]Djibo, Kaya, Pouytenga

[b]Includes herders, farmers, civil servants, military.

[c]Some sales included combinations of credit, exchange, and cash.

[d]Includes relative, friend, intermediary: owner not present.

markets are easily accessible by distant merchants. This was true in the Kaya region. Intermediaries from the Kaya livestock market also serviced two of the region's local markets (Pissila and Samtaba), both of which were on main roads. Both had a greater level of activity than the other village markets in the region and both often attracted livestock buyers from Ouagadougou -- something that rarely happened in the survey in the Kaya or Pouytenga regions and never happened around Djibo.

The major regional markets afford the herdsman the widest and most competitive demand for his stock. Buyers include local butchers, butchers from nearby towns, petty traders and long distance traders, speculators and other herdsmen. Herdsmen are able to negotiate with several prospective buyers (usually through an intermediary) before selling. Against the likelihood of a better price, the herder must weigh the costs of traveling to this market, usually a day or more away from his village. It is clear from the data that he is more likely to take the time and incur the costs to sell cattle in regional major markets. In all three regions the proportion of cattle sold in the major market exceeds that of small ruminants. Only in Kaya did the samples sell more cattle in local markets than in the regional major market.

Almost as important as the site of the sale and the overall level of demand is the composition of buyers. Demand by local butchers strengthens the market for cull animals and others which are difficult and costly (because of risk) to trek to distant markets. Demand for young stock by herders and farmers for breeding, fattening, or traction raises the market value for those animals. And, of course, competition among traders ensures that the demand for cattle in other regions is transmitted through the marketing chain. Section II of Table 5.3 presents the composition of buyers for animals sold by the herder sample. The majority of cattle in Djibo and Kaya and almost all cattle sold by the Pouytenga sample were sold through intermediaries. In all cases fewer small ruminants were sold with the aid of intermediaries, though in Pouytenga the proportion is still very high (89.2 percent). Two other results should be noted. First, the number of animals sold to butchers in Djibo is very small, reflecting the thin meat markets in Djibo and the surrounding local markets. This has a depressing effect on the price of cull cows and other animals which are difficult to trek to distant slaughter centers. Secondly, sales to non-commercial buyers (row D) in Pouytenga are weak, indicating relatively few sales to herders and farmers in the region. This seems to conflict with the subjective observations of the author and others (including the veterinary agent in the Pouytenga market) that many young bulls are currently being purchased by individuals for growing out or fattening.

Reviewing the marketing alternatives faced by Voltaic herdsmen, one notes that the willingness to move livestock through the marketing chain is a function of the value of the animal (s) and the likelihood of finding competition close to home. Herdsmen are generally aware of the better prices to be found at distant markets but feel that the costs entailed in making the journey are not justified because of the limited number of livestock sold by the individual. The pattern that emerges shows the herder selling most of his livestock in organized markets. Few sales take place at the farm gate, where buyers are most likely to be able to wield monopsony power. Small ruminants are more likely to be sold in local markets, and cattle most likely to be taken to major regional markets where competition among buyers is strongest. Demand by butchers is weak in Djibo, thus depressing the market for cull (immediate slaughter) animals there.

Access to Market Information. -- As noted in the previous section, most herdsmen claimed an awareness of spatial price variations. Most also reported that they thought prices rose following the rainy season to post harvest peaks and then fell throughout the dry season. This simple pattern appears to be a very accurate reflection of the price trends outlined in a previous section. While few herdsmen were up to date on immediate changes in the market conditions at the terminals of the marketing chain (Abidjan or Ouagadougou, for example), many seemed to have some awareness of the general changes in market conditions that ultimately affected them. All of this information traveled by word of mouth. The herdsmen's sources included merchants, intermediaries, veterinary agents, and friends and relatives. Information concerning local market conditions was transmitted similarly. Upon returning from a local market, a herdsman is obligated to share any information with others.

During each month's interview, herdmen were asked whether they "knew" the prices for cattle in the major market nearest them. The results are shown in Table 5.4. They show that most herdsmen claim to have information concerning prices even when they don't sell. Among cattle sellers, only in Kaya did a large number of herdsmen not know cattle prices in the Kaya market. It should be recalled that Kaya is the region where a majority of cattle sales took place in local markets.

Table 5.4 also gives the average price received by herdsmen claiming price information and for those not claiming this information. In all three regions the difference between the higher prices received by "informed" sellers and the lower price received by those without market information was statistically significant. This conclusion is somewhat mitigated by the price formation model discussed later in the chapter. There it is discovered that the value of information holds only in the case of female cattle sales.

Independence of Transactions. -- Livestock sales by herdsmen were found to be remarkably free of burdens which might have adversely affected the sellers' ability to exercise free choice among his marketing alternatives. As section III of Table 5.3 indicates, few transactions involved the use of credit or direct exchange of merchandise. This would seem to rule out the likelihood of monopsony power resulting from the provision of multiple economic services, for example, the marketing-moneylending-merchandising triad often found in rural economies (Wharton, 1962, pp. 34-35). No herdsman interviewed admitted to any type of exclusive dealing arrangement with traders, though many claimed to have regular relations with some traders or butchers. About the only tying relation likely to restrict the herder's choice of marketing alternatives is with the intermediary. Most herdsmen maintain a close relationship with one intermediary with whom there exists the mutual trust necessary for the herders to feel confident of receiving good advice and for the intermediary to be willing to make the necessary guarantees on the part of the herder. Usually the intermediary comes from the same village

TABLE 5.4

ACCESS TO PRICE INFORMATION AND EFFECT ON CATTLE PRICES

Herders claiming price information for nearest major market.	Djibo	Kaya	Pouytenga	Total
All respondents	59%	49%	80%	61%
Cattle sellers only	82%	65%	84%	77%
Effect on prices[a]				
Mean price when prior price information claimed[b]	20,542 (9,589)	33,837 (10,868)	35,246 (10,336)	27,955[d] (12,302)
Mean price when no prior price information claimed[b]	15,895 (8,433)	24,704 (11,558)	27,102 (11,259)	22,161 (11,428)
z - statistic[c]	3.409	5.751	3.143	5.313

[a]prices in CFA francs.

[b]standard deviations in parentheses.

[c]Null hypothesis that prices are equal ($\overline{P}_{info} = \overline{P}_{no\ info}$) against one-tailed alternative, $\overline{P}_{info} > \overline{P}_{no\ info}$. All statistics significant at .01 level.

[d]Pooled estimates of variance.

or region as the herdsman. Though most herders claimed that they could change brokers if they desired, few admitted to having done so.

The Openness of Marketing Transactions. -- This final criterion for evaluating the market condition faced by herdsmen is based on the view that open transactions and explicitly agreed upon terms of trade are not condusive to exploitation of monopsony power by livestock buyers. Conversely, those characteristics of trade which tend to cloud the exact terms of market transactions encourage "hidden" monopsony gains. This is particularly true where two or more economic functions are linked, such as in the case of provision of multiple economic services. If an animal is sold on credit the duration of the payment period may significantly reduce the real value of the price agreed upon.

As Table 5.3 indicated, almost all cattle and the majority of small ruminants are sold through intermediaries. Most herders attend the market themselves (see section V of Table 5.3) and discuss the price with the intermediary before the animal is actually sold. Even where the animal is not sold with the aid of a market intermediary, the sale usually takes place in front of other witnesses. These conditions tend to reduce the ability of the buyer to exploit herdsmen.

One fairly common allegation is that the intermediaries conspire with buyers to "cheat" herdsmen by reporting lower prices than are actually agreed upon (see for example, Dupire, 1968, pp. 348). Bargaining takes place openly in most Voltaic markets and buyers and intermediaries would be hard pressed to negotiate a secret arrangement. One problem that could arise, though, concerns the sale of cattle in lots. When several animals belonging to several different herdsmen are sold in a lot at a single price or constant unit price, it may be difficult for the broker to appropriate the funds among the sellers. Still, most herdsmen using a single intermediary know each other (often being related or from the same village) and can quickly ascertain whether the full price of the lot has been apportioned. The problem that arises is one of distribution among herdsmen, not exploitation by the group or intermediary.

The characteristics of a transaction which often obscure the terms of sales usually involve the provision of multiple economic services. As noted earlier, this rarely occurs among livestock sales by herdsmen. Almost all sales are for cash. In the few instances where credit was involved, it was extended by the herdsman to the purchaser for short periods of time (usually less than two weeks). In several cases of merchandise exchange, no explicit price was agreed upon, but such arrangements were rare. Thus, there seems to be little opportunity for the purchaser to conceal exploitive gains in credit terms or in the price of merchandise exchange.

Price Model for First-Buyer Cattle Sales

This section presents a model of price variation for cattle sales by herders. It should be noted that this is not an attempt to estimate supply or demand functions; this is immediately evident by the absence of any quantity term in the equation. Rather, it is an attempt to estimate and test for effects on price by several important characteristics specific to the animal sold and the circumstances of the sale. The model is estimated using linear regression and sheds additional light on some of the issues raised earlier in this chapter.

The Model. -- Ideally, a model of price formulation should include four basic elements to accurately reflect price variation: 1) characteristics specific to the animal sold, 2) general supply conditions, 3) general demand conditions, and 4) characteristics of the transaction. The first group of variables regarding the physical characteristics of the animal should give some idea of the value of the animal in the next "stage of production". The value of cattle as inputs in various enterprises (slaughter, breeding and dairy, growing out or fattening, traction, and trade[8]) is largely dependent upon physical characteristics such as breed, sex, age, weight, condition, and health. The factors appropriate to measuring general conditions of supply and demand are largely dependent upon the spatial and temporal parameters selected. It was assumed that the general levels of supply and demand were relatively constant over the period for which data was collected (April 1976 - March 1977) and that both spatial and temporal variations were reflected, to a large degree, in the seasonal and locational variables which were included as factors inherent in the transaction. Besides time and location of sale, other factors which have some bearing on the type of transaction include type of market, buyer (which also reflects the specific demand for the animal), type of seller, and prior knowledge of market conditions -- especially price.

The data were collected from herders and did not allow for the inclusion of every relevant variable into the equation. Perhaps the most important omission was cattle weights. Age is assumed to reflect most of the effect of weight. Because of the vastly different demands for males and females, the model was estimated separately by sex. In general form then, the model can be written as:

Price = f(Age, Sex, Region, Seller, Season, Seller Information, Buyer, Type of Market)

Several functional forms were considered. The most important consideration revolved around the age-weight (and thus the age-price) relationship and the use of interaction terms. Age was considered in both linear and polynomial forms. The results yielded slightly better explanatory power in the latter case, though the effects on other coefficients were marginal. Because the objective of the estimation was to test for broad qualitative effects of various sales characteristics rather than to specify the effect of every combination of sales condition, the model was kept simple; no interaction terms were employed and all variables except age were incorporated as shift factors, using dummy variables for the various characteristics.

The model was estimated using the following equations:

$$(1) \quad P = \alpha + \beta_1 A_1 + \gamma C_1 + \delta_1 R_{12} + \delta_2 R_{12} + \theta E_1 + \psi_1 S_{11} + \psi_2 S_{12} + \iota I_1 + \lambda_1 B_{12} + \lambda_2 B_{12} + \pi_1 P_{12} + \varepsilon_1$$

and

$$(2) \quad P = \alpha + \beta_1 A_1 + \beta_2 A_1^2 + \beta_3 A_1^3 + \delta_1 R_{11} + \ldots + \pi_2 P_{12} + \varepsilon_1$$

TABLE 5.5

ESTIMATED PARAMETERS OF PRICE MODEL FOR FIRST-BUYER CATTLE SALES BY DJIBO, KAYA, AND POUYTENGA HERDSMEN, 1976-1977

Variable	Coefficients[a,b]			
	Males	Males	Females	Females
Constant	7,646.0* (1,152.5)	12,314* (1,426)	24,601* (2,497.4)	29,126* (3,248.6)
Age Terms				
A (Age)	4,730.8* (138.5)	62.2 (707.2)	-292.05*** (125.48)	-3,268.4*** (1,506.1)
A^2 (Age squared)	-	1,017.2* (109.62)	-	347.06† (195.04)
A^3 (Age cubed)	-	-59.493* (5.046)	-	-11.308 (7.33)
Castrated Dummy (C)	1,361.4* (460.7)	1,422.3* (424.09)	-	-
Regional Dummies				
R_1 (Kaya)	-2,927.0* (942.71)	-3,032.1* (901.4)	402.21 (1,864.8)	1,293.1 (1,927.7)
R_2 (Pouytenga)	698.2 (1,083.6)	89.442 (1,023.5)	8,599.2* (1,892.0)	10,472* (2,073.6)
Ethnic Dummy, Fulani (E)	953.5 (787.2)	1,347.4† (722.3)	1,011.0 (1,456.8)	908.86 (1,455.4)
Seasonal Dummies				
S_1 (Oct.-Jan.)	-3,293.6* (497.1)	-3,287.3* (463.21)	-7,833.7* (1,022.1)	-7,297.0* (1,062.0)
S_2 (Feb.-May)	-2,331.6* (508.0)	-2,507.5* (467.36)	-10,328* (1,101.1)	-9,932.0* (1,051.0)
Seller Information (I)	-492.8 (695.8)	-298.45 (638.04)	4,366.6* (1,269.6)	4,707.8* (1,275.6)
Buyer Dummies				
B_1 (Cattle merchant)	2,031.7* (624.5)	1,350.8** (574.8)	-3,737.2*** (1,680.6)	-3,428.1*** (1,691.8)
B_2 (Butcher)	3,120.3** (1,232.5)	3,086.8* (1,129.7)	-7,887.0* (1,843.4)	-7,841.6* (1,838.9)
Market Type Dummies				
P_1 (Local market)	-1,002.0 (886.2)	-848.19 (814.61)	1,314.6 (2,326.1)	1,366.7 (2,329.4)
P_2 (Non-market sale)	-1,678.7*** (806.6)	-1,060.4 (741.44)	3,863.2* (1,433.6)	4,159.5* (1,435.1)
Number of Cases	1,009	1,009	401	401
R^2; R^{-2}	.776; .773	.812; .809	.334; .315	.342; .325

[a]Numbers in parentheses are standard errors of coefficients.

[b]Significance levels: *Coefficient significantly different from zero at the .01 level

**Coefficient significantly different from zero at the .02 level

***Coefficient significantly different from zero at the .05 level

†Coefficient significantly different from zero at the .10 level

where

P	=	Price of animal sold (in CFA)
A	=	Age of animal in years
C	=	Dummy variable for castrated males
R_1	=	Dummy variable for Kaya subsample
R_2	=	Dummy variable for Pouytenga subsample
E	=	Dummy variable for Fulani sellers
S_1	=	Dummy variable for harvest season sales (Oct.-Jan.)
S_2	=	Dummy variable for dry season sales (Feb.-May)
I	=	Dummy variable for seller's claim to market information
B_1	=	Dummy variable for merchants as buyers
B_2	=	Dummy variable for butchers as buyers
P_1	=	Dummy variable for sales in local markets
P_2	=	Dummy variable for sales ouside of markets
e	=	Error term

Estimation and Results. -- Table 5.5 presents the results of the estimation of the four forms of the model for males and females. As expected, the model explained much more of the variation in prices of males than females, largely due to the effects of age. The results suggest that the functional forms used were not appropriate in the case of females; indeed, several other models and stratifications of the data for females yielded better results. Still, these estimations yielded interesting results which are discussed here.

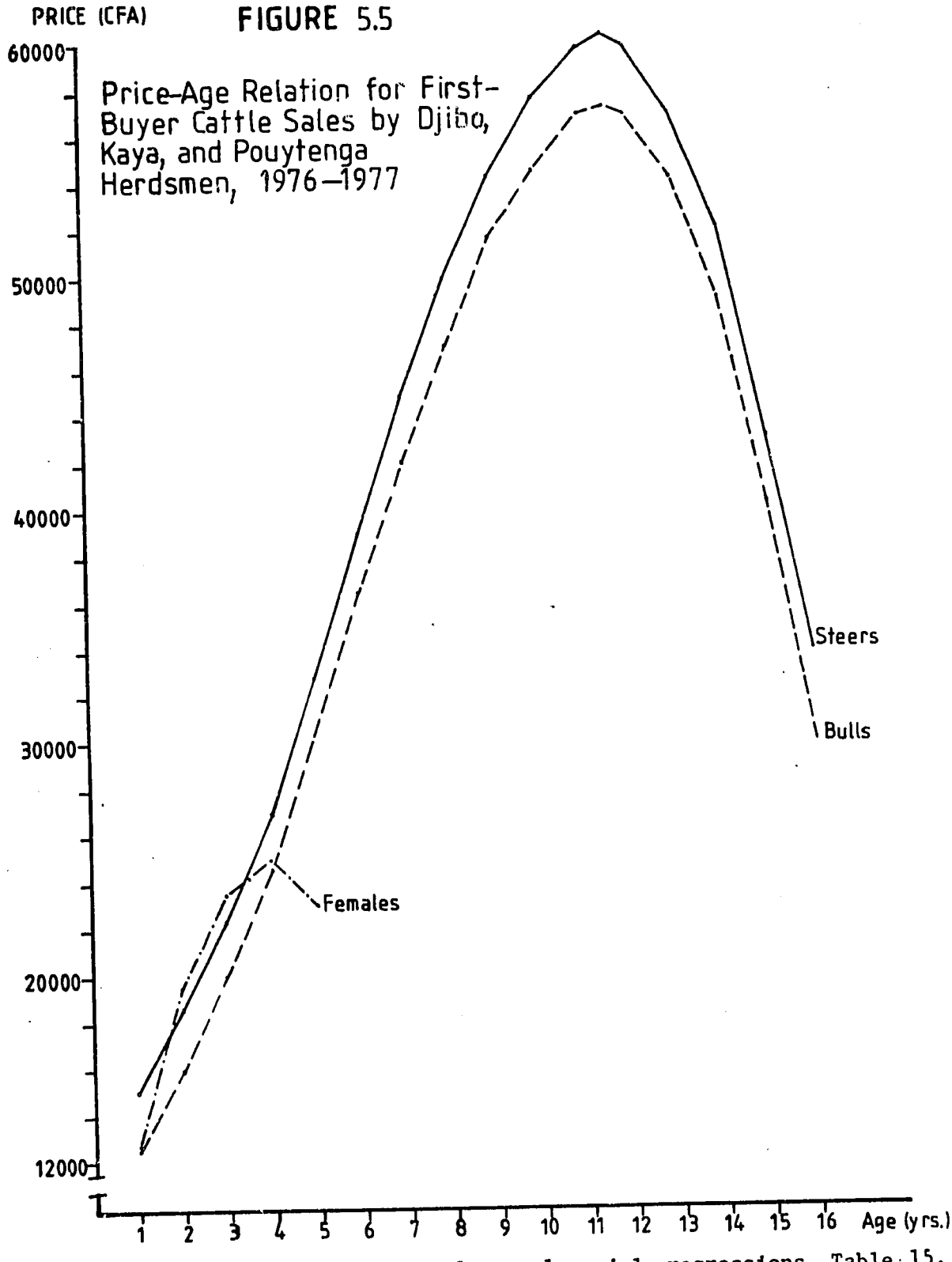
a. Age. -- Most males were sold over a range of ages for which an age-weight relationship is well defined. Because of this and the fact that weight is the most important factor affecting prices for males (presumably because most were sold for slaughter), the age variables had the greatest impact upon price.[9] In the linear form, the model suggests that prices rise by slightly less than 5,000 CFA per year, significant at the .01 level. The polynomial case suggest that an S-shaped curve best fits the data (see Figure 5.5). In that estimation, the rate of price-gain increases from zero to 5.7 years (at which point $\partial^2 P/\partial A^2 = 0$); prices rise at a diminishing rate through 11.4 years (where $\partial P/\partial A = 0$); and prices fall after that point. Table 5.6 shows the changing price-age relationship at several points for the appropriate model.

As noted above, the effect of age on the price of females was not as strong as in the case of males (the partial correlation coefficients for all age terms were low, .117 in the linear model). The linear model modestly suggest an overall slight decreasing trend in price over age. The nonlinear model suggest falling prices for females over young ages (with a minimum at 7.4 years) and very modestly rising prices through the local maximum at 13.1 years, with prices falling thereafter. The results show the highest prices paid for heifers (four years or younger) with a rather flat price-age curve after that.[10]

TABLE 5.6

RATES OF CHANGE IN PRICES OF CATTLE FOR SELECTED AGES FROM THIRD-ORDER POLYNOMIAL REGRESSION ($\partial P/\partial A$)

	$\partial P/\partial A$	
Age	Males	Females
2	3387	-2016
4	5337	-1035
6	5851	- 325
8	4927	113
10	2566	280
12	-1232	176
14	-	- 200



Source: Males: Calculation from polynomial regressions, Table 15.
Females: See footnote 10, page 121.

b. Castrated Males. -- The coefficient for the dummy variable for steers suggest that a premium of about 1,500 CFA is paid for steers over noncastrated males. This can be attributed to their desirability as work animals and the higher quality meat (more fat) associated with castrated males.

c. Regional Price Variation. -- The results of the regional dummies were ambiguous. The expectation that prices would be higher closer to major consumption and export centers (Kaya and Pouytenga) held true for females but not males. Cows brought significantly higher prices in Pouytenga than in Djibo. The difference between cow prices in Kaya and Djibo were not significant. However, the prices of males in those two regions indicate significant differences in prices favoring Djibo. These variations may be explained by different breed characteristics between northern (Djibo) and southern (Kaya and Pouytenga) stock, the preference for males by traders, and the limited demand for slaughter cattle in the Djibo region.

d. Type of Seller. -- The dummy variable for ethnic affiliation of seller does not indicate significant differences between prices received by Fulani and Mossi herdsmen.

e. Seasonal Price Variation. -- Both seasonal variables were significant at the .01 level for all equations. The coefficients show cow prices highest during the rainy season and lowest during the dry season, as one would expect. Males also brought highest prices during the rainy season but were lowest during the October through January period. The fact that prices did not continue to fall off during the dry season (February-May) may be due to the better ability of males to maintain weight during that season and to herders holding off sales, as explained in an earlier section.

f. Seller Access to Information. -- Market price information had no significant effect for prices of male cattle. However, herdsmen claiming prior market information received significantly higher prices than did uninformed herdsmen when selling females. This is perhaps due to the more competitive market for males. Where demand for cull cows is there (as in Djibo), the price the herder receives may be highly dependent on his bargaining ability, including his knowledge of market conditions.

g. Type of Buyer -- The coefficients for the buyer dummy variables indicate that both traders and butchers pay premiums for males over prices paid by herders, farmers, and others (the excluded group). Surprisingly, the data show that butchers pay a higher premium than merchants, though the difference is not significant at the .05 level. For females, prices paid by merchants and butchers were significantly lower than those paid by herdsmen and farmers, indicating that their productive value for breeding, dairy, or in agriculture exceeds their slaughter value. Butchers paid the lower prices, significantly lower (at the .01 level) than those paid by traders.

h. Type of Market. -- The regressions yielded little significant results regarding the effect of market type on price. For males, the coefficients were of the expected signs and magnitudes, showing major market prices highest and non-market sales prices lowest, but the results (in the polynomial case) were not significant at the .1 level. For females, the results showed just the opposite effect; major market prices were lowest and non-market sales prices were the highest, with the difference between the two being significant at the .01 level. These results suggest that non-market sales of females may be for productive cows sold to other herdsmen or farmers who pay a premium for these animals over the price paid by merchants and butchers in organized markets.

Conclusions

This chapter sets forth the major empirical results of the research concerning the cattle marketing strategies of and conditions faced by herdsmen. The major conclusions are generally supportive of the hypothesis that herdsmen face relatively competitive conditions on the buying side of the market for their product. Furthermore, the data suggest that the Stratification Policy the government intends to implement is already in existence in terms of the composition of marketed livestock, with relatively young male cattle being sold in the north and fattened (though not in feedlots), older cattle sold in the south. The implications are that both the production and marketing system should respond well to any price and cost incentives imposed by the government to influence the current offtake and marketing patterns.

The most important findings of the chapter concern the marketing conditions faced by traditional stockraisers. These results are contrasted with the common assertions that herdsmen face a bargaining disadvantage in selling their cattle. When market conditions are examined both independently and together in the form of a model of price formation, there is little evidence to support such claims. Rather, the results of the model lead one to the conclusion that the marketing system is rather efficient at transmitting price signals to herdsmen, both over time (seasonality) and distance (market location). Nor did the model suggest that herdsmen could gain very much bargaining strength by better informing themselves of prices or by being more willing to engage in costly marketing operations (taking their own cattle further south or to terminal markets). The indigenous intermediary system wherein the herdsman entrusts his cattle to a broker seems to protect the stockraiser from abuses and limits the exploitation of even temporary market power by cattle buyers.

These issues of market efficiency, price determination, and the competitive structure of cattle marketing are further discussed in Chapters 7 and 8.

FOOTNOTES TO CHAPTER V

[1]Such suggestions also appear implicitly throughout much of the anthropology literature. It is often claimed that the primary motivation for Fulani livestock sales is cash need (Johnson, 1977, pp. 12-13, Barral, 1967, p. 29). An accompanying disinclination to hold assets in forms other than livestock thus make it difficult for the herdsman to take advantage of seasonal price variations when they don't coincide favorably with his own cash needs pattern.

[2]For the 657 sales recorded in the Djibo sample, responses to the question: "Why did you sell the animal?" broke down as follows:

To buy millet	69%
To buy cloth goods or jewelry	12%
To pay taxes	9%
To repay debts	1%
Medical expenses	2%
To arrange ceremonies	2%
To buy "cola"	3%
Other	2%

[3]In fact, the argument here is largely incomplete, since producer prices are linked to consumer prices by several markets, transactions, and product transformations. For farm level prices to reflect accurately the level of consumer demand less the minimum marketing margin requires efficiency at each stage of the marketing circuit. That issue was discussed in Chapter 3. The point here is to examine the ability of those middlemen who directly link livestock producers with the marketing circuit to exert monopsony power in their dealings with the herdsmen.

[4]Examples include herder indebtedness to or dependence on certain traders for purchase of other commodities.

[5]The problem with this alternative is that its ultimate solution would be discriminatory pricing by middlemen which in itself would be sufficient grounds for declaring the system inefficient. For unless every seller valued the services at a price equal to the costs (including normal profits) of those services, middlemen could gain the so-called consumer surplus from their clients. The lesson here is that while producers' awareness of market alternatives does limit the degree of monopsony power any middlemen can wield, it does not necessarily negate it entirely.

[6]This is not to say that herdsmen never travel far to sell their cattle. Market surveys showed many cases of Malian herders selling in the Djibo market and several Djibo area herdsmen (though not among the sample) appeared in Kaya to sell.

[7]The example which shows this best involved the importation of frozen beef by the Ivorian government in 1976. Local cattle merchants as far north as Djibo were accutely aware of these developments and the implications for Voltaic cattle export. Few herdsmen knew any details, but most had heard how the Abidjan market was being "ruined" by imports of "European cattle".

[8]The demand for an animal purchased for trade is, of course, a derived demand, dependent upon the ultimate use to which the animal is to be put. Under an efficient marketing system, resources (cattle) should be allocated according to value in the most productive use and the derived demand should reflect that. The conditions that assure this include mobility of resources, for which transportability (condition and general health of the animal) is a major consideration.

[9]This is shown by an examination of partial correlation coefficients. In the linear model for males, the partial correlation coefficient for age was .73457, while the next highest value (signifying explanatory power for that variable) was the seasonal dummy for harvest times sales, -.02548.

[10]Other estimations which stratified the female sample into "heifers" (≤5 years) and "cows" (>5) led to quite different results. The regressions do not suggest any significant price-age relationship for older cows, none of the age coefficients being significant at even the .01 level. The relationship for heifers is graphed in Figure 5.5.

CHAPTER VI

THE TRANSPORTATION SYSTEM FOR CATTLE

Because of the long distances livestock must be shipped between the production zones in the north and the major consumption zones along the West African coast, transportation costs are one of the most important elements in the formation of meat prices. This chapter looks at the transportation infrastructure, costs of transporting and marketing cattle, constraints to trade expansion, and areas of possible cost reduction.

Transportation Methods and Infrastructure

As elsewhere in the Sahel, most cattle are moved on hoof within Upper Volta. In most instances there is little alternative to trekking cattle to market. Trekking livestock to market has the advantage of requiring low cash outlays and little infrastructure. The two major disadvantages to this mode of moving livestock are the slow turnaround time and increasing conflicts over trek routes. Cattle may be trekked at rates between fifteen and forty-five kilometers per day, depending upon season and total distance. The government has demarcated several cattle trails with concrete pylons along a corridor running from the northeast to the center-south. There are plans for more cattle trails in the west. The trails are supposed to give drovers the right of way so as to reduce conflict with farmers. Drovers complain that water and pasture are often insufficient along the trail, and thus alter their routes. Good drovers pride themselves on their ability to move herds speedily, finding adequate water and pasture so the cattle arrive in good condition, and avoiding problems with farmers over crop damage. The government believes the cattle trails are necessary not only to reduce the level of crop damage but to reduce high mortality and weight losses for trekked cattle. However, until adequate water resources and forage are available along official trails, most long distance trekking is likely to follow traditional routes.

Trucking has yet to play a major role in Voltaic cattle transportation. The poor road conditions, inexperienced truck drivers unwilling to take on a cattle consignment, and low costs of trekking have resulted in no cattle being transported by truck between domestic markets. A few shipments to export markets in Ghana and Togo are trucked, but even along these paves routes, trucking is considered expensive and usually unnecessary by merchants who prefer to walk their cattle across the border. While cattle exported to Ghana, Niger, and Nigeria are almost always sold at the border, cattle exports to Togo are usually shopped directly to Lomé. Merchants walk cattle across the border and then have the option of putting their herds on trucks in Dapango or Sokodé, depending upon season, market conditions, and truck rental rates. This flexibility is obviously not available to merchants who truck cattle directly from Upper Volta. One major problem that will have to be remedied if trucking is ever to catch on is the large number of unofficial charges that are levied on cattle trucks at the many check points which dot the routes to coastal markets.

The railroad from Ouagadougou through Bobo-Dioulasso to Abidjan plays an important role in the export of cattle and small ruminants to Ivory Coast, Upper Volta's largest cattle export market. The rail line allows for rapid evacuation of cattle from central and western Upper Volta and was the major reason for the dramatic rise in importance of the Ivorian market for Voltaic cattle exports in the sixties. Cattle are shipped from Ouagadougou to Abidjan in three to six days, in contrast to the two-month trek to coastal markets in Togo and Ghana. In addition, returning drovers are able to communicate market conditions to merchants in Voltaic markets immediately upon return, one day after leaving Abidjan. This results in remarkedly efficient information flows and enables merchants to respond quickly to changing market conditions.

There are two major problems which plague train transportation. First, the condition of the cars used for transporting cattle and the lengthy delays which often more than double the time en route intensify the mortality and weight-loss problems which account for a significant share of transportation costs. Second, there are seasonal bottlenecks in the availability of cattle cars (the cars are used for merchandise transport south) during the peak export period. The results are long waits at the rail head and increased costs of holding and transporting cattle.

Transportation and Marketing Costs

This section outlines the explicit and implicit costs of moving cattle within Upper Volta and from Upper Volta to several major export markets. Included are direct transportation costs, market charges, and government levies. Since different transportation methods rarely compete along the same route, there is no direct comparison of trekking versus train shipments. The figures are based on official charges, observation of costs by the author, and interviews with drovers and merchants. Because the sample of observations of truck shipments of cattle was limited to only two cases, few interviewed merchants claimed to have information on trucking costs, and truck rental rates for cattle are not fixed, no costs are presented for truck transportation.

Domestic Trekking. -- Table 6.1 presents the costs of trekking cattle to Ouagadougou. Costs are given per head and per herd of fifty animals. In principle, these are the costs that would be paid legally and traditionally. In reality, there are wide variations in actual costs due to avoidance of taxes, non-payment of salaries to family members acting as drovers, and the stochastic effects of mortality, lost animals, and forced sales.

It is assumed that traders employ these drovers per fifty head of cattle. During and just following the rainy season cattle are more difficult to control because of abundant water and pasture and the greater risk of crop damage. Extra drovers are often used during that period.

TABLE 6.1

COSTS OF TREKKING CATTLE WITHIN UPPER VOLTA
1976-1977 (PRICES IN F CFA)

Herd size = 50 Head
Average price = 30,000

Market of Origin:	Djibo		Markoye		Pouytenga	
Destination:	Ouagadougou		Ouagadougou		Ouagadougou	
Distance:	210 km		325 km		140 km	
Transit time:	8-12 days		15-20 days		3-7 days	
Distance traveled per day:	18-26 km		16-22 km		20-47 km	
Costs[d]	Per Head	Per Herd	Per Head	Per Herd	Per Head	Per Herd
I. Purchase of cattle						
A. Intermediary's commission	250	12,500	500	25,500	250	12,500
B. Identification mark	-	-	-	-	10	500
C. Gardinage before export (a)	(b)	(b)	(b)	(b)	50	2,500
II. Taxes						
D. Patente (Trader's license)	83	4,150	83	4,150	83	4,150
E. Veterinary inspection	150	7,500	150	7,500	150	7,500
F. Certificate of origin	2	100	2	100	2	100
G. Local taxes	-	-	50[c]	2,500	-	-

TABLE 6.1 continued

Market of Origin:	Djibo		Markoye		Pouytenga	
Destination:	Ouagadougou		Ouagadougou		Ouagadougou	
Distance:	210 km		325 km		140 km	
Transit time:	8-12 days		15-20 days		3-7 days	
Distance traveled per day:	18-26 km		16-22 km		20-47 km	
Costs	Per Head	Per Herd	Per Head	Per Herd	Per Head	Per Herd
III. Transport costs						
H. Food and salary of drovers	240	12,000	360	18,000	180	9,000
I. Mortality, lost animals, forced sales	675	33,750	675	33,750	675	33,750
J. Return transport for selling agent	24	1,200	40	2,000	12	600
IV. Costs in Ouagadougou						
K. Market tax	150	7,500	150	7,500	150	7,500
L. Gift to landlord	100	5,000	100	5,000	100	5,000
Total costs of domestic trekking	1,674	83,700	2,110	105,500	1,662	83,100
Cost per kilometer	8.0		6.5			

[a] Assumes assembly time of one week.

[b] Caring for animals is usually the responsibility of the intermediary in these markets.

[c] Transit tax for Gorom-Gorom.

[d] Cost in CFA francs

The evaluation of mortality and losses due to lost cattle and forced sales is based upon a survey of eighteen drovers who were interviewed immediately following their arrival in Ouagadougou with a herd. Based on these interviews, the following loss percentages were computed:

Forced Sales	Escaped or Loss	Mortalities
1.5%	0.6%	0.6%

The calculation of the appropriate value to assign to these factors assumed that animals sold in route recovered two-thirds of purchase price. It was assumed that one-quarter of the purchase price was recouped for animals that died en route since some are sold to bush butchers. Finally, because many escaped cattle are eventually recovered, it was assumed that only one-half of these animals were permanently lost. Thus, the expected loss from mortality, forced sales, and escaped cattle was evaluated as:

$$\text{Expected Loss} = \text{Cost of purchase} \times [(.015 \times 1/3) + (.026 \times 1/2) + (.006 \times 3/4)] = 30{,}000 \text{ CFA} \times .0225 = 675 \text{ CFA per head.}$$

Since there was no evidence of any correlation between losses and length of trek or transit time, this was assumed to be a fixed cost of trekking.

No costs were included for weight loss or crop damage. For the latter, no drover was willing to admit to any occurrence of conflict with farmers. Some acknowledged incidents in the past, but claimed that these were extremely rare and involved small sums as settlements.[2] There is very little information available on the subject of weight loss during trekking. Losses (or gains) en route are a function of season, the route traveled, and the expertise of the drovers. Though it is commonly held that weight loss accounts for a sizable portion of the total cost of transportation, there is evidence to be marshalled to the contrary (Cabaret, 1973).

The portion of total costs of moving cattle between markets attributable directly to transportation is between 51 and 56 percent. The costs per kilometer per head of transport alone ranges from 3.3 CFA for the Marhoye-Ouagadougou route to 6.2 CFA for the Pouytenga-Ouagadougou route. In all three case transportation represented only 3 to 4 percent of the purchase price of the animal. Total marketing and transport costs account for 5-7 percent of purchase price.

Trekking to Export Markets. -- Table 6.2 lists the costs of exporting cattle on foot from three Voltaic markets to three different export markets. The figures used in section II, item H for Voltaic export taxes reflect the amount claimed to have been paid by exporters who were interviewed. They do not necessarily reflect the official export tax rate, which is not applied uniformly on herds crossing the border on foot. The same comments apply to market and import taxes in section IV, item M and N. Of the three routes, only Pouytenga-Lomé can be called long distance. Along that route, costs per kilometer were substantially lower than those for the two shorter routes to Ghana and Niger. Transportation costs alone make up between 12 and 21 percent of toal export costs. Based on theoretical resale prices of 50,000 CFA in Lomé and 40,000 CFA in Téra and Paga, transporation costs account for 5 percent and 2.5 percent of resale price in the former and latter cases, respectively; about one-quarter the share of export and import taxes. Total marketing costs account for between one-fifth and one-quarter of resale price.

Rail Transportation.[3] -- The costs for shipping cattle by rail from Ouagadougou to Abidjan are shown in Table 6.3. Entries under Sections I and II are similar to those found in the table on trekking costs. Section III lists the specific costs of transportation. Cattle are loaded into the rail cars by Fulani and Mauritanians who specialize in this difficult task. In addition to loading the cattle they also cut off the tips of the horns of some cattle to reduce the risk of injury. Before being loaded, the wagons are prepared with straw mats and loose straw is placed upon the wagon floor.

The drover who rides with the cattle often acts as the agent for the trader, few of whom go down to Abidjan to sell the cattle themselves. For his services as selling agent, the drover may receive more than the usual salary of 5,000 CFA (plus 3,000 for food and expenses). Traders who do not rely on drovers to perform this function often pay higher commissions (in the form of gifts) to their broker in Abidjan.

The figure for losses due to mortality is calculated from the results of a surveyof 94 herds. The rates or mortality and forced sales were:

Mortalities (thrown from car)	Sold en Route	Arrived Dead
1.35%	2.16%	0.65%

Losses were calculated assuming that cattle sold en route were sold at 50 percent of the Abidjan price and that those arriving dead were sold at two-thirds of the market price for healthy animals. Losses were evaluated as that portion of the purchase price and export costs not recovered through resale. The average loss per animal was calculated at 1,282 CFA.

Weight loss is a serious problem for cattle shipments by train. It is not included in Table 6.3 because of its implicit nature; however it is critical to calculate the costs and prices per kilogram. The data on shrinkage for rail transport are even more sparse than those on trekking. Based on a Malian study on weight loss for truck transport and a Nigerian study on shrinkage during rail shipments of cattle there, an estimate of 10 percent was arrived at for weight lost by cattle shipped from Ouagadougou to Abidjan (Staatz, 1979, pp. 242-243). This cost can be viewed two ways: first, the loss of 10 percent of the animals means that the purchase price of the animal and all exports costs must be distributed over the net weight of the animal arriving in Abidjan. The total loss of the cost of meat which never arrives in Abidjan due to shrinkage for a 150-kg animal is 5,183 CFA or 38.39 CFA/kg of delivered meat. Alternatively, the loss may be evaluated in terms of revenue lost. In this case, the loss is the shrinkage times the expected resale price. Since the delivery of meat that is normally lost would

TABLE 6.2

COSTS OF TREKKING CATTLE TO FOREIGN MARKETS
1976-1977 (PRICES IN F CFA)

Herd size = 50 Head
Average price = 30,000 F CFA

Market of Origin:	Pouytenga		Kaya		Ouagadougou	
Destination:	Lomé (Togo)		Têra (Niger)		Paga (Ghana)	
Distance:	860 km.		215 km.		170 km.	
Time in transit:	45-75 days		9-18 days		8-12 days	
Distance traveled per day:	12-20 km.		24-25 km.		14-21 km.	
Costs	Per Head	Per Herd	Per Head	Per Herd	Per Head	Per Herd
I. Purchase of cattle						
A. Intermediary's commission	250	12,500	250	12,500	250	12,500
B. Identification mark	10	500	10	500	10	500
C. Gardinage before export[a]	50	2,500	50	2,500	100	5,000
II. Taxes						
D. Patente (Trader's license)	83	4,150	83	4,150	83	4,150
E. Veterinary inspection	150	7,500	150	7,500	150	7,500
F. Certificate of origin	2	100	2	100	2	100
G. Authorization to export	4	200	4	200	4	200
H. Export tax	7,500	375,000	4,930	246,500	6,519	325,950

TABLE 6.2 continued

Market of Origin:	Pouytenga		Kaya		Ouagadougou	
Destination:	Lomé (Togo)		Téra (Niger)		Paga (Ghana)	
Distance:	860 km.		215 km.		170 km.	
Time in transit:	45-75 days		9-18 days		8-12 days	
Distance traveled per day:	12-20 km.		24-25 km.		14-21 km.	
Costs	Per Head	Per Herd	Per Head	Per Herd	Per Head	Per Herd
III. Transport costs						
I. Vaccination of cattle (against Trypanosomiasis)	50	2,500	-	-	50	2,500
J. Salary and food for drovers and agent	1,650	82,000	330	16,500	200	10,000
K. Mortality, lost animals, forced sales	675	33,750	675	33,750	675	33,750
L. Return transport for drovers and round trip transport for seller	400	20,000	-	-	80	4,000
IV. Costs at terminal market						
M. Market tax	100	5,000[b]	-	-	-	-
N. Import tax (laissez-passer)	1,550	77,500	800	40,000	200	10,000
O. Gift to landlord	500	25,000	500	25,000	n.a.	n.a.
Total costs of exporting by trekking	12,964	648,200	7,784	389,200	8,323	416,150
Cost per kilometer	15		36		49	

[a]Cost of herders to watch cattle while herd is constituted.

[b]Traders are charged 1,000 F CFA per day per herd as market tax.

TABLE 6.3

COSTS OF EXPORTING CATTLE BY RAIL,
OUAGADOUGOU-ABIDJAN (CFA)
(3-7 DAYS TRANSPORT TIME)

Item	Cost Per Herd[a] (25 Head)		Cost Per Head		Cost per Kilogram[b] 135 kg	180 kg
I. Purchase of cattle		10,500		420	3.1	2.3
A. Intermediary's commission	6,250		250			
B. Identification mark	250		10			
C. Gardinage before export	4,000		160			
II. Voltaique taxes and duties		169,108		6,764	50.1	37.6
D. Patente (Trader's license)	2,083		83			
E. Veterinary inspection	3,750		150			
F. Certificate of origin	100		4			
G. Authorization to export	200		8			
H. Export tax	162,975		6,519			
III. Transport costs		160,091		6,404+	47.4	35.6
I. Loading cattle cars[c]	750		30			
J. Preparation of wagon	4,000		160			
K. Food and salary of drover	8,000+		320+			
L. Cattle car rental (RAN)	104,780		4,191			
M. Unofficial costs	0-20,000		0- 800			
N. Mortality	32,061		1,282			
O. Unloading cattle	500		20			

TABLE 6.3 continued

Item	Cost Per Herd[a] (25 Head)		Cost Per Head		Cost per Kilogram[b] 135 kg	180 kg
IV. Costs in Abidjan		18,500		740+	5.5	4.1
P. Watering and guarding cattle	1,000		40			
Q. Market tax	12,500		500			
R. Gift to landlord/broker	5,000+		200+			
Total costs of exporting excluding unofficial costs[d,e]		358,199+		14,328+	106.1	79.6
Transportation costs, per kilometer		140		5.6	.04	.03
Total export costs per kilometer		313		12.5	.09	.07

[a]Normal herd size for wagons of type H 1200.

[b]Cost per kilogram arriving in Abidjan, net of weight loss.

[c]Includes 500 francs for loading, and 250 for cutting horns of cattle when needed.

[d]These costs may include payments to assure no delays in receiving cattle car, gratuities to douane officials, and small fees paid to RAN employees for moving cattle cars between Treichville and Port Bouet. Totals assume 10,000 CFA payment per herd.

[e]Shrinkage is not included in this table. The effect of weight lost by cattle in transit is to lower resale prices. As such, its inclusion here would be misleading.

increase supply, current prices in Abidjan set the upper bound (true only in the case of perfectly elastic demand) on the appropriate price to use. Given the Abidjan prices at the time of the study (407 CFA/kg of carcass weight) this method gives an upper bound of 6,105 CFA per head. Whichever method is used, it is clear that shrinkage is one of the largest costs of transporting cattle by train.

Excluding weight loss, transportation including mortality accounts for 45 percent of the total costs of shipping cattle from Ouagadougou to Abidjan. Based on a resale price of 407 CFA per kilogram in Abidjan, transportation costs from Ouagadougou make up 11.7 percent of the resale price of cattle delivered with a carcass weight of 135 kilograms and 8.7 percent of the resale price of 180-kilogram cattle. Total export costs account for 26 percent and 20 percent of cattle weighing 135 kg and 180 kg, respectively.

FOOTNOTES TO CHAPTER VI

[1]This is not meant to imply that the social costs of crop damage are not worthy of serious consideration. There is much evidence to the effect that damage caused by commercial and transhumant herds is a serious problem in some regions.

[2]Similarly, mortality costs could be evaluated in two ways: the actual cost to the trader (which was used) or revenue lost. The latter is perhaps more appropriate when evaluating projects which affect mortality or weight loss. In such an evaluation, these could be viewed as potential benefits.

[3]Evaluations of the cost of meat shipments to the coast are found in Appendix C, Staatz, (1979), and Makinen and Herman (1980).

CHAPTER VII

ORGANIZATION, ACTIVITY AND PRICES IN VOLTAIC CATTLE MARKETS

This chapter looks at the organization of recent activity in the major cattle markets in Upper Volta and examines the formation and determination of prices in those markets included in the surveys discussed in Chapter Four. The first section describes the nature of trade in each general classification of market: collection, redistribution, and terminal. The second section analyzes prices in those markets, especially in relation to the determinants of animal characteristics, seasonality, region, and demand conditions. The major conclusions are that the cattle marketing system tends to be well organized, distributing cattle in a rational manner, and that the major determinants of price are weight, meat quality, and the exportability of cattle.

Organization and Activity in Major Cattle Markets

As noted in Chapter 2, cattle markets are often classified according to function as collection (primary), redistribution (regroupment), or terminal (slaughter) markets[1]. This section describes the conditions observed in the sample markets of each type during the survey period. For each category the types of buyers and sellers which predominate, the mechanics of trade, and the composition of cattle are described.

1. Collection Markets. -- Though the collection market is often considered only in the context of northern cattle surplus zones a set of smaller, highly localized collection markets exists in the south as well. Primary markets are distinguished by the predominance of herdsmen as sellers, and herdsmen and traders as buyers, with local butchers playing a relatively minor role. The special alternatives available to southern herdsmen selling cattle will be discussed in a separate section.

1. Sellers in Northern Collection Markets. -- Most of the cattle offered for sale in northern collection markets are brought by Fulani herdsmen. Markets located in the extreme northern portions of the country (Markoye, Djibo, and Nouna) attract Malian and Nigerien herdsmen who find prices to be higher in the Voltaic markets. There are some sales of cattle by merchants or collectors who specialize in buying animals either en brousse or in smaller markets. However, such traders are less important a factor in Voltaic primary markets than they might have been previously (Bary, 1972, pp. 30-31) or than they might be in other Sahelian regions (Raupp, 1975, pp. 50-51). In Djibo, for example, only one merchant family regularly sold cattle which they purchased in southern Mali. Government officials in markets in Markoye and Gorom-Gorom also reported scant selling activity by traders in their markets in the early seventies.[2]

The typical herdsman selling in primary markets sells only one head of cattle at a time. In Djibo, no herdsman was ever recorded selling more than 5 head at one market session. During the survey period, of all sellers recorded as eleveurs the average number of cattle sold per market was less than 1.25 head. Yet herdsmen rarely bring only the animal(s) they intend to sell to market. Because it is usually difficult to walk a single animal to market as many as ten head of cattle will accompany the animal destined for sale in order to facilitate the trek. The remaining animals are later trekked back to the village. Because of this, many collection markets appear more active than they actually are. In Djibo, the number of cattle assembled on the market grounds is often three or four times greater than the number of animals actually up for sale.

2. Herdsmen Selling in the South. -- Unlike their northern counterparts, traditional herdsmen in the south usually have several alternative markets close by in which they can sell their cattle. This is due to the highly developed system of local periodic (bush) markets that exists in the more densely populated south. It was noted in Chapter 5 that few northern herdsmen sold cattle in bush markets, largely because of the dearth of buyers in those markets. There are, however, two important sources of cattle demand in southern local markets: local butchers and short distance traders.

Butchering is a thriving trade in southern local markets where a large share of the population has to rely on market sources for their meat. The high demand for meat enables most southern bush markets to support several butchers who are able to purchase and slaughter cattle in addition to small ruminants. Local herdsmen thus have the option of selling their slaughter-quality cattle to these butchers rather than take them to more distant markets.

The second source of demand for cattle in small local markets is the short-distance trader who specializes in moving animals from these markets to redistribution markets. Most southern bush markets are within a couple days trek of regroupment markets, are easily accessible by car or motorbike, and meet frequently (usually every three days). These factors allow for a rapid turnover of capital for local traders and thus enable them to operate on a relatively narrow margin. This is not an uncommon source of entry into livestock trading and is even engaged in irregularly by herdsmen themselves. The large numbers of traders engaging in this activity results in a high degree of competition for all types of cattle. Thus, herdsmen are less hesitant to sell cattle in bush markets under these conditions. Interviews with herdsmen suggest that they are well aware of the differential between bush and regroupment market prices. However, considering the costs most would incur by taking cattle themselves to the redistribution market the cost of selling locally appears to them not to be excessive.

Southern herdsmen are also much more likely to sell directly to traders, butchers, or farmers outside of organized markets. These "farm gate" sales do not appear to be too different from local market transactions. In fact, many of the same local traders who frequent bush markets also purchase cattle directly from herdsmen. The exception is sales to butchers which often involve sick or injured cattle which the herdsman must sell urgently and may be unable to bring to market. In these cases, the herdsman usually accepts a price considerably lower than that he would have obtained had he been able to sell the animal in an organized market.

Some long-distance traders also have contacts with herdsmen through agents who collect cattle directly from herdsmen on a regular basis. A good deal of this activity took place in the Léo region along the Ghanaian border. These sales seem to be concentrated primarily during periods when redistribution markets are not well

supplied. Direct, nonmarket transactions also take place between herdsmen and farmers. The latter most often purchase animals for fattening and short-term resale. In the regions studied there was no evidence of farmers purchasing cattle for animal traction.

3. Buyers in Northern Collection Markets. -- The population of cattle buyers in collection markets is dominated in size, though not activity, by herdsmen looking for young animals for replacement stock. It is not unusual for selling herdsmen to apply some portion of their revenues toward such purchases. Though traders are fewer in number, they are usually much more active as buyers than herdsmen. Most of their purchases are of healthy mature cattle which are able to make the trek south to redistribution or terminal markets or to the railheads for export to Ivory Coast. Local butchers are the smallest class of regular cattle buyers in primary markets, directing their attention to older or enfeebled cattle. In some markets there might be only one active butcher buying cattle during a market session. In Djibo, local herdsmen accounted for one-third of all cattle purchases, long-distance traders slightly more than half, local traders about fifteen percent, and butchers only one percent.

4. The Mechanics of Trade in Collection Markets. -- Before entering the market sellers meet with an intermediary who takes charge of the cattle and subsequent sale. As explained in Chapter 5, there is usally some kinship or ethnic relationship which ties the broker and the seller. The intermediary stakes both reputation and money on his guarantee that the animal is neither stolen nor affected with some non-obvious disease known to the owner. For his part, the seller must have confidence that the broker will arrange a fair sale.

Cattle are usually grouped around the intermediary with the herdsmen and other sellers standing off to one side. All market transactions take place through the intermediary, though the sellers are often consulted during the bargaining process. It is usually understood that once an animal is consigned to a broker the owner will not directly interfere except to approve the final terms of sale. One occasionally finds a seller exhorting buyers to consider his cattle but it is considered bad form to discuss price without the aid of the intermediary.

Cattle sales in primary markets are almost exclusively on a cash basis. The purchase price is paid directly to the broker. In addition, buyers pay the intermediary a commission which ranges from 250 to 1000 francs CFA. The larger amounts are most often paid by long-distance traders who purchase large and expensive cattle. The standard fee in most markets in 1977 was 250 francs CFA though in several markets brokers had succeeded in raising it to 500 francs CFA. Early in 1977 the Djibo intermediaries attempted unsuccessfully to raise the commission to 500 francs CFA. The local government would not endorse nor enforce the increase and buyers simply refused to pay the higher amount[5].

Brokers rarely hand over the purchase price to the seller at the marketplace. Neither is any formal record of the sale usually made. Following the conclusion of the market session, sellers gather at the home of their brokers and are then paid. They too pay a small fee to the intermediary (usually 100 francs CFA though it may depend upon the price the broker earned for the seller and the services he provided) which is considered a "gift".

It has been alleged that this system puts the herdsman in the position of being easily exploited by the intermediary. The contention is that brokers may negotiate one price with buyers at the market while settling at a lower price with the selling herdsman, thus pocketing the difference. However, since sellers are almost always present at the market and usually oversee negotiation and approve prices at the time of sale it is unlikely that they would accept a lesser settlement from the broker later on. Furthermore, in most primary markets it is the herdsmen rather than buying traders with whom intermediaries enjoy a close relationship. This diminishes the likelihood of a conspiracy by broker or buyer to deceive the seller.

Table 7.1 presents a summary on the numbers, composition, and prices of cattle sold in the Djibo cattle market from May 1976 to April 1977. The average number of cattle offered for sale during that period was 143 head per market session. Like most major northern markets the Djibo market meets weekly. As explained above, this means that from three to five hundred animals might be assembled in the market because of the extra animals which are brought only to accompany those being sold.

Roughly half of those cattle presented are sold during regular market hours. In the event that an animal remains unsold after the normal market period ends the seller has several alternatives. Both herdsmen and traders attempt to sell unsold cattle in an informal market which takes place later in the day near the mud-brick holding pens in which cattle are kept at the conclusion of the formal market. Such sales are not included in the tabulations in Table 7.1 but are estimated to be no more than one-third of recorded market sales.

If the seller is still unsuccessful he may wait until the following week and reattempt to sell the animal. Traders have the option of continuing on to a market further south, such as Kaya or Ouagadougou. Because they have few contacts (brokers) in southern markets and because of the costs and inconveniences of the long trek south, this is not usually a viable option for herdsmen who sell small numbers of cattle at one time.

The final alternative, available only to herdsmen, is not to sell the animal at all. He may, instead, return it to his herd and attempt to sell it at some later date. Although the Djibo cattle market survey uncovered several cases of frustrated herdsmen doing this when they did not receive what they considered to be a fair price, there is no evidence that it is a common practice.

5. The Composition of Cattle Sold in Collection Markets. -- Looking at the composition figures in Table 7.1 one is struck by the abundance of young cattle which are sold in the Djibo market. Calves, males younger than four, and heifers account for more than one-half of the sales. Most of these animals are bought by herdsmen, local traders who resell to herdsmen or farmers, or townspeople who keep cattle in their courtyard or consign their "herd" to other herdsmen. It is not uncommon for a Djibo resident to purchase an animal and then instruct the seller -- if he is a local herdsman -- to return the animal to the original herd. The herdsman maintains usufruct over milk and manure while the owner minimizes his cost of caring for his investment.

Some of the young cattle are bought by traders who trek them south to regroupment markets where they are sold to other cattle raisers. An emerging and potentially more important trade, however, is for cattle suitable for animal traction programs. These traders generally buy well developed males, four years old or younger. One trader was known to have a contact with the Autorité des Amenagements des Vallés des Voltas

TABLE 7.1

DJIBO CATTLE MARKET, MAY 1976-APRIL 1977

	TOTAL	AVERAGE PER MARKET
Number of markets sampled	37	--
Number of animals offered for sale	5,295	143
Number of animals sold	2,611	71
Percent of those offered sold	49%	--

TYPE OF ANIMAL	NUMBER OF SALES RECORDED	PERCENTAGE OF TOTAL SALES	AVERAGE PRICE (FRANCS CFA)
Male calves	134	5%	10,846
Young males (1-4 years)	923	37%	17,914
Mature bulls	423	17%	34,246
Mature castrated males	333	13%	41,997
Heifers	267	11%	24,042
Cows	410	16%	19,605

(AVV) to provide about 500 males under four years old, weighing between 250 and 300 kilograms, and conforming to a standard suitable for draft animals. His contract called for a fixed delivery price of 27,500 francs CFA per head. While such animals are not easy to come by (the trader claimed that only 40 of the first 150 head he delivered were accepted) more traders will undoubtedly move into this trade as animal traction programs expand. It should be noted that the 17,914 franc CFA average price for young males includes many cattle which would probably not be acceptable to the AVV for their traction program. Thus, the relevant price for potential draft animals is probably closer to 22,500 to 27,500 francs CFA in northern collection markets. The margin for these traders is not very large when one considers the transportation costs (trek) involved in delivering the cattle to the AVV.

The seasonal variation in cattle offered for sale in the Djibo market is shown in Table 7.2. As with the Djibo Herder Sample data evaluated in the fifth chapter, the data show cattle entries and sales rising rapidly during the rainy season, maintaining a high level through the end of the harvest season, and declining during the dry hot season to a minimum just before the rains begin anew. The composition of cattle sold is relatively constant throughout the survey period.

Redistribution Markets. -- These markets are characterized by large numbers of traders selling mainly slaughter cattle to exporters, domestic traders, and butchers. Located south of the tier of northern collection markets, along the major north-south trade routes, the most important Voltaic redistribution markets are Kaya, Pouytenga, Ouagadougou, Bobo-Dioulasso, Youba, (Ouahigouya), Koudougou, and Seytenga. The first three of these were sites for cattle market surveys in this study.

Most redistribution markets display features common to the two other types of markets. Like collection markets, they are a major entry point into the commercial circuit for many cattle offered for sale by local herdsmen. They are also the final market for large numbers of cattle destined for slaughter locally or in nearby urban centers. The feature which distinguishes these markets is that trade is dominated by cattle merchants, both as sellers and as buyers. These markets serve as points of exchange between traders who specialize in buying cattle from herdsmen (either in northern primary markets, bush markets, or at the farm) and traders who move cattle on to terminal markets, both domestic and foreign. Thus, the major function of regroupment markets is to redistribute cattle which have already entered the marketing chain toward their various ultimate destinations

1. Sellers in Redistribution Markets. -- Sellers in redistribution markets include local traditional herdsmen, townspeople, farmers, local merchants, and long-distance cattle traders. As in the collection markets, herdsmen typically sell a variety of cattle from calves to cull cows. Farmers and townspeople most often sell cattle that they have fattened using feed supplements. As a result, they are among the heaviest and best quality cattle offered for sale in these markets. These animals are most often purchased by traders who either resell them to urban butchers specializing in high quality meat, or export them to Ivory Coast by train. Because these animals have not been exposed to the same rugged conditions as "bush cattle", they are not usually considered fit by exporters to make the difficult long trek to coastal markets.

The other category of sellers in regroupment markets is the market professionals: Local and long-distance traders, butchers who also sell cattle, and speculators (coxeurs). These are the individuals who bring the largest number of cattle to redistribution markets. In the Kaya and Pouytenga markets almost four-fifths of the cattle offered for sale are brought by market professionals with the remaining twenty percent being sold by herdsmen, farmers and townspeople.

2. Buyers in Redistribution Markets. -- Cattle buyers in redistribution markets include all the above mentioned sellers plus butchers from local towns and nearby urban centers and exporters. Herdsmen, farmers, and townspeople buy cattle for breeding or fattening, purchasing young stock mostly. Purchases by local butchers buying for immediate slaughter are concentrated on cull cows or other animals too weak to be taken to other markets. The survey of 39 local butchers in Pouytenga showed that 67 percent of their purchases were cull cows, 24 percent young males, and only 8 percent mature males.

Butchers from urban centers often frequent redistribution markets that are accessible by car in several hours or less. They buy not only slaughter cattle for their own use but other cattle that they attempt to resell in urban markets. At least fifteen butchers from Ouagadougou regularly travel to Kaya and Pouytenga to buy cattle both for themselves and for resale in the Ouagadougou market. Some of these butchers are also cattle exporters but even those who are not often buy export quality cattle for resale to exporters in Ouagadougou. This practice is most common in those seasons when cattle are in short supply in the Ouagadougou market.

Local traders act as arbitrageurs, buying all types of cattle in regroupment markets and reselling them in the same market at a later date (or even time) or in other domestic markets. Exporters usually buy only the best quality and healthiest cattle, organizing herds of at least 25 head which they either trek to railheads or coastal markets.

3. The Mechanics of Trade in Redistribution Markets. -- Sellers have an interesting alternative for selling cattle outside of regroupment markets. Speculators (sometimes known as coxeurs) attempt to buy cattle from sellers (usually herdsmen or other nonprofessionals) before the market session begins or between market days. These buyers "play the market", trying to take advantage of variations in market supply and price. Often they buy cattle from herdsmen who are willing to take a guaranteed price, and then hope that market conditions will enable them to profit from the short-term exchange. Payment to the seller is often delayed until after the coxeur has resold the animal in the market, with the speculator keeping his profit or sometimes making up the difference from his own pocket. One advantage that the speculator has is that he may accumulate several head of export quality cattle and attempt to resell them to an exporter at a single price. This method of resale is especially profitable during those seasons when cattle supply wanes (March through the end of the rainy season) and exporters have difficulty finding enough animals to make up a convoy. Where herdsmen are well informed about market conditions the costs to them of this method of sale will be low and may be considered a premium

TABLE 7.2
CATTLE SALES. DJIBO CATTLE MARKET, 1976-77

	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	APRIL	TOTAL
I. Average number of cattle offered each market	82	61	22	81	179	205	240	146	103	166	83	124
II. Average number of cattle sold each market	39	36	11	51	43	106	126	71	67	88	56	63
III. Males as percent of total cattle sold	76%	80%	74%	68%	82%	77%	66%	65%	78%	73%	72%	72%
A. Mature castrated males as percent of total	10%	21%	12%	10%	18%	20%	11%	10%	11%	9%	11%	13%
B. Mature bulls as percent of total	26%	21%	9%	16%	15%	19%	17%	15%	23%	11%	17%	17%
C. Young males (1-4) as percent of total	28%	29%	33%	31%	45%	35%	36%	34%	41%	46%	43%	37%
D. Male calves as percent of total	12%	9%	21%	11%	4%	3%	2%	6%	3%	7%	1%	5%
IV. Females as percent of total cattle sold	24%	20%	26%	32%	18%	23%	34%	35%	22%	27%	28%	28%
A. Cows as percent of total	14%	16%	14%	17%	10%	16%	22%	17%	13%	15%	19%	16%
B. Heifers as percent of total	10%	4%	12%	15%	8%	7%	12%	18%	9%	12%	9%	11%

for certainty. There is no evidence of any systematic coercion by market professionals to promote this type of intermediate sale in redistribution markets.

Most herdsmen choose to sell their cattle directly in the large redistribution markets instead of outside them. When they do, the procedure is similar to that followed in collection markets. The seller meets with his regular intermediary who handles all aspects of the sale, keeps the herdsman informed of market conditions and prices, and usually secures herder approval before finalizing a sale. Other cattle raisers follow similar selling patterns.

Like the occasional seller, the trader usually uses the services of an intermediary. Often though, this is only a formality since traders participate directly in the bargaining process to a greater degree than other sellers. Still, the broker collects his fee for the sale of any animal sold under his license, 250 francs CFA or more paid by the buyer and usually a 100 franc CFA gratuity paid by the seller.

The role of the intermediary in redistribution markets is similar to his role in northern collection markets. He may serve as a landlord to both buyer and seller, providing food and lodging for his clients and accompanying drovers. He takes charge of the cattle both before and following the sale. In rare cases when credit is extended to the buyer it is the broker who guarantees payment to the seller. Finally, he makes the usual guarantees that the animal is neither stolen nor diseased.

Cattle are arranged according to likely destination in redistribution markets. Slaughter quality cattle occupy one side of the market area, export quality another, and young cattle take yet a third space. This organization is possible even though traders may bring a variety of animals to market since brokers may distribute any one seller's cattle to a number of assistants or associates for sale. This grouping facilitates the sale of large numbers of cattle to one buyer in a single lot. Because the animals sold together may not always belong to a single seller there is the possibility of misunderstanding over the division of receipts received from group sales. However, in neither Kaya nor Pouytenga did the market surveys uncover evidence of discontent among sellers in regard to this practice.

The breakdown of cattle sales in the Pouytenga cattle market is presented in Table 7.3. The figure for the number of cattle sold is estimated because the enumerator was unable to record each sale (during several market sessions over 1000 head of cattle were offered). The estimate is based on the data for the sample of selling groups for which complete sale information was collected, usually eight to ten groups involving 150-200 head of cattle each market.

The Pouytenga market meets every three days (typical of southern redistribution markets). Monthly entries over the survey period (July 1976-March 1977) averaged nearly 4000 head. Since only slightly more than half of these are recorded as having been sold it is likely that a significant number of cattle offered for sale in any one market are returns from previous markets. The rest of the animals which are unsold during regular market hours are sold outside of the market or taken on to other markets further along in the marketing chain. The latter option is frequently followed by traders who move their herds on to the market in Ouagadougou when they find prices not to their liking in Kaya or Pouytenga.

4. The Composition of Cattle Sold in Redistribution Markets.-- The extent to which trade in slaughter and export quality cattle dominates trade over sales of young cattle for raising or fattening is evidenced by the fact that mature males and cull cows account for 86 percent of all cattle sales in the Pouytenga market (see Table 7.3). Very few calves or heifers are sold, each accounting for less than one percent of total sales.

The seasonal variation in the composition of cattle sold in the Pouytenga cattle market over the survey period is recorded in Table 7.4. The number of cattle offered for sale increases through the rainy season, reaching a peak in September, and then falling steadily. The proportion of male cattle sold per month is highest in the July-October period, corresponding to the period of highest export activity.

Terminal Markets.-- While this class of markets usually includes only coastal markets which receive large numbers of cattle, almost all of which are slaughtered locally, there are two markets in Upper Volta which typically channel more animals into local meat markets than onto further destinations. These are the markets of Ouagadougou and Bobo-Dioulasso. They are the two largest sources of domestic meat demand. Still, both of these markets can also be classified as redistribution markets because of their importance as redistribution centers for livestock and as embarkation points for rail shipment.

1. Sellers in Terminal Markets.-- While most of the sellers offering cattle for sale in domestic terminal markets are traders, other types of sellers appear as well (See Table 7.5). Though rare, there are cases of northern herdsmen trekking cattle long distances to Ouagadougou or Bobo-Dioulasso to take advantage of the higher prices paid for cattle. Most herdsmen who bring cattle to the Ouagadougou market are either acting as traders themselves or as agents for other herdsmen. Local herdsmen, farmers, and townspeople also offer cattle for sale, though on a very limited basis. Most individuals who have fattened an animal and wish to sell it wait until the peak price period, usually starting in April, when few good quality animals appear in Ouagadougou. These well fed cattle may be sold at premium prices to the local butchers who supply the European style meat markets and export meat to Ivory Coast.

Cattle merchants selling in these markets include long-distance traders who bring cattle down from Mali or from Voltaic collection markets, local traders and butchers selling cattle purchased in nearby markets or directly from cattle owners en brousse or in town, and some exporters who occasionally sell off surplus cattle before continuing further south.

2. Buyers in Terminal Markets.-- The ultimate buyers of cattle in terminal markets are local butchers and cattle exporters. Although there are approximately 250 registered butchers in Ouagadougou, only about 65 of them buy and slaughter cattle on a regular basis; the remainder deal in other kinds of meat. Almost all of the exporters operating out of Ouagadougou are local residents. During the survey period in Ouagadougou (February 1976 - March 1977) 23 different traders bought cattle regularly in the Ouagadougou market for export to either Ghana or Ivory Coast.

TABLE 7.3

POUYTENGA CATTLE MARKET, JULY 1976-MARCH 1977

	TOTAL	AVERAGE PER MARKET
Number of markets sampled	80	--
Number of animals offered for sale	29,552	369
Number of animals sold (estimated)	15,930	199
Percent of those offered sold	54%	--

TYPE OF ANIMAL	NUMBER OF SALES RECORDED	PERCENTAGE OF TOTAL SALES	AVERAGE PRICE (FRANCS CFA)
Male calves	46	1%	10,332
Young males (1-4 years)	961	12%	26,469
Mature bulls	2,645	33%	41,246
Mature castrated bulls	2,782	35%	42,615
Heifers	56	1%	21,402
Cows	1,471	18%	32,507
Total Number of Recorded Sales	7,961	100%	

TABLE 7.4

CATTLE SALES: POUYTENGA CATTLE MARKET, 1976-77

	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	TOTAL
I. Average number of cattle offered for sale at each market	241	478	646	429	347	357	269	180	188	348
II. Average number of cattle sold each market	110	314	428	259	222	216	214	104	88	206
III. Males as percent of total cattle sold	87%	83%	87%	87%	76%	69%	73%	66%	74%	81%
A. Mature castrated males as percent of total	41%	36%	35%	31%	31%	38%	31%	31%	36%	35%
B. Mature bulls as percent of total	41%	39%	34%	36%	33%	25%	25%	16%	23%	33%
C. Young males (1-4) as percent of total	5%	8%	17%	19%	10%	6%	16%	16%	13%	12%
D. Male calves as percent of total	0%	0%	1%	1%	1%	0%	1%	3%	2%	1%
IV. Females as percent of total cattle sold	12%	17%	13%	14%	25%	30%	26%	34%	26%	19%
A. Cows as percent of total	11%	16%	13%	14%	25%	30%	26%	31%	26%	18%
B. Heifers as percent of total	1%	1%	0%	0%	0%	0%	0%	3%	0%	1%

TABLE 7.5a

TYPE OF SELLER BY ANIMAL TYPE, OUAGADOUGOU MARKET

	Merchants	Butchers	Herdsmen	Others	Total[a]
Bulls	579	22	124	47	772 (32.7%)
Steers	810	16	121	35	982 (41.6%)
Cows	453	12	78	42	585 (24.8%)
Calves	22	0	0	2	24 (1%)
Total[b]	1864 (78.9%)	50 (2.1%)	323 (13.7%)	126 (5.3%)	2363

TABLE 7.5b

TYPE OF SELLER BY ORIGIN OF CATTLE, OUAGADOUGOU MARKET

Origin[c]	Merchants	Butchers	Herdsmen	Others	Total[a]
North	697	0	44	0	741 (31.7%)
East	280	50	13	107	450 (19.2%)
Center	458	0	134	19	611 (26.1%)
South	415	0	123	0	538 (23.0%)
Total[b]	1850 (79.1%)	50 (2.1%)	314 (13.4%)	126 (5.4%)	2340

[a]Row total as percentages of all cattle sold in parentheses.

[b]Column total as percentage of all cattle sold in parentheses.

[c]The origin of sale herds was stratified as follows:
North = predominantly Sahelian region.
East = Pouytenga, Koupéla, Fada N'Gourma
Center = Ouagadougou, Kaya, Kougoussi.
South = Léo, Po, Manga.

3. The Mechanics of Trade and Composition of Cattle Sold in Terminal Markets.-- The role of intermediaries and their relationship with buyers and sellers is similar to that described above. Only butchers and traders who sell to other locals are able to avoid selling through brokers. As in all other Voltaic markets, almost all transactions are for cash. Only exchanges between butchers involve credit, that being of a short term nature, usually no more than several days.

One peculiarity of the terminal market is the role of the coxeur or petit commerçant. The market in Ouagadougou meets in the morning when butchers are busy selling meat. Some of the other market participants take advantage of this by "buying" slaughter quality cattle before the butchers arrive and then "reselling" these animals to the butchers who come late. Most of these individuals are young, have little capital, and operate on a credit basis, like the coxeurs described in an earlier section. They "guarantee" a price to the seller and pay when they have "resold" the animal. For this the coxeur receives about 500 francs CFA per animal. In this way, the petits commerçants act very much like an additional layer of intermediaries in the system. Though they often insist that they represent a specific butcher, they appear to have the freedom to sell to almost any butcher or even exporter.

This system of coxeurs could be easily undermined by the butchers. It continues through a tacit understanding among butchers, traders, and intermediaries. In part, it provides additional market employment. Most of the coxeurs are either related to other market participants who have some social obligation to find them jobs somewhere in the cattle marketing or slaughtering circuit.[4] The butchers seem to be quite content with this arrangement since they are really under no obligation to "buy" the animal if they feel the price is not acceptable. If the coxeur does not find a buyer for the animal he returns it to the seller at no cost or he arranges credit with his own sponsor or another butcher or trader in order to keep the animal for resale at a later date.

Table 7.6 shows some of the results from the year-long survey of the Ouagadougou cattle market. Unlike the Pouytenga and Djibo markets where only half of the cattle offered for sale in any market session were immediately sold, in Ouagadougou only eight percent of the animals entering the market remained unsold at the conclusion of the market. Most of these were returned the following day and sold. One can also see the dominance of slaughter cattle. Most of the young males were bought to be slaughtered and sold as "veal" in the European style butcher shops.

Determinants of Cattle Market Prices

This section describes cattle prices in various markets, the formulation of prices, and the relationship between price and its various determinants. Those determinants include animal characteristics (sex, age, weight, and origin), market conditions (location, type of seller), and demand conditions (season, intended destination or use, and buyer type).

Difficulties in Evaluating Price Relationships. -- As explained in the previous section, cattle prices are determined through a direct bargaining procedure involving seller, intermediary, and buyer. Prices are negotiated in units of livestock, singly or in lots. Nowhere in Upper Volta are cattle explicitly bought and sold by weight. Prices are never given units of weight nor are scales used to evaluate how much the animals weigh.

Butchers value the animal for the immediate return of meat production. They thus visually evaluated the quantity and quality of meat that each animal will yield. Traders dealing in slaughter quality cattle also value the condition and health of the animal in so far as it affects its ability to be shipped to other markets. Herders, farmers, and townspeople are more concerned with streams of future returns depending on their purpose for owning cattle: reproduction, milk production, weight gain, etc.

Few studies have been made of cattle prices in Voltaic markets. One of the problems in studying cattle prices is the difficulty involved in collecting information on prices from traders who are reluctant to discuss this subject. Another is finding an appropriate standard on which to base prices. The Service de l'Elevage issues livestock price indices in their monthly and annual reports. However, these are of the broadest nature ("cattle," "goats," "sheep," etc.) and are not based upon any organized survey in any of the markets. Ideally, one would like to see prices expressed in francs per kilogram of liveweight or carcassweight. Unfortunately, the absence of cattle scales in most markets make it difficult to evaluate weights except by estimation.

The Evolution of Cattle Prices. -- Cattle prices have risen considerably over the past decade. Tyé estimates that cattle prices had at least doubled between 1967 and 1974 (SEDES, 1975, p. 5). This was confirmed in interviews with traders, butchers, and government officials throughout Upper Volta. A former livestock market tax collector in Djibo, claimed that prices for all cattle had about tripled between the mid-sixties and 1976. He claimed that most of the increase in price had occurred in the preceding five years, with slaughter-cattle prices rising steadily during the seventies and prices of young animals increasing near the end of the period but at a very rapid rate.[5] Butchers and traders operating in the Kaya, Pouytenga, and Ouagadougou markets had similar responses. When asked to evaluate the change in prices for different types of cattle between pre- and post-drought periods, their responses confirmed Hassan's opinion that prices had increased between two and three fold during the past decade. It is interesting to note that between 1964 and 1974 the overall consumer price index for Upper Volta rose by only 25 percent while the index of food prices rose by 71 percent. Grain prices, which may be the more relevant index to use for calculating the terms of trade between the livestock and agricultural sectors, have about doubled over the same period (Berg, 1977, pp. 45, 54).

Regional Price Differences. -- Cattle prices can be expected to vary by region or market according to transportation costs. The expectation is that prices vary inversely with the distance from terminal markets or points of export embarkation. However, variations in prices between markets are difficult to evaluate because of the lack of information on prices and cattle weight and condition in the different markets. Table 7.7 presents the average price for six broad categories of cattle for three of the markets surveyed. Because prices are given

TABLE 7.6

OUAGADOUGOU CATTLE MARKET, FEBRUARY 1976-MARCH 1977

	TOTAL	AVERAGE PER MARKET
Number of markets sampled	373	--
Number of animals offered for sale	43,862	118
Number of animals sold	33,176	89
Number of animals slaughtered or exported by seller	7,237	19
Percent of animals offered but not sold in market or slaughtered or exported by seller	8%	

TYPE OF ANIMAL	NUMBER OF SALES RECORDED	PERCENTAGE OF TOTAL SALES	AVERAGE PRICE (FRANCS CFA)
Male calves[1]	39	1%	--
Young males (1-4 years)	1,514	5%	12,784
Mature bulls	11,397	34%	32,730
Mature castrated males	11,717	35%	39,471
Heifers	385	1%	19,250
Cows	8,124	24%	21,490

[1]Since many of the calves were sold together with a cow, no average price is given.

per head and not in units of weight, it is difficult to make comparisons. The fact that the prices given for mature males in the Ouagadougou markets are lower than those recorded for the other two markets is not at all indicative of the historical price structure.[6] These prices do not take into account the different size and quality of cattle sold in each market.

Similarly, even when prices are expressed in units of known weights, comparisons are not completely enlightening. Table 7.8 presents average price per kilogram for cattle slaughtered in Ouagadougou and Pouytenga. As expected, the price of slaughter cattle is higher in Ouagadougou, ranging from 10 to 30 percent higher. Cull cows, which have the highest implicit transporation cost -- because of risk -- show the greatest difference. Only young males, which have value in alternative uses in rural Pouytenga, show a price advantage in Pouytenga. To some extent, the degree of differential may be overstated since cattle slaughtered in Ouagadougou are of higher quality than those slaughtered in Pouytenga.

Another approach at measuring regional price differences is through regression analysis. Again, slaughter cattle with known carcass weights in Ouagadougou, Kaya, and Pouytenga from July 1976-March 1977 were the units of observation. The form of the equation estimated was:

$$P = \alpha + \beta CW + \gamma_1 PM + \gamma_2 KM + \delta_1 B + \delta_2 S + \varepsilon$$

where

P	=	price of the animal in CFA francs;
CW	=	carcass weight of the animal in kilograms;
PM	=	dummy variable for cattle bought in the Pouytenga market;
KM	=	dummy variable for cattle bought in the Kaya market;
B	=	dummy variable for bulls; and
S	=	dummy variable for steers.

Because the variable for cattle purchased in Ouagadougou was suppressed, the other two locational dummy variables measure how much of the price variation is attributable to location; that is how much the actual price in that market differed from the price in Ouagadougou given the same characteristics of the animal. The model was estimated for all cattle sexes and then rerun for each type separately (bull, steer, and cow) to see if the locational price differential might be related to animal type. The results are presented in Table 7.9. All locational dummy variables are statistically significant at at least the .05 level. They suggest that substantial premiums are paid for cattle sold in Ouagadougou of the magnitude of 3,000-5,500 francs CFA over prices in Kaya and Pouytenga. While these premiums appear to be higher than the 1660 francs CFA costs of trekking cattle from Pouytenga to Ouagadougou computed in Chapter 6, the likelihood of quality differences between cattle slaughtered in urban markets (Ouagadougou) and small town markets (Kaya and Pouytenga) must be considered.

Seasonal Price Variation. -- The question of seasonal price variation was first considered in Chapter 5. The difficulties of evaluating seasonal effects from others in a short study include factoring out inflationary bias and temporary (but seasonally unrelated) aberrations in supply and demand. It can be argued that the demand for slaughter cattle is a derived demand for meat consumption (locally or abroad) and that the demand for meat is relatively constant throughout the year. However, the price of cattle will then depend not only on the supply of cattle (see Chapter 5) but also on their weight. This combined supply of "meat on the hoof" is likely to fluctuate even more than the simple supply of cattle (as measured by numbers offered for sale) since the variations in weight change seasonally along a similar pattern to presentations, troughs coming before and peaks coming just after the rainy season.

In general, dry season per kilogram prices rise as much as 25 percent in the months immediately preceding and following the rainy season. The implications are higher costs to butchers and traders dealing in slaughter animals in the beginning of the year and lower costs from the middle of the rainy season until the end of the year. The selling herdsman, however, is not concerned with the seasonal variations in the price per kilogram. It is little consolation to the herder that his cow is worth more per kilogram when sold "skinny" at 15,000 francs in May than it would be if he sold it "fat" at 20,000 francs in October since the marginal cost of keeping the animal approaches zero. From the herders' point of view, prices are lowest at the end of the dry season and highest following the rainy season.

Average monthly cattle prices for Djibo, Pouytenga, and Ouagadougou are shown in Tables 7.10-7.14. Prices are unadjusted for any long trend and estimated weights and prices per kilogram are included in the Ouagadougou tables.

One notes that prices rise in August through September for all but the "young males" category in the Djibo market. This increase is probably due almost entirely to the improvement in cattle weights and conditions. In addition to being more valuable purely for the quantity of meat they will yield, cattle also become more valuable as export animals because their improved condition allows them to better withstand the rigors of long treks or long passage in railroad cars.

The period from October through December is one of decreasing prices for slaughter cattle. The reason lies principally in the decrease in demand for export cattle. This phenomenon is the result of the approach of the holiday of Tabaski when Moslems traditionally slaughter sheep. Many traders shift to the profitable sheep trade and other cattle merchants find difficulty in getting cattle cars because of the pressure put upon the railroad by the large numbers of sheep being exported to the Ivory Coast. The increase in the prices for mature males in the Pouytenga market after January (Figure 7.1) reflects a return to normal exporting patterns.

For the rest of the year, it is difficult to make much of the individual variations. The price of young males in the Pouytenga market and heifers in the Djibo market rises throughout the survey period. This is primarily due to the large demand for traction animals and cattle for restocking programs discussed in Chapter 1. The large

TABLE 7.7

AVERAGE CATTLE PRICES
(1976-77)

Cattle Type	Market Type: Collection: Djibo	Market Type: Regroupment: Pouytenga	Terminal: Ouagadougou
Male calves	10,846 CFA	10,332 CFA	--
Immature males	17,914 CFA	26,469 CFA	12,784 CFA
Mature bulls	34,246 CFA	41,246 CFA	32,730 CFA
Mature steers	41,997 CFA	42,615 CFA	39,471 CFA
Heifers	24,042 CFA	21,402 CFA	19,250 CFA
Cows	19,605 CFA	32,507 CFA	21,490 CFA

TABLE 7.8

AVERAGE PRICES FOR CATTLE SLAUGHTERED LOCALLY
CALCULATED IN TERMS OF CFA PER KILOGRAM OF CARCASS WEIGHT
(November 1976-March 1977)

Cattle Type/Market	Pouytenga	Ouagadougou	Percentage Difference
Calves and immature males	166 CFA/kg.	149 CFA/kg.	-10.8
Mature bulls	197 CFA/kg.	237 CFA/kg.	+18.4
Mature steers	227 CFA/kg.	252 CFA/kg.	+10.4
Cows	164 CFA/kg.	223 CFA/kg.	+30.5

TABLE 7.9

ESTIMATED PARAMETERS OF LOCATIONAL PRICE MODEL
BASED ON SLAUGHTERED CATTLE IN OUAGADOUGOU, POUYTENGA, AND KAYA
July 1976-March 1977

Variable	Sub-Sample[b]			
	All Sexes	Bulls	Steers	Cows
Constant	-8181.4*	-1322.7	-9300.1*	-2832.9**
	(657.2)	(1772.5)	(1106.4)	(1137.2)
CW	294.4*	246.0*	319.2*	248.7*
	(5.08)	(12.69)	(7.76)	(9.9)
PM	-4064.0*	-5418.4*	-2797.2**	-5188.6*
	(389.0)	(850.2)	(1267.8)	(400.1)
KM	-2534.6*	-3068.8**	-5187.7**	-4144.1*
	(419.0)	(1324.9)	(2647.1)	(430.6)
B	718.8***			
	(374.5)			
S	2271.4*			
	(356.0)			
N	1098	204	365	529
R^2	.879	.859	.838	.778
$\bar{R}^2$	.878	.851	.834	.775

[a]See text for description of variables.

[b]Standard errors in parentheses.

*significantly different from zero at the .01 level.

**significantly different from zero at the .05 level.

***significantly different from zero at the .10 level.

TABLE 7.10

MONTHLY AVERAGE CATTLE PRICES: DJIBO CATTLE MARKET
MAY 1976-APRIL 1977[a]
(Prices in Francs CFA)

	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	APR.
Male calves	13,530	11,825	9,445	9,260	10,645	12,180	9,950	10,640	12,145	10,845	
Young males (1-4 years)	17,205	17,635	17,355	17,810	18,160	18,040	17,765	17,575	18,560	18,650	
Mature bulls	29,600	29,500	35,750	32,000	36,425	34,625	34,290	35,920	35,730	35,300	37,945
Mature castrated males	34,310	42,550	36,200	37,725	45,765	42,380	41,480	45,730	45,500	37,385	39,165
Heifers	22,940	20,415	20,800	19,740	20,875	24,665	25,250	24,670	24,020	26,665	26,700
Cows	19,545	19,585	16,165	21,150	21,500	20,605	17,385	18,065	20,720	22,065	17,950

[a]No sample taken in March 1977.

TABLE 7.11

MONTHLY AVERAGE CATTLE PRICES: POUYTENGA CATTLE MARKET
JULY 1976-MARCH 1977
(Prices in Francs CFA)

	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
Male calves		12,250	15,667	15,050	11,063	7,250	10,464	6,150	5,125
Young males (1-4 years)	19,659	19,731	26,922	27,735	29,453	27,667	28,202	30,508	33,835
Mature bulls	42,029	39,439	42,438	43,699	40,617	38,490	39,772	43,361	47,667
Mature castrated males	46,849	40,170	43,338	43,400	41,260	38,743	41,519	46,065	48,774
Heifers	20,200	21,000	28,250					20,350	
Cows	30,948	35,374	41,510	40,792	36,642	29,953	30,559	16,062	15,458

TABLE 7.12: WEIGHT AND PRICE BY ANIMAL TYPE AND MONTH OF SALE; BULL OUAGADOUGOU MARKET (1976-77)

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg.	(SD)
FEB. 1976	64	215	(50)	64	27,328	(11,136)	64	120	(31)
MAR. 1976	91	263	(41)	85	36,606	(8,530)	85	137	(12)
APR. 1976	75	257	(49)	75	33,087	(7,803)	75	128	(13)
MAY 1976	35	214	(39)	36	32,068	(8,333)	35	152	(15)
JUNE 1976	39	220	(37)	39	32,702	(8,431)	39	147	(17)
JULY 1976	75	239	(46)	98	25,547	(9,954)	75	125	(13)
AUG. 1976	71	238	(44)	77	32,158	(10,026)	71	139	(17)
SEP. 1976	85	245	(44)	106	27,154	(10,179)	85	126	(17)
OCT. 1976	102	249	(39)	108	31,698	(8,174)	102	131	(10)
NOV. 1976	61	280	(44)	58	38,214	(7,055)	58	137	(12)
DEC. 1976	44	249	(41)	44	34,643	(7,312)	44	138	(8)
JAN. 1977	85	263	(38)	85	36,366	(8,320)	85	137	(16)
FEB. 1977	42	269	(48)	44	34,159	(10,178)	42	129	(14)
MAR. 1977	49	251	(42)	50	31,010	(8,239)	48	126	(13)

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

TABLE 7.13: WEIGHT AND PRICE BY ANIMAL TYPE AND MONTH OF SALE; STEER
OUAGADOUGOU MARKET (1976-77)

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
FEB. 1976	73	290	(42)	73	35,072	(7,835)	73	120	(15)
MAR. 1976	54	309	(40)	54	43,954	(6,968)	54	142	(6)
APR. 1976	78	304	(42)	78	41,256	(4,876)	78	136	(14)
MAY 1976	24	302	(60)	25	50,035	(14,502)	24	170	(15)
JUNE 1976	32	270	(54)	32	43,282	(10,656)	32	160	(16)
JULY 1976	79	274	(51)	91	32,883	(11,062)	79	131	(11)
AUG. 1976	55	293	(31)	59	39,429	(7,848)	55	142	(12)
SEP. 1976	112	271	(58)	119	32,637	(9,853)	112	123	(12)
OCT. 1976	105	300	(45)	105	43,087	(10,146)	105	142	(14)
NOV. 1976	85	300	(48)	85	44,632	(10,864)	85	147	(15)
DEC. 1976	70	303	(34)	70	45,871	(8,475)	70	150	(14)
JAN. 1977	167	305	(22)	167	46,434	(8,531)	167	151	(19)
FEB. 1977	104	353	(49)	106	50,613	(11,558)	104	144	(13)
MAR. 1977	86	364	(37)	86	55,957	(11,221)	86	152	(17)

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

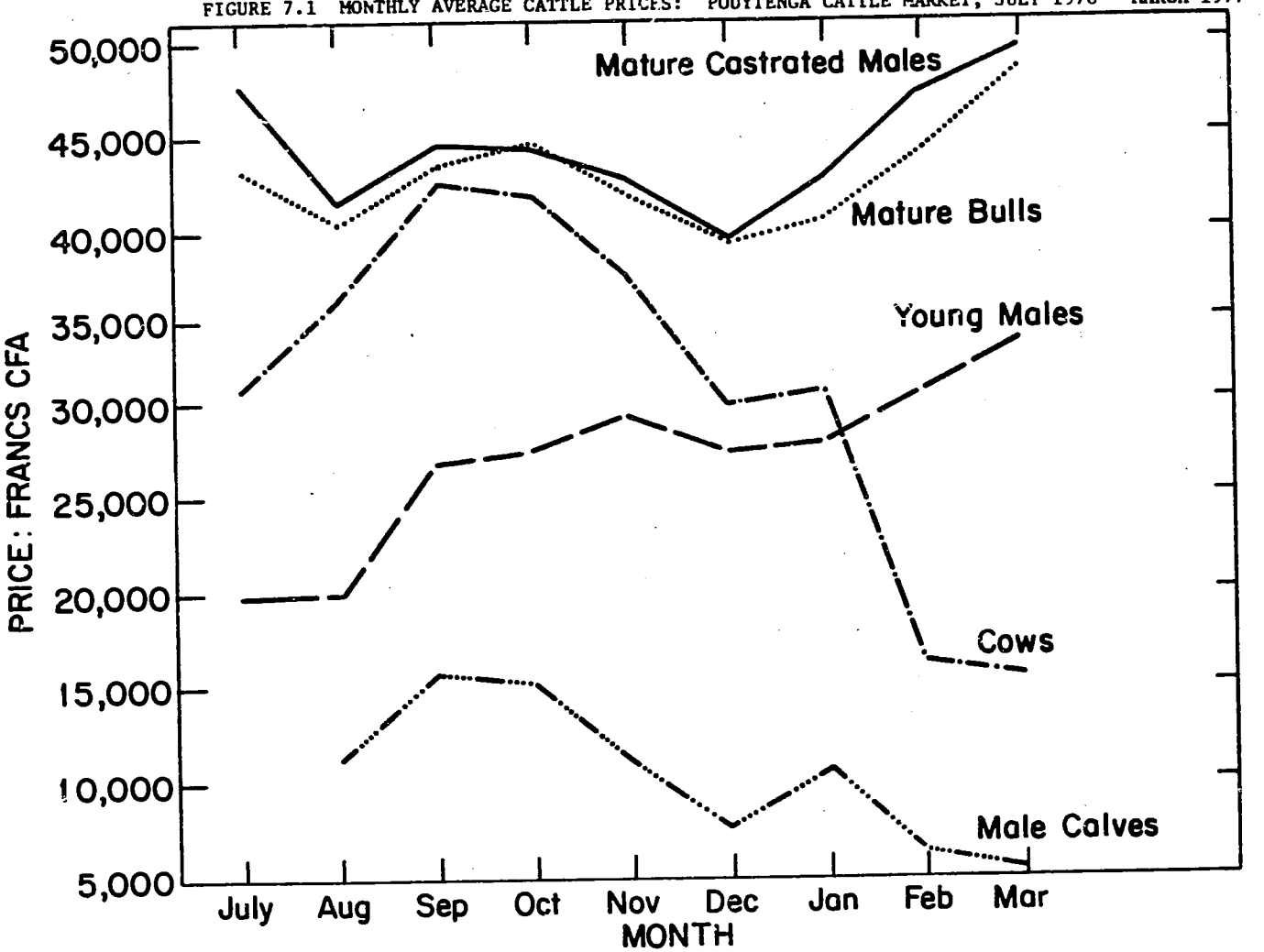
TABLE 7.14: WEIGHT AND PRICE BY ANIMAL TYPE AND MONTH OF SALE; COW
OUAGADOUGOU MARKET (1976-77)

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
FEB. 1976	57	190	(23)	57	20,368	(5,305)	57	106	(15)
MAR. 1976	56	205	(25)	59	22,322	(3,784)	59	109	(11)
APR. 1976	107	192	(40)	107	18,813	(3,811)	107	100	(16)
MAY 1976	27	177	(46)	27	21,310	(5,119)	27	123	(23)
JUNE 1976	35	181	(42)	35	24,431	(5,986)	35	137	(23)
JULY 1976	48	170	(38)	57	19,053	(5,199)	48	107	(10)
AUG. 1976	40	179	(24)	43	21,965	(3,505)	40	120	(5)
SEP. 1976	75	189	(36)	85	21,557	(9,072)	75	111	(34)
OCT. 1976	54	213	(56)	54	25,730	(9,897)	54	118	(16)
NOV. 1976	46	208	(40)	46	25,368	(6,641)	46	121	(9)
DEC. 1976	23	187	(29)	23	24,032	(5,058)	23	128	(9)
JAN. 1977	57	199	(30)	57	24,412	(4,106)	57	123	(13)
FEB. 1977	51	226	(31)	51	25,735	(7,003)	51	112	(20)
MAR. 1977	50	221	(35)	44	24,045	(6,668	44	109	(14)

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

FIGURE 7.1 MONTHLY AVERAGE CATTLE PRICES: POUYTENGA CATTLE MARKET, JULY 1976 - MARCH 1977



decrease in the price of cows in the Pouytenga market between October and March is more difficult to explain. It may be that many of the cows offered for sale in the period August through November were of export quality or still productive while those sold after that represent no longer productive elements of the herd. Djibo cow prices also registered an unexpected increase between November and February.

The Ouagadougou data show slightly different patterns in per head prices (Tables 7.12-7.14). Modest peaks in prices in May and June are followed by depressed prices throughout the rainy season. In October prices rise to relatively stable levels through the end of the year, especially for cows. The estimated price per kilogram suggests an even more accentuated pre-rainy season peak. Per kilogram prices during those months rose an average of 15.7 percent for bulls, 24.6 percent for steers, and 26.0 percent for cows over the previous three month period. Similarly, rainy season prices (July-October) are 5.5, 12.2, and 8.5 percent lower than prices in the following three months.[7]

Attempts to further quantify the seasonal effects were carried out through regression analysis of the Pouytenga and Ouagadougou market data. The general form of the equations estimated was:

$$P = \alpha + \beta_1 A + \beta_2 A^2 + \gamma ELW + \Sigma\delta_i S_i + \Sigma\psi_i T_i + \varepsilon$$

where:

P	=	price of the animal in CFA francs;
A	=	age of the animal in years;
ELW	=	estimated liveweight in kilograms;
S_i	=	dummy variables for season;
T_i	=	dummy variables for cattle sex.

Regressions were run on sub-samples of each markets sample by sex and age.

The results of the Pouytenga analysis are presented in Table 7.15. The use of grouped data precluded the inclusion of a weight term in the regression.[8] No observations for April through June were available. The other months were divided into three seasons: Rainy season from July through September; Harvest season from October through December; and Early-dry season from January through March. Five regressions were run, the first including all cattle and including dummy variables for bulls and steers; the second excluded calves and cattle over eight years old; and the last three were run on each sex category, bulls, steers, cows. In each case the early dry season dummy was suppressed.

The effect of rainy season sales on prices was negative and significant for all categories except cows. During that period, the prices of males were depressed around 6,000 francs from dry season prices. Cow's prices appeared to be strongly positively affected during the rainy season. The coefficient for the harvest season dummy was not statistically significant for bulls and again had opposing effects on steers and cows. The results on cows is not inconsistent with expectations. Prices are lowest during the dry season (the suppressed term) when cows are in worst condition. Though they are better during the dry season when the cows' condition is improving, highest prices occur during October through December when they are in the best condition. The seasonal effect on male cattle is more puzzling. The results seem to indicate an increasing effect on prices through the harvest and dry season. While rising prices through the harvest season and toward the end of the year are consistent with both the improving condition of the cattle and export demand, the implicitly positive effects of dry season sales would seem to be contrary to expectations. It might reflect an inflationary bias or be due to reductions in supply after the first of the year (see Table 7.4).

The results of the analysis on the more complete Ouagadougou data (Table 7.16) are somewhat less ambiguous and consistent with observations made earlier. The regressions were run on individual obvservations, included the estimated liveweight as an independent variable, and covered all months. Four seasonal groupings were made for the seasonal dummy variables: the hot dry season from February through April; pre-rainy season in May and June; the rainy season from July through September, and a harvest-post harvest season from October through January which was the suppressed dummy. The first regression was run on all cattle types and included the sex dummies for bull and steer (suppressing cows). Regressions on each sex category were run separately. Finally, another all-types regression was run excluding the weight term and adding an age-squared term.

The results of the first four regressions including the weight term suggest statistically significant and unambiguous seasonality effects. When all other variables are taken into account (age, weight, and sex), prices are depressed during the hot dry season (February-April), higher just prior to the rainy season, and depressed again during the rainy season. This suggests a pattern of two relative peaks (pre-rainy and harvest-post harvest) and two troughs (dry season and rainy). Among cattle types, the effects all tend in the same direction though the magnitudes vary by type.[9] Cow prices are more depressed by the hot-dry season effect and less improved during the pre-rainy season than the prices of male cattle. Among males, steer prices seem to suffer relatively more during the dry and rainy seasons than bull prices, but gain less than bull prices during the pre-rainy season.

One of the problems in the first form specifications of the model (both econometrically and perceptionally -- though not theoretically) is the multicolinearity among the variables, especially weight. This has the effect of "hiding" much of the seasonal variation in price. This can be seen by considering two types of seasonal effects: the effect on the animal's weight and the effect on other market conditions. Only the latter is picked up in the seasonal coefficent when weight is included as a variable. This is because the estimated weights are already accounting for the seasonal effect on weight (this can be seen in Tables 7.12-7.14). To show both effects at once requires adjusting the weight variable. This was accomplished by dropping that term and adding a second polynomial age term. In this way, the age variables and the sex dummies pick up some of the non-seasonal effect of weight (since they are all correlated with weight) and the seasonal dummies now include the seasonal effects

TABLE 7.15

ESTIMATED PARAMETERS OF SEASONAL PRICE MODEL, BASED ON POUYTENGA CATTLE MARKET SURVEY, JULY 1976 - MARCH 1977[a]

Variable[b]	Sub-Sample[c]				
	All Sexes, All Ages	All Sexes, Ages 2-8	Bulls	Steers	Cows
Constant	-6238.5* (2198.5)	3361.6 (2125.[illegible])	7625.8* (1494.6)	8357.9* (1914.3)	1645.4* (5902.6)
Age	5043.8* (230.2)	5320.2* (215.7)	5430.9* (211.8)	5698.5* (277.3)	547.4 (731.4)
Rainy S	-4069.0* (1176.4)	-5640.7* (982.3)	-5771.7* (1193.1)	-6386.7* (1230.1)	1156.3 (3447.1)
Harvest S	-276.2 (1110.8)	-1686.1** (910.7)	-1249.9 (1123.5)	-3381.7* (1233.7)	1658.9* (3443.6)
Bull	1640.3* (1352.9)	6089.1* (1755.3)			
Steer	1542.9* (1368.4)	5302.4* (1760.3)			
n	163	134	73	65	25
R^2	.961	.974	.985	.977	.930
$\bar{R}^2$	.960	.973	.984	.975	.916

[a]Weighted regression used to correct for heteroskedasticity arising from grouped data.

[b]See text for description of variables.

[c]Standard errors in parentheses.

*Significant at .01 level.

**Significant at .10 level.

TABLE 7.16

ESTIMATED PARAMETERS OF SEASONAL PRICE MODEL, BASED ON OUAGADOUGOU CATTLE MARKET SURVEY, FEBRUARY 1976 - MARCH 1977

	Sub-Sample[b]				
Variable[a]	All Sexes	Bulls	Steers	Cows	All Sexes
Constant	-14.706* (536.0)	-10,700* (636.3)	-16,362* (942.7)	-3127.1* (1350)	-34,836* (1705.8)
Weight	171.05* (1.84)	168.97* (2.87)	176.46* (3.89)	138.79* (4.0)	
Age	539.0* (56.0)	303.4* (90.7)	1032.8* (147.7)	-18.9 (85.6)	12.810* (426.8)
Age^2					-673.6* (27.9)
Feb-Apr	-2119.9* (192.1)	-603.6** (263.7)	-2899.7* (342.4)	-3307.9* (360.1)	1821.5* (359.6)
May-June	4090.4* (324.1)	4702.6* (409.4)	5872.8* (631.6)	1485.9* (563.4)	-20.2 (609.9)
July-Sep	-2063.7* (211.3)	-625.0** (272.9)	-3900.1* (359.4)	-1211.8* (413.6)	-4026.5* (392.4)
Bull	2876.4* (261.7)				14,766* (413.9)
Steer	3145.5* (295.0)				21,305* (378.0)
n	2755	908	1124	723	2864
R^2	.899	.874	.839	.687	.653
$\bar{R}^2$	.898	.874	.838	.684	.652

[a]See text for description of variables

[b]Standard errors in parentheses

*Significant at .01 level

**Significant at .05 level

on weight as well as other factors. The cost of the adjustment is both precision and efficiency (as shown by higher standard errors and lower R^2). However, the appeal of this approach is the greater clarity of the complete effect of seasonality.

The results shown in the last column of Table 7.16 suggest that when the weight effects of seasonality are included, the complete seasonal effect on price appears much different. Now prices are seen to be positively affected during the hot-dry season. The implication of this is that cattle are relatively heavier during this period, contrary to expectations though consistent with the weight data in Tables 7.12-7.14. Falling weights just prior to and during the rainy season account for the price depressing effect of season as depicted by the season dummy coefficients for May-June and July-September. Both coefficients are substantially less than their counterparts in the regression including weight. The appropriate interpretation of the results is that prices are highest during the harvest-post harvest and dry season periods and falling during the pre-rainy and rainy seasons when age and sex characteristics are accounted for.

Cattle Sex, Weight, Age and Origin. -- This section examines the effects of the inherent characteristics of cattle sold on their price. All of these characteristics except origin have been considered above in the discussions of regional and seasonal variations in price. The inclusion of animal origin is here used as a proxy for otherwise unidentified breed characteristics which are associated with different cattle raising regions. The discussion is based on analysis presented in previous tables and additional analysis based on the Ouagadougou market survey.

Most of the cattle sales observed in these surveys were of slaughter cattle, age 5-10. Younger cattle, valued as breeding stock or other nonslaughter purposes are sold for prices exceeding those of older cattle of similar weight. However, sales of such animals in the redistribution or terminal markets upon which this chapter is largely based are relatively rare. For the vast majority of sales, carcass weight and quality and the exportability of the live animal are the major determinants of price. These variables, even when not directly observable, may be considered in that they are strongly related to sex, age, and breed characteristics.

1. Sex and Weight. -- Typically, cows are sold at relatively old ages, being culled from the herds after serving their reproductive and lactation functions. Most of these cull cows tend to be thin, averaging from 200 to 250 kilograms in Ouagadougou, Kaya, and Pouytenga. The quality of meat is inferior to that of the better fleshed males and most cows must be slaughtered locally, having little export potential. As a result, the prices of female cattle are substantially lower than those of male cattle, both per herd and in terms of price per kilogram (see Table 7.17). Among the larger males, better weights, meat quality, and export potential contribute to the higher prices. Steers usually yield a premium, both because they tend to weigh more and because of their somewhat better meat quality (higher fat content and more tender meat). In Ouagadougou these factors result in average prices of 22,356; 31,926; and 42,001 francs CFA for cows, bulls, and steers respectively. The per kilogram differences are somewhat smaller, being approximatly 113; 132; and 142 francs CFA per kilogram for the same categories.

The data presented and analyzed earlier substantiate these tendencies. Among slaughter cattle, after weight is accounted for, bulls yielded a premium of around 700 francs CFA and steers 2300 francs CFA (Table 7.9). In Pouytenga, where no weight data were incorporated in the regression analysis, bulls yielded an average of 16,403 francs CFA more than cows while the premium for steers was just 1000 francs CFA lower. When the observations were limited to young cattle (8 years old and less), the premiums fell to 6089 and 5302 francs CFA for bulls and steers respectively. The lower premiums reflect both the smaller weight differential between young males and females and the relatively greater value for females in alternative uses. In Ouagadougou, the premiums for males when weight is included were 2876 and 3145 francs CFA for bulls and steers respectively. Excluding the weight variable, the premium rises to 14,766 and 21,305 francs CFA, suggesting the strong relationship between weight and sex evident in Table 7.17.

2. Age. -- The effect of age is threefold; first age is correlated with weight. Males tend to increase in weight over all ages sold in almost linear fashion. Females put on weight at young ages but may in fact decrease in weight at older ages. Secondly, the quality of meat falls off at older ages, especially for old, thin cows. Finally, exportability is greatest for cattle between five and eight years. Thus the older cattle, especially females, tend not to be purchased for live export. Table 7.18 shows the overall effect of age on price for cattle sold in Ouagadougou. However, consideration of the regressions presented in Tables 7.15 and 7.16 suggest that most of the variation in price with respect to age is likely due to the weight effects. In Pouytenga where age served as a proxy for weight, the age coefficients were 5480, 5698, and 547 francs CFA for bulls, steers and cows respectively. In Ouagadougou where weight was included as a variable the age coefficients were 303, 1032, and -18.9 (though not significantly different from zero) for the same groupings.

3. Region of Origin. -- Tables 7.19-7.20 present average weights and prices for cattle sold in Ouagadougou by region of origin. They suggest that the northern cattle tend to weigh more and be sold for higher prices, both per head and per kilogram, then cattle from any other region except Ouagadougou. Most of these cattle are the large frame Sahelian zebu, which in addition to their good quality meat are particularly suited to live export, thus adding to their value. The even heavier and more costly Ouagadougou cattle are predominated by "boeufs du case" which are raised around Ouagadougou. Their extremely high quality meat goes mostly to local European-style butcher shops.

The lighter and lower priced cattle of the eastern, center and especially southern regions are explained by the preponderance of taurins (in the south) and cross-breeds (in the center and east). These cattle are smaller framed, yield lower quality meat (in terms of fat content), and are less desirable as export animals.

Market Variables. -- This section briefly summarizes the data presented in Tables 7.21-7.26 which show the relationships between price and seller types, buyer type, and the destination of the animal based on the Ouagadougou Market survey. The section is strictly descriptive, its only intention being to indicate the type of animals sold or bought by different market participants and destined for alternative uses. The following section

TABLE 7.17: AVERAGE WEIGHT AND PRICE BY ANIMAL TYPE, OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kg.			Price per kg. Cattle Sold Individually			Price per kg. Cattle Sold in Lots		
	N	Wt.	(SD)	N	Price	(SD)	N	F/kg	(SD)	N	F/kg	(SD)	N	F/kg	(SD)
Bull	918	248	(46)	969	31,926	(9,742)	908	132	(17)	573	130	(19)	335	138	(18)
Steer	1,124	305	(51)	1,150	42,001	(11,732)	1,124	142	(18)	562	137	(19)	562	146	(18)
Cow	729	197	(39)	745	22,356	(6,500)	723	113	(20)	540	111	(17)	183	122	(34)
Calf	4	225	--	42	13,154	(5,936)	4	124	--	4	124	--	--	--	--

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

TABLE 7.18: WEIGHT AND PRICE BY ANIMAL TYPE AND AGE: OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
BULL									
Less than 2	12	133	(4)	17	8,677	(1,015)	12	69	(4.0)
3 - 4	21	167	(39)	71	14,543	(4,790)	21	113	(26.2)
5 - 6	415	227	(39)	415	29,023	(7,221)	409	128	(15.6)
7 - 8	393	269	(28)	390	37,320	(4,336)	390	139	(11.1)
Over 9	77	294	(53)	76	41,536	(10,858)	76	139	(18.5)
STEER									
Less than 2	0	--	--	5	11,400	(1,917)	0	--	--
3 - 4	1	165	--	21	13,619	(2,397)	1	91	--
5 - 6	233	259	(44)	234	33,713	(8,017)	233	130	(16.5)
7 - 8	648	304	(34)	648	42,913	(7,314)	648	141	(14.2)
Over 9	242	353	(51)	242	55,420	(10,739)	242	156	(19.8)
COW									
Less than 2	0	--	--	3	18,500	--	0	--	--
3 - 4	2	220	(14)	9	21,000	(1,323)	2	105	(3.5)
5 - 6	116	201	(28)	120	21,704	(5,210)	113	107	(18.9)
7 - 8	278	213	(30)	279	24,858	(6,141)	278	116	(19.2)
Over 9	333	181	(43)	334	20,572	(6,858)	330	113	(20.7)

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

TABLE 7.19: WEIGHT AND PRICE BY ANIMAL'S REGION OF ORIGIN, OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. wt.	(SD)	N	Avg. wt.	(SD)
Northeast	100	288	(46)	100	39,795	(10,673)	100	137	(23)
Northcentral	545	281	(61)	554	38,663	(14,174)	539	136	(23)
Northwest	303	270	(51)	299	36,675	(11,144)	296	134	(20)
NORTH TOTAL	948	278	(57)	953	38,158	(12,982)	935	136	(22)
Far East	67	269	(48)	73	33,089	(9,847)	67	129	(12)
Pouytenga Region	77	252	(50)	87	30,667	(12,351)	77	130	(24)
Pouytenga	307	235	(54)	330	29,195	(9,858)	307	127	(16)
EAST TOTAL	451	243	(54)	490	30,037	(10,413)	451	128	(17)
Kaya Region	16	212	(40)	16	22,000	(7,501)	16	101	(17)
Kaya	421	270	(71)	425	36,200	(14,069)	421	131	(24)
Centre	277	242	(67)	299	31,123	(12,389)	277	132	(18)
Ouagadougou	37	295	(64)	37	46,405	(14,181)	37	155	(20)
Center West	35	245	(53)	35	32,829	(9,119)	35	132	(11)
CENTRAL TOTAL	786	259	(70)	812	34,370	(13,737)	786	132	(22)
SOUTH TOTAL	567	235	(62)	628	28,638	(11,841)	564	127	(22)

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

TABLE 7.20: WEIGHT AND PRICE BY ANIMAL TYPE AND AGGREGATED REGION OF ORIGIN
OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
BULL									
NORTH	260	261	(34)	255	35,586	(6,733)	253	136	(11)
EAST	158	246	(40)	180	29,642	(9,524)	158	129	(17)
CENTER	310	248	(54)	319	32,744	(10,614)	310	132	(21)
SOUTH	180	232	(47)	205	28,126	(9,932)	177	132	(17)
STEER									
NORTH	504	312	(43)	504	45,633	(10,609)	504	145	(19)
EAST	148	284	(45)	156	36,965	(10,136)	148	133	(16)
CENTER	278	316	(58)	287	45,445	(11,922)	278	146	(15)
SOUTH	191	285	(52)	200	37,595	(11,901)	191	134	(18)
COW									
NORTH	184	209	(42)	178	22,978	(7,881)	178	109	(21)
EAST	145	197	(36)	148	24,003	(6,136)	145	120	(17)
CENTER	194	194	(36)	194	21,628	(5,370)	194	112	(17)
SOUTH	196	188	(41)	215	21,566	(6,546)	196	115	(23)

[a]Estimated weight in kilograms.

[b]Price in CFA france.

TABLE 7.21: AVERAGE PRICES OF CATTLE SOLD BY SELLER TYPES, OUAGADOUGOU MARKET

	Price per head				Price per kilogram (est.)			
	Merchants	Butchers	Herdsmen	Others	Merchants	Butchers	Herdsmen	Others
N	1,853	50	309	126	1,748	46	303	111
Minimum	3,000	14,000	12,000	3,000	57.8	106.8	86.7	97.6
Maximum	75,926	41,667	72,500	50,000	217.4	135.7	191.4	148.4
Mean	34,860	28,350	32,516	29,996	134.7	122.6	130.1	126.9
Std. Dev.	13,674	9,316	12,797	9,905	22.23	9.73	19.59	10.95
T-Stat[a]	4.018	-3.973	-1.467	-4.066	6.370	-6.044	-1.061	-4.23

[a]Testing Ho: $\mu_i = \mu$ against Ha: $\mu_i = \mu$ where μ_i = subsample mean for each seller type and μ = overall sample scene, 33,584 and 131.29 for price per head and price per kilogram respectively.

TABLE 7.22: AVERAGE PRICES OF CATTLE SOLD BY CATTLE TYPES AND SELLER TYPES, OUAGADOUGOU MARKET

	Price per head				Price per kilogram (est.)			
	Merchants	Butchers	Herdsmen	Others	Merchants	Butchers	Herdsmen	Others
Bull	32,414 (9,793)	29,314 (8,085)	30,098 (10,046)	29,543 (7,606)	134.91 (15.62)	123.97 (10.84)	130.96 (17.36)	127.18 (12.35)
Steer	43,970 (12,064)	33,100 (10,061)	42,474 (11,[illegible]00)	37,814 (10,746)	145.08 (17.93)	125.88 (8.60)	139.82 (18.21)	135.08 (7.45)
Cow	22,637 (7,411)	20,250 (4,186)	21,590 (5,974)	25,226 (5,450)	115.46 (23.34)	116.55 (6.31)	114.66 (14.32)	120.07 (6.37)
Calf	11,471 (4,308)	---	---	4,000 (1,414)	---[a]	---	---	---[a]

Standard deviations in parentheses.

[a]No estimated weights.

TABLE 7.23: AVERAGE PRICES OF CATTLE SOLD BY CATTLE TYPE AND BUYER TYPE
OUAGADOUGOU MARKET

Buyer Types	N	Price per head				Price per kilogram (est.)			
		Bull	Steer	Cow	Calf	Bull	Steer	Cow	Calf
Merchants	1290	34,648	41,798	27,936	28,000	136.9	139.6	126.2	124.4
		(6,945)	(9,098)	(6,783)	--	(13.16)	(15.90)	(19.36)	--
Butcher	1065	30,091	46,114	22,256	12,750	128.4	146.2	113.3	--[a]
		(9,500)	(14,893)	(6,566)	(261)	(16.46)	(21.7[illegible])	(18.32)	
Herdsmen	69	10,329	--	31,036	10,232	66.9	--	158.1	--[a]
		(1,994)		(10,016)	(5,076)	(5.06)		(49.62)	
Butcher/Merch.	105	33,556	40,097	17,652	--	127.5	137.64	90.9	--
		(13,942)	(4,549)	(4,114)		(24.76)	(8.98)	(20.12)	
Butcher Group	323	31,985	33,616	20,647	--	135.2	156.5	110.75	--
		(8,563)	(16,420)	(4,949)		(11.89)	(24.36)	(16.46)	
Government	32	9,944	14,000	21,350	12,611	--[a]	--[a]	--[a]	--[a]
		(3,186)	(1,154)	(2,749)	(220)				

Standard deviations in parentheses.

[a]No estimated weights.

TABLE 7.24: WEIGHT AND PRICE BY ANIMAL'S REGION OF DESTINATION
OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
ABIDJAN	1,086	292	(50)	1,109	40,604	(10,719)	1,086	140	(16)
BOUAKÉ	3	193	(12)	3	23,000	(1,374)	3	119	--
GHANA	196	256	(40)	196	34,339	(6,115)	196	134	(12)
LOMÉ	1	210	--	1	22,500	--	1	107	--
SYTHENGA	25	224	(25)	35	25,243	(9,904)	25	132	(21)
ABIDJAN-OUAGADOUGOU[c]	25	258	(82)	25	36,900	(17,146)	25	133	(38)
EAST	6	217	(19)	44	17,614	(11,360)	6	167	(47)
WEST	--	--	--	13	12,500	(289)	--	--	--
PARC[d]	5	146	(5)	5	17,800	(274)	5	122	(3)
OUAGADOUGOU[e]	868	233	(62)	92	28,714	(13,093)	855	123	(24)
GRAND MARCHE	104	196	(48)	104	25,058	(10,068)	104	125	(21)
SMALL MARKETS	130	187	(41)	130	22,315	(7,144)	130	118	(21)
INSTITUTIONS	111	249	(60)	117	31,795	(12,181)	111	128	(22)
RESTAURANTS-BARS	81	213	(50)	82	26,860	(10,450)	81	124	(27)
HOTELS	49	290	(39)	49	39,724	(7,640)	49	136	(12)
FIRST CLASS BUTCHERS	57	318	(58)	63	41,984	(15,782)	57	141	(21)
PERSONAL USE	2	320	--	2	41,000	--	2	128	--

[a]Estimated weight in kilograms

[b]Price in CFA francs

[c]Purchased by exporting butchers

[d]Reserve stock for butchers

[e]Unspecified use by local butcher

TABLE 7.25: WEIGHT AND PRICE BY ANIMAL AGGREGATED DESTINATION
OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
IVORY COAST	1,089	292	(50)	1,112	40,557	(10,744)	1,089	140	(16)
GHANA	196	256	(40)	196	34,339	(6,115)	196	134	(12)
SEYTHENGA	25	224	(25)	35	25,243	(9,904)	25	132	(21)
UPPER VOLTA	11	185	(39)	62	16,556	(9,769)	11	147	(41)
SLAUGHTERED LOCALLY	1,402	232	(64)	1,449	28,988	(12,904)	1,389	124	(24)
EXPORT	1,310	285	(51)	1,343	39,250	(10,655)	1,310	139	(16)
SLAUGHTER	1,402	232	(64)	1,449	28,988	(12,904)	1,389	124	(24)

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

TABLE 7.26: WEIGHT AND PRICE BY ANIMAL TYPE AND AGGREGATED REGION OF DESTINATION, OUAGADOUGOU MARKET

	Weight[a]			Price per head[b]			Price per kilogram		
	N	Avg. wt.	(SD)	N	Avg. price	(SD)	N	Avg. F/kg	(SD)
EXPORT									
BULL	482	261	(35)	496	34,999	(7,415)	482	136	(12)
STEER	754	307	(47)	763	43,399	(10,409)	754	142	(17)
COW	70	224	(45)	70	28,587	(8,487)	70	126	(15)
CALF	--	--	--	14	17,071	(7,176)	4	124	--
SLAUGHTER									
BULL	408	233	(52)	423	29,547	(10,228)	401	129	(20)
STEER	348	301	(58)	361	42,384	(14,002)	348	143	(21)
COW	646	194	(38)	651	21,539	(5,778)	640	111	(19)
CALF	--	--	--	14	13,032	(2,606)	--	--	--

[a]Estimated weight in kilograms.

[b]Price in CFA francs.

treats more analytically the question of the marginal effect on sale price of all the determinants of price discussed up to now.

As noted in the first section of this chapter, the vast majority of cattle sold in terminal markets are sold by merchants. Herdsmen make up the second biggest group, with butchers and butcher-merchants (under the column "other" in Tables 7.21 and 7.22) selling the fewest. The data suggests that merchants sell the most expensive cattle and butchers the least expensive with herdsmen falling in the middle.

The average prices for buyer types by type of cattle are presented in Table 7.23. Merchants, who purchased 45 percent of all cattle sold in the Ouagadougou market, paid the highest prices for bulls. Butchers (including butcher groups and butcher/merchants) accounted for slightly over half (52 percent) of the total purchases and paid the highest prices for steers. Again this figure is inflated by the number of boeufs du cases, highly desired for their high quality meat but often not suitable for export. Herdsmen accounted for only 2 percent and the government 1 percent of purchases. The high price paid by herdsmen for "cows" actually reflects their purchases of the few heifers which appear in the Ouagadougou market and for which they outbid the other buyer.

The final group of variables against which price is described is the destination of the purchased animal. These data are presented in Tables 7.24-7.26. They show the highest prices are paid for export cattle and those destined for sale as meat to hotels and European-style butcher shops.

Model of Price Formation. -- This section examines the effects of each of the determinants of price using a linear regression model for the Ouagadougou cattle market data. Here the goal is not to measure the total effect of each factor (e.g. the influence of season on weight and thus price) but rather the independent effects of the appearance of each characteristic. The model is not presented as an estimation of supply or demand as quantity does not explicitly appear in the equation.

The model estimated includes all of the determinants discussed above except buyer type, this variable being so highly correlated with destination. The form of the equation estimated was:

$$P = \alpha + \beta \cdot A + \gamma \cdot ELW + \Sigma\delta_i \cdot T_i + \Sigma\psi_i \cdot S_i + \Sigma\lambda_i \cdot O_i + \Sigma\pi_i \cdot SL_i + \Sigma\theta_i \cdot D_i + \varepsilon$$

where:

P	=	price of the animal in CFA francs
A	=	age of the animal in years;
ELW	=	estimated liveweight in kilograms;
T_i	=	set of dummy variables for cattle type (sex);
S_i	=	set of dummy variables for season;
O_i	=	set of dummy variables for region of origin;
SL_i	=	set of dummy variables for seller type;
D_i	=	set of dummy variables for destination; and
e	=	error term.

The sets of dummy variables were:

Cattle Type (Sex): T_i

T_1	=	Steer,
T_2	=	Bull,
T_3	=	Cow;

Season: S_i

S_1	=	February-April (Hot-Dry),
S_2	=	May-June (pre-Rainy),
S_3	=	July-September, (rainy)
S_4	=	October-January (Harvest-post Harvest);

Region of Origin: O_i

O_1	=	North,
O_2	=	East,

O_3 = Center,

O_4 = South;

Seller Type: SL

SL_1 = Merchants,

SL_2 = Butchers,

SL_3 = Herdsmen;

Destination: D_i

D_1 = Export,

D_2 = Local Slaughter;

and each variable was set equal to one when the observation had the characteristic and zero otherwise. In each case, the last variable in the set was suppressed and thus the coefficients of the remaining dummies measure the difference in price from the excluded one in each set.

The model was estimated once for all cattle and then independently for males and females. The results are presented in Table 7.27. As was the case in Chapter 5 when a similar model was estimated for cattle sold by herders, more of the variation in price was explained for males than for females. What follows is a brief description of the results.

1. Animal Characteristics. -- This group of variables had the greatest amount of explanatory power with weight being the major determinant of price, as expected.[10] The independent effects of age on price are positive for males (about 1.5% increase in price per year) but not significantly different than zero for females. When age was included in polynomial form to see if the independent age effects turned negative over some range of prices, the additional explanatory power of the extra term (A^2) was not significant (as measured by the F statistic). The positive coefficient on age for males probably signifies the increasing exportability and quality of meat.

The coefficient on weight was not only significant but was the single variable with the greatest explanatory power (see footnote 10). The implication of the coefficient is that the marginal value of additional weight is 173 francs CFA for males but only 133 francs CFA for females[11], not an unexpected result.

Finally, when all sexes are considered, substantial premiums are paid for males when all other factors are accounted for. Given the difference in weight coefficients in the male and female regressions, the appropriate term might have been an interaction term between sex and weight rather than just a shift factor. In the equation for males, steers were shown to yield a premium of 724 francs CFA, undoubtedly due to the superior quality of meat.

2. Seasonality. -- The problems of likely misconstruction of the meaning of these terms were discussed earlier. The coefficients (which were all significant at the .01 level) measure the independent effects of season and thus do not reflect the seasonal variation in price. They suggest that price per kilogram is highest just prior to the rainy season and that the relationship is strongest for males (see footnote 10). Not only are cattle in very short supply during that period, but many heavy boeufs de cases are brought to the markets at this time, precisely to take advantage of the price conditions. The negative coefficient during the hot-dry season (February - April) likely reflects the decline in export demand, perhaps a decline in meat quality not accounted for by falling weights, and certainly a surge of precautionary sales, especially of females, prior to the most dangerous season.

3. Animal Origin. -- The region of origin had only modest influence on cattle prices. The strongest relationship was for male cattle coming from the north. This is explained by the larger breed which tends to come from the north. All significant coefficients except one (East for males) were positive, suggesting that the prices of cattle from the south were lowest, corresponding to the preponderance of taurins originating from that region. The fact that the effect of regional origin on price was lower for females than males is explained by the fact that fewer cows than males are brought from long distances.

4. Type of Seller and Destination. -- None of the dummy variables for seller type were significant. This suggests that the seller type has no effect on price and has significant implications for competitiveness and market power which are discussed in the following chapter.[12] The destination coefficients were mixed, small and negative for males (significant at the .10 level) and large and positive for females (significant at the .01 level). The implications are that the price of males is not much affected by the destination of the specific animal but that females which are of high enough quality to be exported are worth significantly more than their more numerous locally slaughtered counterparts.

Conclusions

This chapter has looked at both the conditions under which cattle are bought and sold in Voltaic markets and at the determination of price with respect to those observable conditions. The overwhelming impressions are that the cattle marketing system tends to be well organized, distributing cattle in a rational manner, with weights, meat quality, and exportability being the dominant determinants of price.

Cattle prices rose from the end of the sixties and throughout the seventies, despite some aberrant declines during the drought itself. Both the relative decline in supply due to the drought and a growing population, increasingly urbanized with rising money incomes, contributed to this phenomenon. Regional price differentials favor the slaughter and export embarkation market of Ouagadougou. Premiums for young cattle, especially heifers, were more apparent in the primary markets of the north. The effects of season on price seem to be

TABLE 7.27

ESTIMATED PARAMETERS OF MODEL OF PRICE FORMATION BASED ON OUAGADOUGOU CATTLE MARKET SURVEY, FEBRUARY 1976 - MARCH 1977

Variable[a]	All Sexes	Males	Cows
Constant	-14,975*	-13,008*	-3218.2
	(816.5)	(854.3)	(1973.6)
Animal Characteristics			
Age	638.7*	510.8*	135.1
	(68.2)	(103.5)	(116.5)
Weight	167.58*	172.81*	132.77*
	(2.06)	(2.86)	(4.75)
Steer	4125.5*	724.3*	
	(352.7)	(231.2)	
Bull	3101.5*		
	(322.9)		
Seasonal Dummies			
Feb.-Apr.	-2336.2*	-1752.6*	-2395.6*
	(248.2)	(296.7)	(456.0)
May-June	4635.5*	5598.0*	1816.2*
	(373.1)	(432.4)	(667.9)
July-Sep.	-1899.5*	-1885.5*	-1794.2*
	(243.2)	(272.1)	(472.8)
Animal Origin Dummies			
North	1076*	1699.8*	-712.9
	(298.7)	(338.4)	(571.3)
East	-395.3	-748.1***	1334.4***
	(328.7)	(376.6)	(596.4)
Center	681.3**	918.2*	-269.8
	(270.7)	(312.4)	(485.2)
Seller Dummies			
Merchant	-646.7	-56.2	-708.2
	(444.0)	(533.6)	(725.4)
Butcher	-398.5	-45.5	-1121.9
	(728.8)	(851.9)	(1257.3)
Destination Dummy			
Export	-161.6	-398.9#	3182.2*
N	2131	1590	541
R^2	.903	.881	.736
R^2	.902	.880	.730

[a] see text for description of variables

[b] standard errors in parentheses

* significant at .01 level

** significant at .02 level

*** significant at .05 level

\# significant at .10 level

twofold; first, as cattle weights cycle throughout the year according to climatic conditions, so does the overall cattle price level. Secondly, the per kilogram prices paid throughout the year are much more responsive to the variations in supply and demand than are per head prices. The dichotomy can be emphasized by considering that the supply of cattle is la' , a function of price per head while demand is a function of price per kilogram.

The effects of weight, age, sex, and breed (implied from origin), were all as expected. Weight had by far the greatest explanatory power. Also, premiums were paid for males (even more for steers) both because of better quality meat and greater exportability. Prices also rose slightly with age for males, probably due to similar factors. Finally, the generally higher prices paid for animals of northern origin and lower prices for southern cattle reflects the relative desirability of large frame pure zebu cattle (north) over the smaller, less fatty taurins (south). This was probably due to both meat quality and export desirability factors.

The market condition variables (buyer and seller types and destination) tended to have little effect on price. This has very important implications for competitive efficiency in cattle markets. However, the question of market efficiency still requires a determination of the elements of market structure, conduct and performance in order to see whether the seemingly "rational" marketing system approached the competitive model. This is the task of the next chapter.

FOOTNOTES TO CHAPTE'

[1]The names in parentheses are often used as synonyms for the market labels described here and in Chapter 2. General descriptions, locations, and aggregate official statistics for each type of market are given in the second chapter also.

[2]Except where otherwise noted, reports by government officials or market participants should be understood to refer to personal communications by these individuals during interviews.

[3]In many communities the local government ostensibly regulates the market activities of intermediaries.

[4]The petit commerçant became more prevalent after the construction of the modern slaughterhouse and stockyard facility in Ouagadougou. Since the move to the new facility reduced employment opportunities in the marketing system, market professionals may be trying to replace some of these employment and training positions by using coxeurs.

[5]Mr. Tamboura Hassan's observations concerning the Djibo market were quite remarkable. His estimations of market prices were uncannily accurate. Only in his evaluation of current prices for adult females where he was referring to currently productive cows while the Djibo sample was heavily weighted with cull cows was there any considerable difference from the average price computed from the Djibo market survey.

	Hassan's Estimates		Djibo Market Survey
Animal Type	Prices in 1962-65	Current (1976) Prices	Average Prices (1976-77)
Young Males	5000 CFA	17000 CFA	17914 CFA
Mature Steers	15-20000 CFA	40-45000 CFA	41997 CFA
Heifers	10000 CFA	25000 CFA	24042 CFA
Cows	10000 CFA	30000 CFA	19605 CFA

[6]Like all surveys carried out over a short period of time, this market survey suffers from the difficulties of sorting out aberations that cloud long run patterns. One such problem arose during the course of this survey. Starting in early 1976 marketing patterns and trade flows were significantly altered by the increased demand for cattle in cattle markets in western Niger. This issue was more fully discussed in Chapter Two. The effect was a reversal of cattle flows from the normal northeast-southeast direction which moved cattle toward traditional markets in the Ivory Coast to a massive flow of cattle toward these Nigerien markets. The increased demand for both young cattle for the Nigerien herd reconstitution program and for mature slaughter animals which are ultimately exported to markets in Nigeria served to raise prices in northern markets relative to prices in cattle markets further south for all but cull cows.

[7]All percentages were computed as weighted averages of monthly prices.

[8]Not all observations in each group included the weight variable. The regressions were actually run on variables weighted by number of observations to correct for heteroshedasticity inherent in grouped data.

[9]Comparison of the magnitude of the values of seasonal coefficients among cattle types is inappropriate. Rather, comparison of the partial correlation coefficients is called for. For the individual regressions for Bulls, Steers, and Cows on Table 7.16 they are:

Variable	Bulls	Steers	Cows
Feb.-April	-.076	-.245	-.324
May - June	.357	.268	-.098
July-Sep.	-.076	-.309	-.1[illegible]

[10]The partial correlation coefficients for the equations were:

Variable	All Sexes	Males	Cows
A	.200	.123	.050
ELW	.870	.836	.772
T_1	.204	---	---
T_2	.246	.078	---
S_1	-.200	-.147	-.223
S_2	.261	.310	.118
S_3	-.167	-.172	-.163
O_1	.078	.126	-.054
O_2	-.026	-.050	.097
O_3	.055	.074	-.024
SL_1	-.032	-.003	-.042
SL_2	-.012	-.001	-.039
D_1	-.017	-.046	.190

The relatively large partials for the animal characteristics group of variables (A, ELW, T_1, and T_2) can be contrasted with the values of the other sets. Only season (S_1, S_2, and S_3) comes close to approaching age, weight, and sex in importance.

[11]The weight coefficients which measure the marginal effect of weight on price should not be confused with price per kilogram. In fact, the former ($\partial P/\partial ELW$) overstates the value of the latter (P/ELW) since the intercept term (taking all shift parameters into account) for males is less than that for cows. A correct interpretation is that female cattle prices (or prices per kilogram) rise less rapidly with weight than do prices for male cattle.

[12]When the destination dummy was replaced with buyer dummies, none of the coefficients were significantly different from zero, suggesting that market power was not apparent on either side by any single type of market participant.

CHAPTER VIII

LIVESTOCK MARKET STRUCTURE, CONDUCT, AND PERFORMANCE

Some alleged deficiencies in the livestock marketing system were noted in Chapters 2 and 3. They include charges of unnecessary transactions, excessive numbers of middlemen, monopsonistic power in the hands of traders and intermediaries, and the absence of modern market infrastructure and institutions to facilitate trade. These criticisms are typical of the view of many government officials and foreign advisors who assert that the indigenous market structure thwarts efficient market operation. In response to these charges, the Voltaic government has joined with several other West African countries to establish stricter control over marketing activity through a series of protocols concerning livestock and meat marketing.[1]

This chapter looks at the structure, conduct, and performance of the livestock marketing system in Upper Volta. It begins by looking at market concentration among livestock marketing professionals. Other structural dimensions are examined including vertical integration, economies of scale, barriers to entry, and the diffusion of and access to information on market conditions and prices. Market conduct is examined by looking at evidence of collusion by traders, butchers or intermediaries to fix prices or restrict sales. Finally, market performance is judged by looking at the ability of the marketing system to adjust to changing patterns of supply and demand, net margins and returns to labor and capital, and the broader issues of employment effects, the incidence of externalities, and social costs.

Market Concentration

Perhaps the single most important indicator of market power is the market share held by any one buyer or seller. This section looks at the number of buyers and sellers active in various cattle markets, the number of intermediaries operating in each market, market share for wholesale butchers, and market share for cattle exporters who ship cattle from Ouagadougou to Abidjan. The question of defining the market for purposes of evaluating market shares as an indication of market power merits some attention before turning to the data.

Defining the Market. -- The problems of isolating the appropriate vertical stages and delimiting the local or regional nature of a market in a distributive industry were touched upon in Chapter 3. In addition to these, two other problems should be considered when attempting to define the market for purposes of computing market concentration and evaluating market power. The first is determining the scope of the market in terms of product substitutability. The second involves the temporal definitions of the market.

1. Products. -- How inclusive should the analysis of animal and meat marketing be? The choice to limit the investigation of market structure to cattle and beef was not arbitrary. The trade in livestock is very much segregated between cattle and small ruminants. Substitution by traders of different types of livestock as inputs into their commercial activities is rare. Of 22 traders dealing predominantly in cattle, only 2 acknowledged dealing in small ruminants on a regular basis.[2] Furthermore, the cattle and small ruminant market-places are physically separate in most places. Though the physical separation doesn't preclude traders from operating in both (as butchers often do) it is indicative of the clear distinction most merchants make between the two markets.

That butchers' purchases of livestock and sales of meat should be differentiated in a like manner is not so clear. In the small towns and villages where butchers were interviewed or observed, almost all cattle slaughterers also dealt in small ruminants. In large cities such as Ouagadougou, however, such a mixture was more rare. Almost all wholesale butchers specialized in one type of meat: beef, mutton and goat, or pork. Even so, in terms of meat sales by wholesalers or retailers it must be recognized that market power is significantly limited by the close substitutability of mutton and goat meat for beef.

The other possibility is that looking at market concentration on the cattle and beef trades is too wide a classification, that there are sub-markets for types of cattle or beef which are relatively independent. In such a case market power could exist in one sub-market while the aggregate concentration level is low. Indeed, not all cattle are good substitutes as intermediate or capital goods. The demands for feeders, beef cattle, draft oxen, heifers for reproduction, and milk cows are usually quite distinct. Thus, it is quite possible that while the aggregate demand for cattle in a market is competitive, the demand for certain cattle, say old cows, might be monopsonistic.[3] In general though, most cattle merchants are willing to trade in any type of cattle they feel has a market elsewhere. Thus, it is not unreasonable to look at cattle as a single market.

In beef marketing it appears that there are at least two distinct markets in urban centers; the market for high quality meat demanded by upper income Africans and expatriates is highly differentiated from the more traditional market which places far less emphasis on marbling, tenderness, and identifiable cuts. An attempt is made to evaluate market concentration in each of these markets in Ouagadougou.

2. Spatial limitations. -- In looking at the number of buyers, sellers, and intermediaries, each market place is treated separately. To the extent that the same merchants and butchers frequent several markets, market concentration is understated by this method. On the other hand, to the extent that merchants or butchers don't actually attend nearby markets but stand by as potential competitors the data on market shares may exaggerate true market power. Also examination of selected, albeit important cattle markets does not rule out the possibility of pockets of monopsony in rural areas or small markets. However, if competitive purchases of cattle are the rule in even selected regional markets, the monopoly power of buyers in more remote areas is limited by the willingness of producers to make the trip to the regional markets to sell there instead. For purposes of computing market shares for urban wholesale butchers the relevant market is considered to be the entire town.

3. Temporal limitations. -- Where each day's transactions constitute a separate market the implications of the appropriate time frame are significant. For example, if ten merchants service a market which meets ten times monthly, over the course of the month where each purchased an equivalent amount of cattle one might suggest that the amount of market power held by any one was low. On a daily basis, however, the traders might in fact be monopsonists, each attending only one market. The extent to which that monopsony power may be used depends upon the independence of the market sessions. Where storage is difficult or costly monopsony power over the short run will be stronger than where storage is inexpensive and temporal arbitrage easy. In general cattle can be grazed and watered (stored) at relatively low cost near most markets including Ouagadougou and Bobo-Dioulasso. Therefore, temporary monopsonistic positions do not necessarily lead to significant market power.

The Number of Sellers, Buyers, and Intermediaries in Cattle Markets.-- Because of the large number of different traders, butchers, herders, and others who bought and sold cattle over the course of the survey period and the problems of consistently identifying these individuals, it was not possible to calculate exact market shares for cattle sales or purchases. As a second-best alternative, the total number of buyers and sellers active during each market session in various marketplaces was determined. While not as meaningful as concentration ratios these figures can give some indication of the competitive pressures which exist on either side of the market. In the absense of significant assymetry in market shares--something which is at least qualitatively recognizable by a regular market observer--large numbers of participants on either side of the market suggest low levels of market power in the hands of individual buyers and sellers and little likelihood for coordinated action by any group.

1. Sellers. -- In primary markets such as Djibo the vast majority of cattle are sold by local herdsmen who usually offer no more than one or two animals for sale at any time. Complementing them are several cattle merchants who try to sell herds ranging from a few to twenty head. The result is an assymetrical market structure with a few merchants selling twenty or thirty percent of the cattle sold and up to fifty or more herdsmen sharing the rest of the market. In the Djibo cattle market during the survey period an average of 3.2 merchant groups offered for sale just over 25 percent of the cattle offered for sale during each market session. The average number of herdsmen offering cattle at each market exceeded 50.

Similarly, large numbers of sellers also appeared in redistribution markets. In both Kaya and Pouytenga, as many as 30 different groups of animals would be presented for sale each market session (every three days) by different sellers. Often the actual number of sellers far exceeded the number of groups, as explained in Chapter 7. Sellers in these markets were usually equally divided between merchants and herdsmen, with the merchants controlling nearly three-fourths of the number of cattle. In Ouagadougou, the numbers of sellers appearing daily was considerably less. Usually 5 - 15 diff ellers would be represented by the three or four groups being offered for sale. The vast majority of the sellers were merchants. However, these sellers were almost always complemented by butchers and exporters, who often would sell cattle they had purchased elsewhere or had retained in their reserve stock. Thus, even where the number of sellers appearing daily may be small, sellers have difficulty exploiting their seemingly short-run monopoly position, for two reasons. First, many butchers maintain a buffer stock of cattle during most of the year, which enables them to consider supply over a broader time frame than just one day, thus reducing their susceptibility to day-to-day fluctuations in supply. Second, butchers and exporters holding stocks of cattle are present in the market as potential competitors, ready to intervene by selling off parts of their reserve herds should prices rise much above the prevailing "normal" price. It should be noted that during the dry season butchers' and exporters' stocks of reserve cattle are very small, which makes buyers much more susceptible to irregular arrivals of cattle during that season.

2. Buyers. -- The data on the number of active buyers in the four markets surveyed is presented in Table 8.1. They indicate that the number of different buyers active in any one market session is usually large suggesting a high degree of competition. As one would expect, the number of active buyers is largest in markets with the largest volume, Pouytenga and Ouagadougou.

In Djibo, the small number of active butchers reflects the limited demand for beef, typical of small towns. This feature tends to diminish the derived demand for older cows and contributes to their depressed price, discussed in Chapters 5 and 7. Also note that in Djibo the number of buying traders is lowest prior to and during the rainy season, from May through September. It is during this period that roads are in poorest condition and access to northern markets like Djibo is most difficult for merchants coming from the south. Additionally, the supply of cattle is lowest at the end of the dry season, thus diminishing the incentive for merchants to attend the market. One is led to the conclusion that some seasonal market power might exist in northern markets for cull cows and during the rainy season for all cattle.

Such market power, even of a temporary nature, appears less likely in the southern markets. Not only is the number of buyers relatively high throughout the year, but markets meet more frequently, every three days in major periodic markets like Kaya and Pouytenga, and every day for major slaughter markets like Ouagadougou. These cycles give sellers more flexibility, especially if the costs of holding cattle over short periods of time are relatively low. Similarly, as noted above, a number of butchers and merchants always stand ready to purchase cattle for their reserve stocks or for strictly speculative purposes, thus increasing the potential level of effective demand.

3. Intermediaries. [4] -- The role of intermediaries was discussed briefly in Chapter 7. Though commonly assailed as being "parasites on the marketing system," the research showed that market intermediaries play an important role in facilitating trade in livestock. Among the services often provided by these brokers are:

1. Provision of lodging for nonlocal buyers and sellers.
2. Arrangement for cattle to be cared for before and after the sale.
3. Guaranteeing the buyer that the animal is neither sick (unless evident) or stolen.
4. Negotiating prices between buyer and seller.

TABLE 8.1

NUMBER OF ACTIVE BUYERS IN VOLTAIC CATTLE MARKETS,[a] 1976-1977

MARKET	TYPE OF BUYER	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.
Djibo[b]	Butchers	0	0	0	0	1	1	1	1	1	1	0
	Traders	4	3	3	5	5	8	12	9	8	8	7
Kaya[c]	Butchers[f]	-	8	4	5	7	3	8	7	9	11	5
	Traders	-	5	6	8	15	7	14	14	11	11	13
Pouytenga[d]	Butchers[f]	-	-	23	28	17	11	9	14	13	13	13
	Traders	-	-	24	23	21	18	19	13	11	10	12
Ouagadougou[e]	Butchers	9	17	20	19	28	22	21	21	25	26	22
	Traders	3	6	10	11	15	11	11	11	14	10	9

[a]Average number of different buyers per market session each month. Does not include butchers or traders who attended market but failed to buy.

[b]It should be noted that the Djibo market is frequented by a large number of herders who buy cattle for raising. Average number of cattle sold per market: 71; market meets weekly.

[c]Average number of cattle sold per market: 90; market meets every three days.

[d]Average number of cattle sold per market: 199; market meets every three days.

[e]Average number of cattle sold per market: 89; market meets daily.

[f]Many of the buyers classified as traders in the Kaya and Pouytenga surveys are Ouagadougou butchers who buy not only for their own use but also resell to other butchers in Ouagadougou.

5. Guaranteeing credit (increasingly rare in Voltaic markets).
6. Serving as conduit for market information and advising clients.
7. Stabilizing market prices over short-run periods of surplus or shortage.

In payment for these services the Voltaic intermediary usually receives a sum between 350 and 500 CFA per transaction, amounting to between 0.5 and 2 percent of the purchase price. Thus, even in the case where an animal is sold three times before reaching its final destination, intermediaries' commissions usually account for less than 5 percent of the total cost.

The question of market power among intermediaries and how they might exploit it is a difficult one. Since intermediaries rarely buy animals themselves[5] and collect a fee based on the number of head sold, their interests would seem to lie in promoting the volume of sales as opposed to restricting it--traditional monopolistic behavior. Still market power may be exercised in the form of raising commissions, favoring certain buyers or sellers, or in other ways.

Unfortunately, it was not possible to compute concentration ratios for intermediaries active in each market. The total number of officially registered intermediaries operating in each market is relatively large: twenty-four in Djibo, thirty-two in Pouytenga, fifteen in Kaya, and eighteen in Ouagadougou. In Ouagadougou, however, not all of the intermediaries were active each market session. The number of different sellers entering the Ouagadougou market was usually lower than for other markets; but, unlike sellers in other markets, sellers in Ouagadougou often divide their herds among several different intermediaries for sale. It is not clear whether this is a voluntary act by the selling merchant or the result of "subcontracting" by the intermediaries. In either case, the result is that in Ouagadougou, intermediaries represent fewer sellers at any one time than do intermediaries in other markets.

Are intermediaries concentrated enough to yield market power and if so how might they exploit such power?[6] There is evidence of rivalry, if not competition, among intermediaries in all markets studied. Some sellers change intermediaries when dissatisfied with services, but most exhibit a loyalty they expect to be reciprocated. It is obvious too, to anyone spending any time observing market operation, that brokers are socially and sometimes politically powerful men. Yet little clear evidence can be marshalled to support the allegation that such power arises from monopolistic structure, or that it is exploited in the market place to the detriment of sellers or buyers.

Market Shares for Butchers and Exporters. -- More exact market shares for butchers and exporters operating in one market or shipping from one point of embarkation were more easily computed. On the buying side, butchers and exporters compete with each other and with domestic traders, speculators, and even herdsmen. However, each market is at least imperfectly partitioned; the market for cull cows in Ouagadougou, for example, can be considered the domain of local butchers. Thus, these market shares should represent a lower limit on concentration (upper limit on shares) in each market. On the resale side the market shares for butchers are generally more meaningful. Only in Ouagadougou where meat marketing is stratified between wholesale and retail markets and among various specializations (qualities, institutions, local meat markets, etc.) are larger effective shares likely to be hidden by the data. For exporters, exporting shares have little meaning on the resale side where Voltaic cattle account for only one-third of the Ivorian live animal import market and even less when one considers only those shipments originating in Ouagadougou.

1. Butchers. -- Concentration ratios for slaughtering butchers in Pouytenga and Kaya are presented in Table 8.2. They suggest relatively low concentration in Pouytenga and high concentration in Kaya where the market is dominated by two butchers who share almost three-fourths of the beef slaughters. However, the high market share of the largest Kaya butcher is somewhat attributable to the low level of demand for beef in Kaya and the minimum efficient scale of slaughter--one head of cattle. The largest butcher in Kaya only slaughtered less than 3 head every two days. Much of this meat was sold to regular customers on a relatively large scale (restaurants and meat grillers). Thus, the retail meat market tended to be somewhat more competitive. Several of the butchers were in fact much more active in the small ruminant market. (The three least active butchers slaughtered only one head per month, usually on special occasions.) Such dominance is common in smaller markets where the limited beef demand restricts the amount of competition which is supportable.

In Pouytenga, a somewhat uneasy and loosely defined agreement among butchers led to less domination. Most of the butchers restricted their activity to market days (every three days) when beef demand was greatest. Since the majority of butchers were either active in small ruminant trade, or some other aspect of cattle trade, or engaged in another occupation altogether, this system created little hardship.

The concentration ratios for butchers in Ouagadougou are presented in Table 8.3. The first part includes the entirety of cattle slaughters in Ouagadougou. Here, relatively few butchers are active in both beef and other meat. The figures suggest little market domination. In fact, the market is even less concentrated because of the techniques of license sharing, wherein two or more butchers slaughter under the same name and are counted as one in the data. However, when the market is stratified between low quality and high quality cattle,[7] a greater amount of market concentration is apparent, especially for high quality cattle. These butchers supply the European style butcher shops, supermarkets, restaurants, and hotels, and even export meat to Ivory Coast and Togo. This indication of large market shares is mitigated by two considerations. First, even in the purchase of high quality animals, these butchers must compete against exporters for all but the highest quality boeufs de cases which are not usually sought after for live export but make up a limited portion of the cattle offerings. Second, in resale, these butchers undoubtedly face significant countervailing power (in the case of local high quality beef wholesale markets) or high levels of competition (in the case of chilled beef exporters to the coast). Altogether, these considerations suggest limited sources of market power in wholesale butchering in Ouagadougou.

TABLE 8.2

CONCENTRATION RATIOS FOR WHOLESALE BUTCHERS, POUYTENGA AND KAYA; SEPTEMBER 1976 - MARCH 1977

NUMBER OF BUTCHERS	PERCENTAGE OF TOTAL SLAUGHTERS BY HEAD	
	Pouytenga	Kaya
Largest 1	9	45
Largest 4	31	96
Largest 8	52	100
Largest 20	85	--
Number of active butchers	39	7
Average monthly slaughter	153	95

TABLE 8.3

CONCENTRATION RATIOS FOR WHOLESALE BUTCHERS, OUAGADOUGOU, JANUARY 1976 - FEBRUARY 1977

NUMBER OF BUTCHERS	PERCENTAGE OF TOTAL SLAUGHTERS	
	By Number of Head	By Weight
	All Cattle[a]	
Largest 1	7.8	8.4
Largest 4	22.7	22.9
Largest 8	37.1	37.1
Largest 20	63.1	63.4
	High Quality Beef[b]	
Largest 1	19.5	20.0
Largest 4	48.0	49.8
Largest 8	70.8	72.2
	Common Quality Beef[c]	
Largest 1	12.3	9.6
Largest 4	29.2	27.6
Largest 8	45.9	44.4
Largest 20	72.9	75.5

[a]Includes 75 active butchers slaughtering an average of 1863 head per mo. weighing an average of 127.2 kilograms carcassweight.

[b]Includes 24 active butchers, slaughtering an average of 675 head per mo. weighing an average of 147.8 kilograms carcassweight.

[c]Includes 51 active butchers slaughtering an average of 1188 head per mo. weighing an average of 115.5 kilograms carcassweight.

Similar data were examined for butchers in Bobo-Dioulasso. Unfortunately, the data show daily market shares, and thus when aggregated, represent upper bounds for concentration ratios since the most active butchers varied from day to day. For 52 butchers slaughtering an average of 1708 head per month the maximum concentration ratios in Bobo-Dioulasso were:

Largest Butcher	9%
Largest Four	28%
Largest Eight	44%
Largest Twenty	71%

2. Exporters. -- The final source of concentration ratios for cattle and meat market participants was for cattle exporters operating out of Ouagadougou. These are merchants who purchase cattle in Ouagadougou and in other markets throughout Upper Volta and ship cattle to Ivory Coast by rail. These ratios have little meaning for power on either side of the market; such exporters not only compete in several cattle markets against each other and other buyers, but also make up a relatively small portion of the Abidjan resale market in most seasons. The importance of these figures are related to the limited availability of railroad cattle cars, discussed in Chapter 6. Large market shares could suggest power being exploited in the allocation of the rental rates.

For the period August 1976 through January 1977, seventy-seven different merchants shipped cattle by rail from Ouagadougou to Ivory Coast. Average total monthly shipments in numbers of head were 1740. The concentration ratios in terms of numbers of head shipped are:

Largest Exporter	18.6%
Largest Four	40.7%
Largest Eight	60.6%
Largest Twenty	84.8%

The data have two possible implications. First, the fact that one exporter accounted for almost one-fifth of all shipments and the top 10 for more than two-thirds is supportive of the allegation that a relatively small group of merchants controls access to rail cars. That such power may be exploited in Voltaic cattle markets must be considered. This conclusion is mitigated however by the observation that 30 merchants made only one or two shipments during the survey. It would thus appear that access to rail cars is available to even small scale exporters.

Numbers of Participants and Market Shares: Implications for Competitive Efficiency. -- How should these various measures of market shares be used? Certainly one must be careful not to place too much importance on market concentration alone, without considering the barriers to entry and possibilities for collusive activity by traders. Nevertheless, the data show relatively large numbers of competing merchants, intermediaries, and butchers at each stage of the marketing chain. In rural and small-town markets the level of demand for meat is often so limited as to only support one or several cattle slaughterers. Their market power in the cattle market is limited, however, by competition from traders or exporters who purchase cattle for shipment farther along in the marketing circuit. It is usually only in the purchase of old or weak cattle which might not stand up well to long distance trekking that such butchers wield considerable monopsony power. In wholesale and retail meat markets such butchers face competition from small ruminant slaughterers who are usually more numerous, thus effectively limiting their market power on the resale end.

In general, then, the large number of buyers and sellers at almost every level of the livestock marketing circuit in itself suggests a highly competitive market structure. The following section describes other conditions of market structure and conduct which serve to foster competition.

Other Elements of Structure and Conduct

This section examines other determinants of market structure which are traditionally considered to be related to the exploitation of market power. Four categories are investigated in turn: vertical integration, economies of scale, barriers to entry, and other structural determinants. The final sub-section then looks at the question of potential collusive behavior among market professionals.

Vertical Integration and Diversification. -- Many market participants engage in several levels of trade at the same time. This is not unexpected behavior in distributive trades, and in fact, often leads to the exploitation of vertical economies. However, the potential abuses associated with the inherent advantages of vertical integration are well known (Bain, 1968, pp. 360-362). Integration may be a source of market power or may extend power from one stage to another. This section examines this phenomenon as well as the diversity of non-livestock marketing activity engaged in by butchers, traders, and intermediaries.

The study categorized the activities of market participants involved in the wholesale level trade into five classifications: long and short-distance domestic traders, cattle exporters, wholesale butchers, and intermediaries. Table 8.4 shows the degree of vertical integration and diversification for fifty-two market participants interviewed during the study. Intermediaries show the lowest tendency to engage in other forms of trade. The vast majority of other market participants complemented their major occupation with some other marketing activity. In some instances, the distinction between trades was arbitrary, so that the participant considered himself to have a single occupation while he was classified as having two or three. This was especially true for the first three categories and for butchers. Besides wholesale butchers who sold meat in retail markets, the most common crossover was to short-distance trade. This is especially true for Ouagadougou-based butchers or exporters who travel to markets in Kaya or Pouytenga to purchase cattle, and later resell some

TABLE 8.4

VERTICAL INTEGRATION AND DIVERSIFICATION AMONG MARKET PARTICIPANTS

Major Occupation	Total	Secondary Livestock Marketing Occupation[a]								
		A	B	C	D	E	F	G	H	None
(A) Short-distance Trader	3	-	1	0	0	2	0	0	0	1
(B) Long-distance Trader	6	3	-	4	0	0	1	0	0	0
(C) Exporter	13	9	2	-	2	0	2	0	0	3
(D) Wholesale Butcher	19	0	0	5	-	0	1	15	3	0
(E) Intermediary	11	0	0	3	0	-	0	0	0	8
	52									

(F) Speculation in Livestock

(G) Retail Butcher

(H) Meat Exporter

[a]Some participants engaged in several secondary activities; thus row totals may exceed number in major occupation.

of these purchases to other merchants or butchers in Ouagadougou. In effect, they act as spatial arbitrageurs. Category F, speculation in livestock, was included for those merchants and butchers who regularly maintained larger stocks of cattle than they required for their major activity and resold animals to other buyers during periods of short-run shortage.

In addition to livestock marketing activity, many participants also diversified to activities outside of the livestock or meat trade. Many (71% of butchers, 85% of merchants, and 57% of intermediaries) had farming interests and almost all claimed to engage in some stockraising activities. Other "investments" ranging from taxis to rental property to stock in public corporations were commonly claimed (36% of butchers, 55% of merchants, 57% of intermediaries). Several traders dealt in other merchandise and one exporter had diversified into importing lumber from Ghana though he did not ship cattle there. Surprisingly, no traders acknowledged using cattle revenues to finance or back haul trade in other merchandise. Butchers, particularly those in small towns, considered their meat trade as secondary or at least part-time activity and engaged in tailoring, shopkeeping, and even teaching.

It is interesting to note that the direction of government policy is to restrict vertical integration in the livestock and meat trades.[8] Such absolute interdictions seem to ignore the positive effects on competition that mobility among the marketing profession may have. Where butchers or traders develop parallel expertise, their threatened expansion may always serve to increase potential, if not actual competition in the various trades.

Economies of Scale. -- Where economies of scale in marketing exist, they may offset the costs of increased market concentration. Such economies may take the form of technical or pecuniary economies. Only the former have real social benefit though in livestock trade, the latter may be more common. Where pecuniary economies exist, they tend to enhance and entrench market power.

1. Technical Economies. -- In examining the potential economies of scale, it is necessary to differentiate between the minimum efficient scale of slaughter or shipment (equivalent to plant size) and the scale of entrepreneurial activity (firm size). In cattle trading or exporting, the minimum efficient scale is largely given by the technological constraints of transport. For trekking cattle this typically ranges from 25 to 50 head for long distance trade. This number of cattle makes most efficient use of drovers, spreads the fixed costs over a large number of head (many of these fixed costs are imposed by government paperwork),[9] and avoids the diseconomies of larger size herds due to risk of disease, escape of cattle, and possibilities of arriving at the market when prices are low. For rail transport there are clear limits set by the capacity of the cattle wagons. Although large size wagons yield modest cost advantages, traders typically have little control over the type of wagon they are issued.[10]

Economies in the scale of operation by traders are largely a function of capital and management. Where short term capital markets are perfect (or even where short term capital is readily available) such considerations are diminished. According to most traders, short-term capital markets and brief alternative uses for capital in other trades are not available. Thus, financial capital is usually idle when trading activity is slack. Lowest implicit capital costs result where rotation of capital is rapid and constant. Large scale operations run the risk of encountering long periods of idleness with the concomitant implicit capital costs. This results in an attitude by traders that a relatively small, steady trade is superior to larger, less frequent shipments. However, this strategy is often hampered by the uneven supply and price conditions discussed in the previous chapter.

On the management side, traders try to optimize the scale that will most fully employ their skills (often a function of the availability of alternative occupations) and keep their employees fully occupied. Since most traders were found to engage in other activities as well as cattle exporting, such considerations may not be binding.

Overall, the technical economies of scale associated with the current technology in cattle trading tend to be relatively minor. The possibilities that technological improvements might change those (e.g. improved road conditions might make trucking more feasible) must be considered, though.

2. Pecuniary scale economies. -- These arise especially in terms of price negotiation and evasion of official fees and tend to be more significant than technical economies in cattle trading. As noted earlier, allocation of cattle rail cars is thought to favor large traders. Furthermore, the relationship between many officials and traders would seem to benefit those whose large volume enables them to establish a "trust" between themselves and customs officers, livestock agents, etc. It must be clear that such advantages simply result in money transfers, notably from the government treasury to traders, and offer no real social justification for large scale.

Barriers to Entry. -- Like both vertical integration and economies of scale, barriers to entry into the marketing professions may be both a source of and a boon to market power. The absolutely large numbers of market participants and relatively low market shares noted in the first section of this chapter would seem to argue against the existence of high entry barriers. Nevertheless, there are five possible sources of restricted entry which should be considered. They are capital requirements, professional training, social or ethnic ties, access to infrastructure, and legal barriers.

1. Capital Requirements. -- The previous section argued against the existence of large scale economies. Still, market operation requires relatively large outlays of capital by traditional standards. There are many cases of traders and butchers who started on a small scale in small ruminant trade and accumulated financial resources until they could enter the next level of trade. However, at any point in time, the minimum cost of entering the export trade is between 1.5 and 2 million francs CFA. The sources of initial finance cited by exporters as their basis for entering the profession included private saving, family loans or gifts, military pensions, and theft.

Butchers, especially in small towns, face considerably lower capital requirements than exporters. Like the small scale livestock traders, theoretically one needs only the cost of a licence, slaughtering fees, and the price

of an animal to enter the butcher trade. Even in cities like Ouagadougou where credit from wholesale meat sales carries over for short periods of time, 100,000 francs CFA is acknowledged to be sufficient for entry. Intermediaries seem to have no entry capital requirements beyond a house to lodge clients and the funds to feed them and care for their cattle until they are sold.

2. Professional Training. -- For each profession in livestock marketing, development of professional expertise is probably the most important factor determining the likely success of the enterprise. In the traditional cattle and marketing system, professionals must be able to evaluate weight and quality by eye, assimilate market information, and deal with the government bureacuracy in addition to managing a business enterprise. To this end, most professionals undergo an unofficial, traditionally organized training program. Table 8.5 shows the professional training of butchers, merchants, and intermediaries in Ouagadougou, Kaya, and Pouytenga.

Would-be butchers begin as apprentices, selling meat retail, preparing carcasses, and acting as market "helpers". Most cattle merchants similarly served as drovers, agents, petit commerçants or simply market errand boys before starting on their own. Intermediaries rise from the ranks of butchers or merchants. Formal education appears to have little importance for butchers, though almost 50% of merchants and intermediaries reported some level of formal schooling. Finally, familial ties in marketing are strongest for butchers and intermediaries but almost non-existent for merchants, suggesting that access to the indigenous training system is relatively open.

3. Social and Ethnic Ties. -- Among the market participants interviewed, the predominant ethnic group was Mossi (93% of butchers, 80% of merchants, 64% of intermediaries). This large proportion is a function both of the research sites (Kaya, Pouytenga, and Ouagadougou are all in Mossi "country") and some bias in sampling. Indeed, Fulani, Arab (Maure), and even Haussa professionals are common throughout central, northern, and eastern Upper Volta. In terms of religion, the majority of professionals were Moslem (57% of butchers, 85% of merchants, and 71% of intermediaries) but many prominent merchants, intermediaries and butchers were Christian, including the president of the Ouagadougou butchers' union. There is no evidence that either ethnic or religious affiliation restricts entry.

4. Access to Market Infrastructure. -- Most marketing facilities (cattle parks, abattoirs, cold rooms, market places, etc.) are operated by the local government or livestock service and are available to all licensed professionals for regulated fees. Since scales are not used in a systematic way anywhere in the marketing chain, their lack of availability poses no problems either. Railroad cars are a scarce factor in the export trade, however. The rail bottlenecks between Ouagadougou and Ivory Coast, especially during peak export months, present considerable problems for many exporters and would-be exporters. Since the rental rates are fixed by the RAN (in conjunction with Voltiac and Ivorian officials), cattle wagons are not allocated by price but by an unspecified rationing system. Economic theory suggests that this should lead to excess profits in export trade. The possible outcomes include black-market bidding for wagon rentals, the capitalization of some of the profits by railroad officials, and the exclusion of some requestors. All three contribute to a restriction of entry into rail export of live animals.

5. Legal Barriers. -- These tend to be the most significant barriers to entry in the marketing system, and the potential that they will be multiplied is great. Legal barriers fall into two categories: bureaucratic and direct restriction.

Government bureaucracy in the cattle and meat trade is substantial. The extraordinary amount of paper work and number of different official fees and taxes necessary to work as a butcher, merchant, or intermediary tend to discourage entry. The learning costs, efforts to develop connections, and problems of keeping up with changes are high. Indeed, officially exporters must process nine separate documents and pay a fee for most of them.[11] In fact, one document supposedly required since 1974 (livestock passport) was still unknown in 1977 to almost all merchants and even most of the authorities who were supposed to issue them. In addition to this mass of paperwork is the potential (often realized) for unofficial harassment and collection of additional fees. The result is a propensity among many professionals to bypass the legal regulations where possible. Such confusion cannot help but deter entry.

In addition to this unintentional discouragement of new entry, the Voltaic government in conjunction with member states of the Entente and the CEAO is committed to undertaking measures to "rationalize" the livestock and meat marketing system by imposing measures to license, "professionally train", and restrict the occupational mobility of market participants. Where such measures have been instituted in similar marketing systems, the result of governmentally blocked entry has typically been decreased competition and higher prices (Staatz, 1979, p. 454; Brown, 1978, pp. 91-92).

In general, most economic conditions of entry appear to impose low or medium barriers to new sources of competition. The most serious sources of high barriers arise from the transportation bottlenecks and the bureaucratic and legal constraints imposed by government.

Other Structural Determinants. -- This section looks at the role of four other possible determinants of market structure in livestock and meat marketing. They are: access to information, product differentiation, credit, and the nature of transactions.

1. Access to Information. -- In order for the large number of buyers and sellers to compete effectively they must be aware of market conditions and prices. In the Voltaic livestock marketing system, this information flows easily and quickly, and is readily accessible at little cost. Within markets, information on prices is almost instantaneously transmitted. Bargaining is done in the open. Buyers pass from intermediary to intermediary, making offers and considering the responses. When a major purchase is made, the news spreads rapidly. The only requirements for being able to obtain and use the continous outpouring of market information are that one speak a common language, spend time in the market, and be able to evaluate the animal visually.

Information between markets is usually transmitted by drovers and traders. Perhaps one of the most remarkable aspects of the marketing system is how quickly this information is transmitted. News of market

TABLE 8.5

PROFESSIONAL TRAINING

	Butchers	Merchants	Intermediaries
No. of respondents	18[a]	20	11
Formal education (literate in French)	14%	45%	43%
Father in livestock marketing trade	64%	10%	71%
Served as apprentice, convoyeur, meat retailer, market helper, etc.	100%	80%	100%
Avg. length of apprenticeship	4.1	2.9	--
Avg. number of years in profession	21.8	13.9	12.7

[a]9 wholesale butchers from Ouagadougou, 4 wholesale-retailers from Pouytenga, 5 wholesale-retailers from Kaya.

[b]All 11 intermediaries were formerly cattle merchants or butchers.

[c]Years as intermediary only.

conditions and general price levels in the Abidjan market is furnished daily by returning drovers who describe in detail the events that took place during the time they spent at the Abidjan market. The delay is rarely more than 48 hours.[12] Within Upper Volta, information between markets serviced by common traders also flows extremely fast. And though news of conditions in northern markets does not travel as quickly, the passage of drovers and traders between central and nothern markets assures regular exchange of market information.

2. Product Differentiation and Credit. -- These two possible sources of market power have little impact on the Voltaic livestock marketing system. The distributive services provided by cattle traders show little evidence of any differentiation of service. The possible sources of monopsony power attributable to multiple transactions, tied purchases, credit, etc. between herdsmen and cattle collectors were discussed and dismissed in Chapter 5. Similarly, neither are such specialized arrangements in evidence in resale markets. The most likely source of differentiation would be in credit arrangements. However, the system of long-term credit for livestock sales has not been in evidence in Upper Volta for many years. In the large Ouagadougou cattle market short-term credit of 24-48 hours is not uncommon, but it is usually between traders or butchers operating out of Ouagadougou. Exporters selling in Abidjan are usually obliged to accept delayed payment from butchers there and do expect premiums (implicit interest) for such credit arrangements (see Staatz, pp. 113-124). Few merchants or butchers acknowledge making use of commercial loans for these livestock marketing activities.

3. The Nature of Transactions. -- This somewhat ubiquitous element of market structure concerns the fact that livestock sales typically take place after intense individual bargaining between buyer and seller, almost always through an intermediary. Theoretical models of competition usually assume some celestially derived auction market, most often juxtaposed against the price setting model of the monopolist. Obviously, neither of these approaches the nature of Voltaic livestock markets. Cattle are remarkably heterogeneous in nature and if information is not cheap or readily available, the potential for discrimination under haggling is clear. Thus, such marketing systems are particularly sensitive to both market alternatives (degree of competition on each side) and to access to information. The market structure (and performance) can vary from perfect discrimination under monopoly (monopsony) with imperfect information to the highest levels of competition.

The fact is that the structure of Voltaic cattle markets offer remarkable advantages in terms of flexibility. Within market places, prices tend to adjust rapidly and markets clear almost perfectly as buyers and sellers instantaneously adjust their reservation prices. This is the case in cattle markets, wholesale meat markets, and even retail meat markets. It must be the case wherever large numbers of non-colluding sellers and buyers are assembled in a small place with access to information

Collusive Behavior by Market Professionals. -- To the extent that traders or butchers are able to coordinate their marketing strategy, they may effectively "defeat" the efficient properties of a competitive market structure. In general that did not appear to be the case in livestock marketing in Upper Volta. The large number of buyers and sellers described earlier would seem to make any collusive arrangements inherently unstable. In most markets, both the buyers and sellers are heterogeneous groups, consisting of locals and strangers -- many different ethnic groups -- performing different economic functions. Thus, explicit agreements among buyers or sellers in any market to raise prices (for sellers) or lower prices (for buyers) would seem to be impossible to enforce. Indeed, such arrangements appeared to be absent in the markets investigated.

Butchers would seem to have the greatest ability to maintain collusive agreements since they are all local residents and buy and sell in the same markets. Even here, the scope for successful collusion is limited; on the cattle buying side the butchers still face competition from traders and exporters; on the meat side, competition from sellers of other types of meat limit the gains to be made. Indeed, in Ouagadougou, the failure of the butchers' union to promote any type of cooperation among the meat professionals has been labeled one of the major factors in their supposed inability to adopt modern efficient meat marketing practices.

Throughout the livestock and meat marketing system, intermediaries appear to make up the only group which has had any success in coordinating marketing strategy, but their scope for enhancing their gain is also quite limited. Except in the rare case where the intermediary is involved in some other aspect of the trade they may only gain by raising the official commission. To do so, however, makes the intermediaries particularly susceptible to losses elsewhere. A portion of the broker's fee is paid as a discretionary gift by sellers and buyers, which intermediaries would risk if they were to raise commissions. In addition, intermediaries, who are already under considerable attack by many government officials, would risk increased government regulation[13] were they to show too much power.

Market Performance: Margins and Other Considerations

How good a job does the existing marketing system do? The answer depends upon the application of several criteria. These include looking at the responsiveness of the distribution system to changing patterns of supply and demand; the margins and rates of return earned by typical enterprises; adoption of efficient, low cost marketing techology; and considerations of the social aspects of marketing such as employment generation, externalities, and the imposition of cost on the society. This section looks at these issues in two parts; the first examines the question of gross and net margins, profitability and cost while the second considers the other criteria.

Traders' Margins and Costs. -- The analysis of structure in the first part of this chapter is generally suggestive of an absence of the theoretical sources of market power in the livestock marketing system. Economic theory associates such a state with efficiency (in the absence of external constraints), including low cost. In fact, gross margins throughout the marketing system, and especially those in long distance trade, tend to be rather high in absolute terms. In the face of evidence which argues against the existence of unexploited scale economies, supports the use of low-cost, labor-intensive technology, and suggests competitive pressures at most

every level, what are the sources of these price spreads? This section will suggest that net traders' margins represent a modest element of gross margins. They are overshadowed by the contribution (to cost) of government levies and transportation costs.

Analysis of price data in Chapter 7 determined estimates of the price differentials for cattle slaughtered in Pouytenga and Kaya over those slaughtered in Ouagadougou. The differentials were -4064 francs CFA per head for Pouytenga and -2535 francs CFA per head for Kaya (Table 7.9). Table 6.1 in Chapter 6 evaluated the cost of trekking between Pouytenga and Ouagadougou as 1662 francs CFA per head. Even though Kaya is somewhat closer to Ouagadougou (100 km) domestic trekking costs appeared to be dominated by the fixed cost component (note that the trekking costs from Djibo, 210 km from Ouagadougou, were only 1,674 francs CFA per head) so a transportation cost estimate of 1500 francs CFA between Kaya and Ouagadougou is not unreasonable. These yield net margins of 2402 and 1035 francs CFA for cattle brought to Ouagadougou from Pouytenga and Kaya respectively. For cattle priced at 40,000 francs CFA (slightly less than the average price of adult males in Pouytenga during the survey period), the net intermarket margins are 6.0 percent and 2.6 percent for Pouytenga and Kaya respectively. Yet there is reason to believe that these figures are biased upward. The data come from the prices of locally slaughtered cattle. The quality of cattle slaughtered in small towns like Kaya and Pouytenga is undoubtedly inferior to that found in Ouagadougou. Unfortunately, there is no way to determine what premium is paid for the quality differential to adjust the estimates of the margins.

A similar attempt at quantifying the Djibo-Ouagadougou differential was made. Monthly average prices for 5-7 year old males in Djibo were contrasted with prices predicted by the price formation model (Table 7.27) for cattle of northern origin in each season. Average weights of 315 kilograms for steers and 264 kilograms for bulls were used based on the data in Tables 7.19 and 7.20. The results are presented in Table 8.6. The margins calculated for each season have little meaning. First, the estimates of price in Ouagadougou were calculated with a constant weight when in fact weight varies seasonally. Secondly, during several periods few cattle are in fact shipped between the two markets, particularly in May and June when the price spread appears highest. However, the aggregate results are instructive. Besides year totals, aggregates of the most active periods for Djibo-Ouagadougou trade were computed. One assumes most trade occurs from July through April, the other -- and probably most realistically -- assumes October through April are the peak months.

The Djibo-Ouagadougou estimated margins suggest that traders net between 5.7 and 12.7 percent of the sales price for steers and between -2.7 and 5.2 perc for bulls. The combined margin ranges from 2.0 to 9.4 percent of Ouagadougou retail prices.

Two other analyses of margins are presented in Table 8.7. This shows the composition of beef prices in Ouagadougou and Abidjan for cattle originating in Djibo. The gross marketing margin is calculated only to the wholesale level. If retail margins (gross) are 10-15 percent of resale price, then the gross margin for meat delivered in Ouagadougou would be around 34 percent (reducing producers' share to 66 percent) and about 50 percent for cattle shipped to and sold as meat in Abidjan (with a corresponding 50 percent farm share).

In both cases, the net margins are returns to four factors: 1) the labor provided by the trader or butcher; 2) overhead costs not directly included here; 3) returns to capital; and 4) profits, or returns to the trader for his entrepreneurial skills and assumption of risk. How net margins should be distributed over these four items is a difficult issue; the rate of return they suggest is highly dependent upon the implicit wage rate, correct assessment of necessary overhead costs, and the rotation rate for capital. Bearing these in mind, returns to capital and entrepreneurial ability do not appear excessive, with two exceptions.

Exporters who shipped cattle by train from Ouagadougou to Abidjan enjoyed far superior rates of return on their capital than domestic traders or than traders who shipped cattle to the coast on foot. This higher rate of return seems largely to be the result of transportation constraints and the riskiness of shipping cattle to the coast. During periods of highest profitability for exporting cattle, the rail car rental mechanism operates quite imperfectly, placing "regular" shippers in substantially advantageous positions to procure space. Thus, the monopoly gains appear not to be so much the result of market structure or conduct, but more the result of the allocation mechanism used by the RAN.

Second, the net margins of butchers supplying the high-quality meat markets in Ouagadougou (supermarkets, butcher shops, and restaurants) were significantly higher than those of the majority of butchers who sold lower quality meat on the popular market. The reasons for the semi-exclusive arrangements between these wholesalers and institutions were not obvious, though there may be significant barriers to entry into this specialized trade because of high capital requirements and institutional ties.

Is there room for significant reduction in costs or a narrowing of the price spread? Undoubtedly there is, but the prime areas of cost reduction seem not to be in the reorganization of trade. The data would seem to dispel the notion that intermediaries' commissions or excessive direct labor costs are major sources of inefficiency. And though the question of butchers' margins is not explored in this work, the structural evidence argues against that component excessively inflating costs. That leaves traders' margins, taxes, and transportation as candidates for reduction of gross margins.

A closer examination of traders' margins which accurately accounts for rotation of capital and imputes values for labor, overhead costs and risk assumption might reveal excessive rates of return (Staatz, 1979 Ch. 11 argues against that for most trade in Ivory Coast). It has already been suggested that margins for rail exports are likely high. However, these possible sources of inefficiency are dwarfed by the costs attributable to taxes and transportation. Taxes account for 11.8 percent of wholesale prices for exported cattle and explicit transport costs for 11 percent. When the implicit costs or weight loss are considered, the total contribution of government and transportation costs to final price approaches thirty percent. One is led to conclude that within the range of technology available to marketing participants, cattle and meat appear to be delivered at relatively low cost. Most areas of potential cost reduction are outside of the control of traders or butchers: taxes; improved transportation infrastructure or methods, and the incidence of unofficial charges which are prevalent throughout the system.

TABLE 8.6

ESTIMATED NET MARGINS: DJIBO-OUGADOUGOU

Season	Estimated Price Ouagadougou[a]	Transport[b] and Marketing Costs	Average Price Djibo[c]	Net Margin	% of Ouaga. Price
		STEERS			
Feb-Apr	44,764	1674	37,699	5,391	12.0
May-June	52,115	1674	34,324	16,117	30.9
July-Sept	44,631	1674	42,344	613	1.4
Oct-Jan	46,517	1674	43,112	1,731	3.7
TOTAL	47,007	1674	39,369	5,964	12.7
July-Apr	45,304	1674	41,052	2,578	5.7
Oct-Apr	45,641	1674	40,406	3,561	7.8
		BULLS			
Feb-Apr	35,228	1674	35,841	-2,287	-6.5
May-June	42,578	1674	30,313	10,591	24.9
July-Sept	33,094	1674	34,273	-853	-2.4
Oct-Jan	36,979	1674	35,000	305	0.8
TOTAL	37,470	1674	33,857	1,939	5.2
July-Apr	35,767	1674	35,038	-945	-2.6
Oct-Apr	36,104	1674	35,421	-791	-2.7
		TOTAL			
Total	42,239	1674	36,613	3,952	9.4
July-Apr	40,536	1674	38,045	817	2.0
May-June	40,872	1674	37,914	1,284	3.1

[a]Predicted value of price from regression, Table 7.27. See text for explanation.

[b]From Table 6.1.

[c]See text for explanation.

TABLE 8.7

COMPOSITION OF WHOLESALE PRICES FOR CATTLE & BEEF DELIVERED, OUAGADOUGOU & ABIDJAN[a]

	Beef Delivered In Ouagadougou		Cattle Delivered in Abidjan	
	CFA	% of Wholesale Price	CFA	% of Wholesale Price
Return to Producer	29,900[b]	76.1[b]	38,122[c]	59.0[c]
Intermediaries Fees	700	1.8	1,050[d]	1.6[d]
Labor[e]	540	1.4	820	1.3
Taxes	1,585	4.1	7,649	11.8
Transportation[f]	(1,249)	(3.2)	(7,132)	(11.9)
Direct	424	1.1	5,175	8.0
Mortality	675	1.7	1,957	3.0
Shrinkage and Condemnation	150	0.4	[7,175][g]	[11.1][g]
Net Margin	(5,326)	(13.5)	(9,802)	(15.2)
Djibo-Ouagadougou	2,026	5.1	3,954	6.1
Wholesale Butcher	3,300[h]	8.4[h]	--	--
Ouagadougou Abidjan	--	--	5,848	9.1
Wholesale Meat Price	39,300	100.0	--	--
Carcass	33,000	16.0	--	--
Fifth Quarter	6,300	84.0	--	--
Wholesale Cattle Price (Abidjan)	--	--	64,575[i]	100.0

[a]Based on cattle prices in Djibo, Ouagadougou, and Abidjan, Wholesale meat prices in Ouagadougou, and average costs during 1977, as collected during survey period. Margins calculated as residuals.

[b]Assumes 200 CFA/kg. carcass weight at 150 kg.

[c]Assumes 218 CFA/kg. carcass weight at 175 kg.

[d]Does not include commission paid by wholesale butcher in Abidjan.

[e]Salaries paid to herders, drovers, convoyeurs, loaders, and meat handlers (calculated wholesale share only).

[f]Does not include direct labor share.

[g]Cost of shrinkage for trekked cattle assumed to be minimal. Weight loss for rail shipments assumed to be 10%. Transportation shrinkage is not included in calculation of margin since it is already included implicitly in the lower delivered price.

[h]Most butchers typically sell both wholesale and retail, thus these margin calculations may in fact be artificially inflated.

[i]Based on resale price of 410 CFA/kg carcass weight at 157.5 kg (John Staatz, personal communication).

Responsiveness, Employment, and Social Costs. -- Other criteria of acceptable performance should be applied in an evaluation of the efficiency of a distributive industry. The decade of 1967-1977 provided ample opportunities to apply them. Significant changes in patterns of both supply and demand have occurred due to the effects of the drought on sales patterns by herdsman and the distribution of livestock throughout Upper Volta, the closing of the border with Mali and interdiction of transit cattle, the disintegration of the Ghanaian market for beef cattle, increased competition from extra-African sources of beef on the coast, the opening of the Nigerian market for beef, programs of herd reconstitution in Niger, increases (though modest) in animal traction, rapid urbanization and increases in money incomes, and the breakdown of the transportation system for chilled meat exports to Ivory Coast. Additionally, the Voltaic government has shown increasing proclivity to directly intervene in the marketing system by reorganizing market places, constructing new slaughter facilities, and augmenting the amount of bureaucracy and regulation associated with livestock marketing. Through all this, the indigenous trade in cattle and meat has continued, adapted, and even prospered.

The marketing system has responded to each shock or stimulant to change, especially where geographic patterns have been altered. That activity in various markets has fluctuated with these changes is evidence of that. The declining importance of some northern markets like Markoye and Gorom-Gorom has accompanied the rise of Seytenga and Déou as the result of drought, import restrictions, and restocking programs in Niger. The fall of activity in Diapaga in the early seventies when Benin transit laws changed had begun to reverse in the late seventies as the Nigerian market improved. The sight of commercial herds of cattle passing each other - young cattle being shipped northeast to Niger and slaughter cattle southwest to consumption markets - bears testimony to the adaptability of the system and responsiveness to changing prices. The reactive abilities of the system to market conditions seem only to be limited by the technological and policy confines imposed on it. Considering the distances and problems of communication and transportation in relatively remote regions, the proven ability of the marketing system to purchase, transport, redistribute, export, and slaughter close to 250,000 head of cattle each year is remarkable.

The traditional marketing system has also been efficient in its use of low-cost labor, something the government should seriously consider before opting for so-called modern methods of marketing which often involve heavy capital requirements and significantly reduce employment in the sector. Indigenous technologies in marketing, transportation, and slaughter use low levels of imported capital and are highly labor intensive. This includes the use of herders to assemble cattle in markets; drovers for trekking; low technology methods of slaughter, breaking bulk at the wholesale level of beef trade, and cartage of meat to retail markets which employ numerous butchers' apprentices and market helpers; as well as the intermediary and petit commerçant system which serves such diverse functions as lodging for strangers, information transmission, and market organization. In addition, numerous other individuals are employed in or on the fringes of the livestock marketing system. These include specialists who load and unload cattle into railroad cattle wagons, record-keepers, guardiens who look after reserve stocks, and the abundant vendors who frequent cattle and meat markets selling food, cola nuts, and sundry items to the assemblage.

While no exact estimate of the number of people employed full or part time in the marketing system was calculated, the indigenous system can be contrasted with both implemented and proposed "improvements" that the government has called for. As already noted, government policy embraces a decrease in the number of diverse occupations, especially those roles played by intermediaries. In some cases, government institutions are proposed as functional substitutes. In others, more capital intensive technologies are proposed. Enclosed cattle markets (with imported metal rails) have reduced the need for herders. Municipally operated trucks take meat to market where private taxis, truckers, and even boys on motorbikes used to operate (see public health considerations, discussed below). The most notorious example of employment displacement involves the Abattoir Frigorifique de Ouagadougou. Theoretically operable by about 25 skilled and unskilled employees, it replaced a slaughter facility, which using traditional methods, involved several hundred butchers, apprentices, and helpers. The generation of unemployment and underemployment by the new slaughterhouse forced the government to abandon "efficient" highly mechanical operation of the facility and to de-mechanize in order to employ some of the displaced apprentices.[14] A side effect was to disrupt the traditional training system for butchers which depended upon the helper and apprentice system.

One performance area where the traditional system has been lacking is in the imposition of social costs upon the community. The health conditions in livestock and meat marketing could no doubt be greatly improved. The burden of condemnation of carcasses or cattle falls on the individual butcher or trader and thus creates incentives for evasion of controls. Lack of cheap sources of refrigeration near most meat markets leads to spoilage and sale of deteriorated meat. The conditions under which meat is slaughtered and sold (both wholesale and retail) certainly contribute to a public health problem. Unfortunately, most governmental attempts to solve these problems have come at the high cost of labor displacement discussed above. In other cases, the solution raises private costs so much that it is not effective. Such is the case with refrigerated rooms at the Ouagadougou slaughterhouse. Located seven kilometers out of town and using a cost structure that discouraged short-term use, few butchers selling in the traditional market made use of the refrigerated storage facilities.

Problems also arise in conflicts between farmers and traders trekking cattle to market. Where they exist, they suggest that some of the costs of trekking are currently being borne by farmers or villagers, rather than consumers. The same is true for cattle loaded on to trains. They are trekked through the heart of Ouagadougou, disrupting traffic and occasionally damaging property. Again the solution to trekking problems (specified cattle trails) has raised the private costs of trekking so much that merchants ignore the regulations.[15]

Conclusions

This chapter has presented a large body of evidence to support the conclusions that the livestock marketing system is organized along reasonably competitive lines and operates fairly efficiently. Along with the results presented in Chapters 5 and 7, it provides a basis for arguing in favor of strengthening rather than replacing the

indigenous system of marketing. Few of the alleged shortcomings of the system bear up under the evidence. The policy implications are obvious; rather than impose greater restraints to free trade, the government should encourage competition where it is found wanting. The technological constraints that impede efficiency (particularly in the area of rail transportation) need to be addressed. However, careful consideration of the needs for and effects of government intervention need to be made in all cases, rather than a headlong run at "modernization." The potential for harmful intervention has been proven over and over.

In summary then, the traditional system seems to be performing well according to most criteria of efficiency. The final chapter addresses more closely the potential for improving marketing efficiency by means of government policy.

FOOTNOTES TO CHAPTER VIII

[1]Both the CEBV (Communauté Economique du Bétail et de la Viande, comprising the five Entente states) and the OCBV (Office Communautaire du Bétail et de la Viande, comprising the six member states of the CEAO) have signed similar agreements binding member states to stricter regulations to trade according to standards laid out in the protocols.

[2]Many cattle merchants got their start in the small ruminant trade, however. Though the question was not asked of all the merchants interviewed, seven claimed that they began their own careers in this manner.

[3]One must be careful to distinguish between low levels of demand and low numbers of buyers (high buyer concentration). The two are often related because low demand levels can often only support limited numbers of firms operating at efficient scale, e.g., butchers can't slaughter less than one animal. In such cases monopsony power may aggravate the problems of depressed demand. However, the two have far different implications for efficient resource allocation.

[4]In French, intermediaries are called courtiers. In the British literature and Anglophone countries they are often referred to as "Landlords." The Dioulla word used throughout West Africa is dillali.

[5]Several cases of intermediaries who were still active as merchants in cattle trade were noted in southern markets. Usually they specialized in some form of export (as opposed to intermarket or intertemporal speculation). Such cases were not observed in northern collection markets.

[6]This issue along with an excellent description of the role of intermediaries is found in Staatz, 1979, pp. 102-140. Though some functions of cattle brokers in Ivory Coast are not relevant in Upper Volta, many of Staatz's observation concerning the unlikely exploitation of market power by intermediaries is appropriate to Upper Volta.

[7]While butchers were observed to specialize in different quality beef, no systematic qualitative stratification was undertaken. Instead, average carcass weights for each butcher were calculated. Those slaughtering cattle weighing more than 135 kilograms were considered to be high quality suppliers, those with average carcass weights less than that were considered to supply the common quality market.

[8]Both the CEBV and the OCBV professional protocols would make integration illegal, especially in urban butchering occupations (CEBV, 1974, No. 8; CEAO/OCBV, 1977, No. 6).

[9]An example is the cost of a trading license.

CATTLE TRADERS' LICENSE FEE

CATEGORY	NUMBER OF CATTLE	COST (f CFA)	COST PER HEAD (f CFA)
1st	more than 1000	120,173	-
2nd	from 600 to 1000	67,673	68
3rd	from 300 to 600	36,173	60
4th	from 150 to 300	22,523	75
5th	from 75 to 150	11,923	79
6th	less than 75	6,248	83

[10]The capacities of the various wagons and costs are:

COSTS AND CAPACITIES OF CATTLE CARS
(OUAGADOUGOU-ABIDJAN)
(Prices in francs CFA)

TYPE OF CAR	STANDARD LOAD	MAXIMUM LOAD	COST[a]	COST PER HEAD (STD)
H 12000	25 head	27 head	95,255	3,810
H 13000	32 head	37 head	126,640	3,958
J 14000	35 head	40 head	142,330	4,067

[a]Cost in 1976.

[11]The nine documents for export are: certificate of origin, authorization to export, animal health certificate, trader's license, export tax forms, livestock passport, and three transportation documents (request for cattle car, rental papers, and the convoyeur's authorization paper and ticket).

[12]See Appendix B for a remarkable story of the efficacy of information flows from south to north.

[13]Some localities already nominally retain the right to regulate official commissions

[14]One estimate of the initial labor displacement was 300 apprentices and helpers (SAED, 1975, p. 8). Undoubtedly this figure included underemployment effects as some apprentices and helpers continued to work in reduced capacities, assisting butchers in non-slaughter operations. The de-mechanization of the new slaughterhouse increased employment of line labor to almost 100. The net effect on unemployment was probably between 100 and 150.

[15]Merchants argue that the government trek routes don't offer enough access to water and pasture land and result in excessive weight loss by cattle.

CHAPTER IX

CONCLUSIONS AND POLICY RECOMMENDATIONS

A Summary: The Marketing System in a Changing Environment

The first two chapters of this study presented an overview of the current situation of the Voltaic livestock sector. It should be clear that in terms of both production and marketing, the sector is undergoing major transformations. On the production side, the effect of the drought in altering herd structure and distribution was the major factor in the drastic fall in exports in the mid-seventies. Most importantly, the drought caused a redistribution of cattle, both geographically and in terms of ownership, resulting in an increase in production in the south by nontraditional herdsmen. Animal production in the Sahel ORD, once the source of almost the entirety of Voltaic livestock exports (in terms of surplus productivity) was severely hurt by the drought, and recovery means that this region cannot be counted on to produce the bulk of mature, export quality cattle that it once did. On the other hand, the young ages at which large stock are being sold by northern pastoralists seem to open vast possibilities for implementation of the government's declared policy of stratification of production.

At the same time, traditional pastoralists are increasingly pressured by the expansion of agriculture, thus reducing the availability of open rangeland and straining relations between the herdsmen and sedentary populations. An additional factor affecting supply has been the elimination of imports and transits as additions to domestic production. All of these elements have and will continue to affect supply patterns, necessitating appropriate adjustments in marketing.

On the export demand side, the major adjustment of the seventies was a redirection of trade. The traditional market for Voltaic cattle exports in Ghana practically vanished as a result of Ghanaian financial and market organizational difficulties. The Ivorian market has diminished similarly, though for far different reasons. In Ivory Coast, Voltaic and other Sahelian suppliers now find themselves competing against world market beef suppliers. Still, the proximity of the large Abidjan market and the advantages of quick rail transport out of Ouagadougou are major factors in assuring that Ivory Coast will continue to be a major outlet for Voltaic cattle exports destined for the general beef market. Finally, an alternative export market in Nigeria has opened up to Voltaic exporters. The volume of current flows of cattle in this direction can only be speculated, since verification of exports along the southeastern border is currently negligible. The speed with which Voltaic traders responded to changes in market conditions, contrasted with the fact that through 1977 official government reports failed to acknowledge the existence of the new Nigerian flows, speaks well of the ability of the private marketing system to respond and adapt to changing supply and demand patterns.

In addition to these adjustments in supply and demand patterns, the past decade has seen considerable changes in government intervention in the livestock marketing sector. The major thrust at "market reorganization" has yet to be implemented, though new institutions, infrastructure, and regulations have been created. The most significant development was the creation of ONERA (Office National de l'Exploitation des Réssources Animales) as the government's coordinating body for development of livestock and meat marketing. To the extent that ONERA is able to facilitate and redirect trade, reduce costs, and strengthen established market weaknesses without destroying the basic marketing structure, it will provide the major impetus for marketing improvements in the 1980's. Unfortunately, the experience of marketing agencies in general throughout the developing world has been that intervention is often more disruptive than beneficial.

There have also been several changes in market infrastructure and regulation which have been aimed at correcting many of the alleged deficiencies in livestock and meat marketing. Construction of stockyards equipped with fences, scales, loading ramps, and communications facilities throughout the country is aimed at "modernizing" the marketing circuit and making market information more accessible. The establishment of livestock trails is intended to reduce some of the negative externalities of shipping cattle on foot. Construction of a capital intensive abattoir with chilling and freezing facilities in Ouagadougou and plans for a similar facility in Bobo-Dioulasso are directed at improving hygiene and encouraging chilled meat exports. There is also increasing interest by the government to regulate livestock and meat marketing more directly; Upper Volta is party to two sets of agreements which call for increased regulation of marketing professionals (butchers, traders, intermediaries) and the standardization of marketing policies.[1]

The benefits that have been derived from basic infrastructure and regulatory changes made throughout the past decade are not at all clear. Livestock markets which were constructed at high cost are largely under utilized. Though some livestock trails have been demarcated, the corresponding water and pasture requirements have yet to be put in place. The result is that drovers keeping to the trails risk higher shrinkage for their herds than when they are able to follow trails which were initially selected because of water and forage availability. Though the modern abattoir in Ouagadougou has probably improved slaughter hygiene (wholesale and retail meat sales still take place under relatively unsanitary conditions) it has yet to live up to its promise of stimulating meat exports. Up to now, the major effect of the capital intensive facility has been a decrease in slaughter-related employment. In general, construction of livestock marketing infrastructure has been of marginal value, often not well suited to the marketing conditions which currently exist.

Many of the proposed changes in marketing regulations seem similarly ill-suited to the needs of the marketing system. While most of the proposals would indeed afford officials a higher degree of control over marketing, the benefits in terms of improved efficiency are limited while potential costs are great. Erecting barriers to entering the livestock and meat marketing trades by invoking strict licensing requirements is likely to reduce the competitive pressures which have kept prices and net margins low. Imposing new methods of marketing (weighing cattle, grading meat, etc) may satisfy the bureaucrat's inclination to reorganize trade along more verifiable lines but often does little to improve marketing efficiency and may have harmful effects by disrupting trade and raising marketing costs.

Policy Recommendations

Two points dominate the conclusions of the research relevant to the selection and implementation of marketing policy by the Voltaic government. First, market interventions should take into account the proven capability of the marketing network to move cattle long distances at relatively low cost and to adjust to changing market conditions. Policies should be aimed at working with the current structure, not replacing it. Second, projects must be based on more concrete objectives than the commonly referred to "rationalization" of trade, all too often a catchwork for conforming marketing techniques to some modern model.

The following recommendations then are based on the assumptions that government policy objectives include 1) continued reliance on the private sector to carry out most marketing functions, 2) reduction of gross marketing margins, 3) maintenance of a system responsive to changing supply and demand patterns, 4) expansion of livestock and meat exports, 5) reduction of negative marketing externalities and improvement of the social welfare aspects of livestock and meat marketing, 6) encouraging the use of labor intensive marketing techniques and locally produced capital where possible, and 7) improvement of marketing data collection. More specific objectives (e.g., holding down consumer prices or increasing marketing related government revenues) require more specific measures and are not considered here.

Livestock Market Infrastructure.-- These projects should be better justified in the future than they have been in the past. Scales are currently of no use in livestock markets to any one other than researchers; nor are they likely to be in the near future. Attempts to disseminate market information through radio broadcasts are of questionable value. Herdsmen and marketing participants already seem to have good access to such information through traditional sources. On the other hand, collection of statistics and market taxes are appropriate governmental objectives and should be explicitly stated. Thus, markets should be designed to facilitate these goals without disrupting the traditional functioning of the market.

Reorganization of Trade.-- Based on the research findings that marketing is generally competitive and fairly efficient, officials should refrain from restrictive regulation of traders, butchers, and intermediaries which serves to limit competition and increase monopoly power. Instead, policy should be aimed at encouraging competition and reducing barriers to entry. Paperwork and marketing taxes could be streamlined. Not only does the current system encourage fraud and illicit arrangements, it also serves as a barrier to entry.

The data indicate that where major markets are accessible to producers, herdsmen rarely choose to sell their cattle to collectors. Thus, where such markets are lacking, the government could take steps to establish markets by: providing modest infrastructure needs, improving access (waiving patentes, local taxes, or veterinary inspection fees) as inducements to traders to service the new market. The inaccessibility of northern markets during the rainy season limits competition in those markets at that time. Improving road conditions to northern markets would certainly increase competition pressures and provide northern herdsmen with better opportunities to sell during the rainy season.

Transportation. -- Livestock and meat transport is an area for promising interventions. Once again, though, programs should be justified on functional and economic grounds.

(a) Trek Routes. -- These projects are not likely to lower costs or increase trade. Traditionally, drovers have trekked cattle at very low cost without pistes de bétail. The claim of significant weight loss on treks has never been proven. The usefulness of cattle trails lies in lessening conflicts with agriculturalists and improving enumeration of marketing activity. Provision of adequate water resources on the route will encourage drovers to follow the trails.

(b) Truck Transportation. -- Truck transport of cattle, especially to export markets, will undoubtedly gain acceptance as roads are paved and trucking costs decrease. Harassment of truckers by officials should be kept to a minimum.

(c) Rail Transport. -- Improved rail transport presents real possibilities for cost reduction. The most serious problems result from seasonal constraints in rail car availability, excessive duration of shipments, and mechanical problems for refrigerated meat exports. Infrastructure improvements could significantly reduce travel time and improve conditions in the cattle cars. With mortality, forced sales, and shrinkage losses estimated at above 12 percent, there are considerable benefits to be gained from programs which improve the condition of the cattle cars and decrease the time cattle spend in the cars.

Because cattle car rental rates don't reflect seasonal demand, black market deals and/or long waits at the rail head are common during the peak season. Increased rotation of cars during the peak season could relieve the constraint. Lower charges during the off season could encourage exports during that period. Finally, mechanical breakdowns in refrigerated equipment were responsible for a falloff in meat exports in the late sixties and early seventies. However, the dramatic decline in the mid-seventies was more due to non-Sahelian competition in the Ivorian elite market. Whether improvements in transportation technology such as those likely to result from the creation of SATRAF (Societe Africaine de Transport Frigorifique) will be enough to enable Upper Volta to recapture a significant share of that market is not known.

Meat Marketing and Abattoir Construction. -- The lessons of the Abattoir Frigorifique de Ouagadougou should be well heeded. Meat export schemes should play a minor role in total marketing policy. West Africa is no longer isolated from world meat market conditions. The advantage of Sahelian producers lies in the live animal exports. Emphasis on high quality meat exports leaves Upper Volta vulnerable to: world market conditions, efforts at self-sufficiency by coastal countries, high costs of producing high quality beef (usually from expensive fattening operations), transportation problems, and the problem of profitably disposing of the fifth quarter. Furthermore, the modern slaughterhouse involved huge imports of capital goods and resulted in serious disemployment problems in the butcher sector. One must question whether these social costs were considered when the project was evaluated. Certainly they should be, in the future.

Programs to improve market infrastructure in urban meat markets are justified by the social benefits associated with improved sanitary conditions. The possibility of providing clean market stalls, water, public cold rooms close to markets, and slaughter slabs in small town and village markets should be investigated. Current high levels of competition among butchers do not indicate any pressing need to alter sales methods by requiring weighing of meat.

In summary then, improvements in marketing efficiency can best be brought about by fostering healthy competition and providing necessary and appropriate infrastructure. A general reorganization of trade is not necessary: in fact, officials would do well to communicate more effectively with market participants to ascertain their views on marketing needs, project design, and how to implement government policy effectively.

The Role and Focus of Future Research

This study has concentrated on the question of the organization of trade in marketing. Three very clear gaps in information on the livestock sector as a whole were largely untreated: livestock production, meat marketing, and the demand for meat.

On the supply side, the issue of the production function for cattle and beef needs desperately to be addressed. The relationship between traditional stockraisers (Fulani and others) and their herds is the subject of a wide body of anthropological literature (Dupire, 1962, Barral, 1967; Rupp, 1975; and Riesman, 1978). These can be contrasted with the more orthodox economic view of herdsmen as managers of appreciating pieces of capital with the complicating considerations of stream of inputs (supplemental feed, labor, etc.) and outputs (milk, manure, social value, etc.). Some of the economic literature focusing on other geographic regions was cited in Chapter 5. However, work of this type is needed in West Africa to better understand the underlying marketing response of traditional herdsmen.

Other aspects of production are also in need of further attention. Delgado (1977 and 1979) has considered the role of sedentary populations as potential cattle raisers, and the contribution of industrialized production (feedlots) in West Africa is dealt with by Ariza et al (1980). Still more work on the response of commercial units to such variables as costs, prices, and technology would greatly add to the understanding of the supply side of the livestock and meat marketing system.

The area of meat marketing specifically was only scantily dealt with in this volume. A parallel study by Staatz (1979) looked at meat markets in Ivory Coast more intensively. The value of a similar study in Upper Volta or in another Sahelian country would be valuable as a completion of the marketing analysis in producing zones.

The last area of research neglected in this study is the demand for meat. Measures of elasticities of demand (income and price) and a more thorough investigation of potential export outlets for cattle and beef for Upper Volta and other Sahelian countries remain to be done. As these countries develop, the demand side of the market will unquestionably grow and change, placing greater importance on meat quality, form, and packaging.

In addition to these gaps, several issues raised in this study need to be explored further. The theoretical role of intermediaries as price stabilizers and the function of traders as arbitrageurs is one such area. Better information on cattle weights, qualities, and other conditions would facilitate an analysis of regional and temporal price correlation to better measure the efficiency of the marketing system in these matters. Research of a technical nature is required concerning transportation of livestock and meat. Attention needs to be paid to a quantification of weight loss attributable to alternative methods of transportation. The costs of alternatives (e.g. trucking) not currently in use also need to be explored. Finally, more exact calculations of trader margins would enhance the evaluation of market performances.

Some of these suggested areas are very specific to conditions prevailing in Upper Volta, the Sahel, and West Africa. The results of additional research should be made available to policy makers there so that they may direct their efforts to maximize efficiency in the livestock sector. Others of these areas are more theoretical and general, and may suggest new techniques of analysis and applications to other sectors or environments. In either case, continued research will contribute to an improved understanding of the operation of markets in developing countries, so necessary for optimal policy approaches.

FOOTNOTES TO CHAPTER IX

[1]One of the sets of agreements is with the Entente states (Benin, Ivory Coast, Niger, Togo, and Upper Volta) and the other with the members of the CEAO (Ivory Coast, Mali, Mauritania, Niger, Senegal, and Upper Volta). The protocols approved by each are similar and are intended to standardize livestock health and marketing policy. A discussion of the CEBV agreements can be found in Appendix D.

APPENDICES

APPENDIX A

RESEARCH MATERIALS

This appendix contains research materials generated by the author during the field study and referred to in the main body of the text. The materials are copied in the original French form. They include the enumerators' manuals for instructing field staff and the set of questionnaires and forms used to gather data. Each item is identified by a heading in English.

Larry Herman
Economiste
S.A.E.D.
Center for Research on
Economic Development
University of Michigan
Ann Arbor, Michigan, U.S.A.

Drabo Goussina
Ingénieur
S.A.E.D.

MANUEL DES REGLEMENTS D'ENQUETEUR

But et Importance de l'Etude

Cette étude fait l'objet d'une recherche économique sur la commercialisation de bétail en Haute-Volta. Menée par le Centre de recherche sur le Développement Economique de l'Université de Michigan avec la coopération de la Société Africaine d'Etude et de Développement, elle a pour axe de recherche les cinq objectifs suivants :

1) Fournir une description du système de commercialisation de détail en Haute-Volta.
2) Déterminer les coûts et les produits marginaux des commerçants.
3) Identifier les contraintes qui empêchent le développement de la commercialisation du bétail, l'expansion des exportations et l'amélioration du rendement du système commercial.
4) L'évaluation des effets des différentes politiques et interventions gouvernementales sur le commerce du bétail.
5) Comparer la commercialisation des animaux vivants avec celle de la viande refrigérée.

Les objectifs seront recherchés par plusieurs enquêtes aux niveaux des villages (éleveurs) ; marchés de bétail ; commerçants, bouchers, et courtiers en détail et transporteurs.

.../...

Quatre enquêteurs seront placés dans les quatre régions suivantes : Djibo, Kaya Ouagadougou, et Pouyentga où ils rapporteront les activités (entrées et sorties) du principal marché de bétail de la région, enregistreront les ventes d'animaux dans quelques villages d'éleveurs choisis dans la région, et aideront les chercheurs principaux dans la collecte de renseignements relatifs au système de commercialisation du cheptel voltaïque.

On espère que les données des quatre enquêtes constitueront une base originale des connaissances sur la commercialisation de bétail. Les résultats seront analysés (avec ceux de trois autres études en Haute-Volta, en Côte-d'Ivoire, et au Niger) par les chercheurs voltaïques et Américains. Les données permettront d'évaluer le rendement du système commercial et d'identifier les changements nécessaires pour améliorer l'industrie animale voltaïque et de promouvoir tous ceux qui s'y intéressent (éleveurs, commerçants, bouchers, etc...) Cette étude facilitera la planification dans ce secteur important et l'obtention d'une aide extérieure pour amorcer ce développement.

Le rôle de l'Enquêteur.

I. Généralités

En général, l'enquêteur sert de lien entre les commerçants du marché, les producteurs du village, et les chercheurs. Chaque enquêteur couvre un marché de bétail et quelques villages environnants.

La responsabilité principale de l'enquêteur est de maintenir d'excellents rapports de coopération avec les gens des villages et les commerçants aux marchés. Sans cette coopération, la réussite de l'étude est impossible.

Le travail d'un enquêteur n'est pas un travail de bureau. L'étude nécessite que vous soyez sur place chaque jour de marché de bétail et dans un village selon votre programme spécifique. Il se pourrait que vous ayez plus de 40 h de travail pour certaines semaines et certainement moins de 40 h pour d'autres. Vous êtes engagés pour fournir les rapports du marché et effectuer les enquêtes aux village avec les éleveurs, non pas pour accomplir un certain nombre d'heures par semaine au bureau.

.../...

II. Travaux à accomplir

1) Participation dans l'identification de l'échantillon de 20 à 30 éleveurs par village.

2) Prise de contact avec chaque éleveur et effort pour établir des bases d'amitié et de coopération avec les membres de l'échantillon.

3) Administration du "Questionnaire au Niveau des villages" à chaque membre de l'échantillon une fois par mois pour énumérer ses ventes d'animaux pendant le mois d'avant.

4) Assister les chercheurs dans l'administration d'autres questionnaires aux membres de l'échantillon et aux bouchers, courtiers en bétail, et commerçants qui se trouvent dans votre région.

5) Assister chaque tenu ou marché de bétail principal dans votre région et remplir le "Rapport du Marché de bétail." pour énumérer les bovins présentés et vendus, et fournir tout renseignement sur les conditions du marché.

6) Identification et description des exportations (hors du pays) des bovins qui proviennent de votre région par le remplissage du "Rapport sur Exportation."

7) En plus. Il vous sera demandé de faire d'autres travaux relatifs à l'étude. Il est souligné que vous êtes embauchés par les chercheurs pour les aider à accomplir leur travail de recherche, tel qu'ils le conçoivent ! Il ne faut pas revenir un jour dire : on n'a pas été embauché pour ceci ou celà..."

.../...

III. Responsabilités de l'Enquêteur et Fautes Graves

Trois grandes catégories de délits sont jugés suffisamment graves pour mériter le licenciement immédiat sans préavis.

1) Fautes graves de comportement :
   a) Bagarres avec villageois ou gens qui assistent le marché de bétail.
   b) Rapports sexuels avec les filles d'un village.
   c) Manque de respect flagrant pour les villageois ou ceux qui s'occupent avec le marché de bétail.

La constation d'une faute de ce genre revient au chef de village ou perceptcur de marché. Sur sa demande, l'enquêteur sera retiré immédiatement.

2) Malhonneteté dans l'obtention des données :
La création des données fictives pour éviter l'effort de recueillir les données rentables apportera le licenciement immédiat sans préavis.

3) Manque d'assiduité au travail :

Il est très important que l'enquêteur assiste à chaque tenu de marché de bétail, enregistre chaque sortie de bovins par chemin de fer, et soit à son poste dans les villages d'après le programme spécifique, établi pour cette étude. Une absence ou village, du marché, ou de la gare non autorirée par les chercheurs peut amener le licenciement immédiat s'ils jugent la raison de l'absence non serieuse.

En dehors de ces trois grandes catégories de délits, les chercheurs réservent toujours leur droit d'employer des gens qui les aident dans leur étude. Si, à l'avis des chercheurs, un enquêteur, nuit à son travail, pour une raison qui sera seulement aux chercheurs de déterminer, et si une faute grave n'a pas été commise, un préavis de licenciement de 30 jours sera donné. Dans ce cas, tout le matériel de recherche fourni par les chercheurs doit leur être rendu.

Instructions for the Village Herder's Questionnaire p. 1

INSTRUCTIONS POUE LES "QUESTIONS" AU NIVEAU DES VILLAGES"

VILLAGE : IDENTIFIER LE VILLAGE.

DISTANCE : DONNEZ LA DISTANCE DI VILLAGE AU PRINCIPAL MARCHÉ DE BÉTAIL.

Ex : "25 KM DE DJIBO".

DATE : DATEIDE-L'INTERVIEW.

NOM DE SUJET : UTILISEZ LE MÊME NOM CHAQUE FOIS QUE VOUS INTERVIEWEZ LA MÊME PERSONNE ET D'UNE MANIÈRE OU D'UNE AUTRE FAIRE LA DISTINCTION ENTRE DEUX VILLAGEOIS DE MÊME NOM.

ETHNIE : SI L'ETHNIE N'EST PAS ÉVIDENTE, DEMANDEZ-LA AU SUJET.

AGE : D'UNE MANIÈRE DISCRÈTE MARQUEZ SON ÂGE APPROXIMATIF.

QUESTION N° 1 : LA PREMIÈRE FOIS QUE VOUS POSEZ DES QUESTIONS, À TOUT ÉLEVEUR, VOUS DEMANDEZ "PENDANT LE MOIS PASSÉ". PAR LA SUITE À CHAQUE INTERVIEW VOUS DEMANDEZ, "DEPUIS NOTRE DERNIÈRE RENCONTRE "EN RÉFÉRENCE À LA PÉRIODE ENTRE LES VISITES. POSEZ CLAIREMENT VOS QUESTIONS SUR LES CHOSES, SURVEVUES PENDANT LE MOIS DERNIER SEULEMENT. NOUS NE DEVONS PAS ENREGISTRER LES VENTES DEUX FOIS DE SUITE.

FAITES UNE CROIX PRÈS DE "OUI" OU "NON". SI LE SUJET RÉPOND NÉGATIVEMENT ESSAYEZ DE RAFRAÎCHIR SA MÉMOIRE AVEC LA RÉPÉTITION DE CHAQUE ESPÈCE. S'IL NE SE RAPPELLE DE RIEN TOUJOURS, NE CONTINUEZ PLUS AVEC LA PREMIÈRE PAGE, MAIS POSEZ DIRECTEMENT LA QUESTION N° 15.

QUESTION N° 2 : D'ABORD, SOYEZ SÛR D'AVOIR ENREGISTRÉ TOUS LES BOVINS VENDUS EN DEMANDANT EXPRESSEMENT "AVEZ VOUS VENDU DES TAUREAUX DEPUIS MA DERNIÈRE VISITE ?" ET MARQUEZ LE NOMBRE PRÈS OU TYPE. PROCÉDEZ AINSI POUR CHAQUE ESPÈCE :

TAUREAU = MÂLE, NON CASTRÉ, AYANT PLUS DE 5 ANS.
BOEUF = MÂME, CASTRÉ, AYANT PLUS DE 5 ANS.
VACHE = FEMELLE, QUI A DÉJÀ MIS BAS.
VEAU = JEUNES BOVINS AYANT MOINS D'UN AN. MARQUEZ "M" POUR LE MÂLE ET "F POUR LA FEMELLE.
TAURILLON = MÂLE, NON CASTRÉ, AYANT 1 À 5 ANS.
BOUVILLON = MÂLE, CASTRÉ, AYANT 1 À 5 ANS
GÉNISSE = FEMELLE QUI N'A PAS ENCORE MIS BAS.
CHÈVRE = LES CAPRINS.
MOUTONS = LES OVINS
AUTRES = VOUS POUVEZ PORTER LES ÉQUINS, ASINS, CAMELINS ET LES PORCINS QUI SONT VENDUS

N'ENREGISTREZ PAS LES VOLAILLES !

.../...

Instructions for the Village Herder's Questionnaire p. 2

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IDENTIFICATION DE L'ANIMAL : APRÈS AVOIR MARQUÉ LE NOMBRE DE CHAQUE ANIMAL VENDU, VOUS LES ÉNUMÉREREZ PAR LEUR ABRÉVIATION DANS UNE COLONNE. S'IL Y A PLUS DE TROIS ANIMAUX UTILISEZ UNE AUTRE FEUILLE DE QUESTIONNAIRE EN RÉÉCRIVANT L'ENTÊTE EN PORTANT "SUITE 2".

S'IL Y A PLUS DE N'IMPORTE QUELLE ESPÈCE NOTEZ LES AVEC UN NOMBRE. PAR EXEMPLE, S'IL Y AVAIT DEUX TAUREAUX VENDUS, NOTEZ DANS LA PREMIÈRE COLONNE "T-1" ET DANS LA SECONDE "T-2".

UTILISEZ LES ABRÉVIATIONS SUIVANTES :

T = TAUREAU
S = BOEUF (DE L'ANGLAIS STEER)
F = VACHE (FEMELLE)
V = VEAU
TN = TAURILLON
SN = BOUVILLON
G = GÉNISSE
CH = CHÈVRE
M = MOUTON

N'UTILISEZ PAS D'AUTRES ABRÉVIATIONS.

QUESTIONS SUR LA VENTE DES ANIMAUX : N° 3 À 4

POSEZ TOUTES LES QUESTIONS POUR CHAQUE ANIMAL AVANT DE POSER À UN AUTRE ANIMAL. SI LE SUJET DONNE DES RÉPONSES POUR PLUSIEURS À LA FOIS, NOTEZ-LES MAIS SOYEZ SÛR DE NE PAS COMMETTRE DES CONFUSIONS EN PRENANT LA RÉPONSE D'UN ANIMAL POUR CELLE D'UN AUTRE. SI VOUS POUVEZ POSER LES QUESTIONS D'UNE MANIÈRE PLUS SPÉCIFIQUE, POSEZ-LES. PAR EXEMPLE, EN REMPLAÇANT LE MOT "ANIMAL" AVEC L'ESPÈCE OU EN EMPLOYANT LE NOM DE L'ACHETEUR SI CONNU. TOUTE INFORMATION SUPPLÉMENTAIRE DOIT ÊTRE PORTÉE AU VERSO DE LA PAGE SOUS "REMARQUES".

QUESTION N° 3 : VÉRIFIEZ QUE L'ÂGE PORTÉ CORRESPOND BIEN À L'ESPÈCE. UN ANIMAL PRÉALABLEMENT MARQUÉ "TAUREAU" DOIT AVOIR AU MOINS 5 ANS ; SINON L'ESPÈCE DOIT ÊTRE CHANGÉ À TAURILLON. DONNEZ L'ÂGE EN ANNÉES SAUF POUR LES VEAUX. POUR CEUX-CI MARQUEZ L'ÂGE EN MOIS.

QUESTION N° 4 : LA RÉPONSE DOIT ÊTRE UNE OCCUPATION : COMMERÇANT, BOUCHER, OU ÉLEVEUR. EMPLOYER LES ABRÉVIATION "C", "B", OU "E". SI LE NOM DE L'ACHETEUR EST DONNÉ, ÉCRIVEZ-LE AUSSI, AU DESSUS DE L'OCCUPATION.

IL SE PEUT QUE L'ÉLEVEUR REMETTE SON BOVIN AU COURTIER EN DÉTAIL ET QU'IL NE SACHE PAS QUI L'ACHETE. DANS CE CAS, MARQUEZ LA PHRASE "REMIS AU COURTIER" ET ÉCRIVEZ SON NOM SI POSSIBLE. ENSUITE, QUELQUES QUESTIONS DOIVENT ÊTRE MODIFIÉES EN RÉFÉRENCE AU COURTIER AU LIEU DE L'ACHETEUR.

.../...

Instructions for the Village Herder's Questionnaire p. 3

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QUESTION N° 5 : DEMANDEZ D'OÙ VIENT L'ACHETEUR (OU COURTIER) AUSSI SPÉCIFIQUEMENT QUE POSSIBLE: "OÙ HABITE-T-IL ?" NOTEZ, SI POSSIBLE, SA NATIONALITÉ OU SON ETHNIE. MARQUEZ "SAIT PAS" S'IL DIT QU'IL NE SAIT PAS.

QUESTION N° 6 : LA RÉPONSE DOIT ÊTRE "OUI OU"NON" MAIS ESSAYEZ DE DÉTERMINER ET REMARQUER S'IL Y A UNE RÉLATION ENTRE L'ACHETEUR (OU COURTIER) ET LE VENDEUR ; PARENTAGE, AMITIÉ, ETC.

QUESTION N° 7 : SI LA RÉPONSE EST "OUI" VOUS DEVEZ DÉTERMINER COMBIEN DE FOIS LE SUJET VEND AU MÊME ACHETEUR OU REMET AU MÊME COURTIER. VOUS POUVEZ MARQUER DANS LA CASE UN NOMBRE QUI REPRÉSENTERA LE NOMBRE DE FOIS OU UNE PHRASE, "RAREMENT, "SOUVENT," OU"HABITUELLEMENT" SELON LE CAS.

QUESTION N° 8 : SI L'ANIMAL A ÉTÉ REMIS AU COURTIER, MARQUEZ LE MARCHÉ DANS LEQUEL IL A ÉTÉ VENDU. SI L'ACHETEUR ÉTAIT :

A) COMMERÇANT : OÙ L'A-T-IL AMENÉ POUR LE VENDRE ?
B) BOUCHER : OÙ L'A-T-IL EMMENÉ POUR L'ABATTRE ?
C) ÉLEVEUR : OÙ L'A-T-IL EMMENÉ POUR L'ÉLEVER ?

MARQUEZ "SAIT PAS" S'IL NE SAIT PAS.

QUESTION N° 9 : DANS LE CAS D'UNE BÊTE REMISE AU COURTIER, OÙ A-T-IL ÉTÉ REMIS. DANS LES AUTRES CAS, NOTEZ L'ENDROIT OÙ L'ÉLEVEUR ET L'ACHETEUR SE SONT ENTENDUS. REMARQUEZ QUE CE N'EST PAS TOUJOURS LE MÊME ENDROIT OÙ ILS ÉCHANGENT L'ANIMAL ET LE PAIEMENT.

QUESTION N° 10 LA QUESTION PEUT ÊTRE "COURTIER", "LUI-MÊME", OU QUELQU'UN AUTRE QUI A ÉTÉ DÉBIGNÉ PAR LE SUJET.

QUESTION N° 11 A PART LE VENDEUR ET L'ACHETEUR QUI D'AUTRES ONT PARTICIPÉ À LA VENTE ? SONT-ILS TÉMOINS OU INTERMÉDIAIRES DE LA VENTE ? NOTEZ LES LIENS DE PARENTÉ AVEC LE VENDEUR OU L'ACHETEUR.

QUESTION N° 12 : DEMANDEZ LE PRIX DE VENTE EN FRANCS CFA. ECRIVEZ-LE CHIFFRE EN BAS DE LA CASE.

QUESTION N° 13 : SI L'ÉLEVEUR A ÉTÉ PAYÉ AU COMPTANT, ÉCRIVEZ "COMP. X" MARQUEZ LA SOMME PAYÉE EN ARGENT COMPTANT. MÊME SI L'ÉLEVEUR DIT QU'IL A ÉTÉ PAYÉ AU COMPTANT; SOYEZ SÛR DE POSER LES QUESTIONS SUR CRÉDIT. MARQUEZ LA RÉPONSE "CRÉDIT : TANT DE FRANCS, TANT DE TEMPS". PAR EXEMPLE : UN ACHETEUR QUI PREND L'ANIMAL EN JANVIER EN PROMETTANT DE PAYER 20 000 FRANCS EN MARS, "CRÉDIT : 20 000 F. 2 MOIS."

SI L'ÉLEVEUR A DÉJA ÉTÉ ENDETTÉ PAR L'ACHETEUR, NOTEZ-LE COMME CRÉDIT AVEC UN SIGNE MOINS (-) ET EXPLIQUEZ AU VERSO SOUS "REMARQUE."

.../...

Instructions for the Village Herder's Questionnaire p. 4

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QUESTION N° 14 : PARFOIS UN COMMERÇANT DONNE UNE PART OU TOUT LE PRIX DE L'ACHAT EN MARCHANDISE, UN SAC DE GRAIN, DES HABILLEMENTS, TISSUS BICYCLETTE, DU MÊME SOUVENT UN AUTRE ANIMAL. SI LE SUJET RÉPOND QU'IL A REÇU DES MARCHANDISE EN PLUS DE L'ARGENT, MARQUEZ "+" DEVANT LA SORTE. S'IL A RÉÇU DES MARCHANDISES À LA PLACE DE L'ARGENT MARQUEZ "-". APRÈS AVOIR ÉCRIT LA SORTE DE MARCHANDISE, ESSAYEZ DE TROUVER LA VALEUR APPROXIMATIVE ET MARQUEZ-LA

QUESTION N° 15 À 18 : CES QUESTIONS SERONT ADRESSÉES À TOUT LE MONDE, MÊME À CEUX QUI N'AURONT PAS VENDU DES ANIMAUX PENDANT LE DERNIER MOIS.

QUESTION N° 15 : D'ABORD, MARQUEZ LE NOMBRE TOTAL DE GENS QUI, À LA CONNAISSANCE DE L'ÉLEVEUR, A PASSÉ AU VILLAGE POUR CHERCHER DES ANIMAUX. PUIS DÉNOMBREZ LES BOUCHERS ET LES COMMERÇANTS ET PRÉCISEZ LA NATURE DE LEUR RECHERCHE(BOVINS OU PETITS RUMINANTS) PAR EXEMPLE S'IL Y AVAIT 6 ACHETEURS QUI ONT PASSÉ, 4 COMMERÇANTS DE BOVINS, 1 COMMERÇANTS DE CHÈVRES ET MOUTONS, ET UN BOUCHER QUI CHERCHAIT DES CHÈVRES OU MOUTONS, MARQUEZ" 6 ACHETEURS, 4C - BOVINS, 1C - CH ET M, 1B - CH ET M"

TOUTE AUTRE INFORMATION SPÉCIFIQUE (NOMS DE L'ACHETEUR, PROVENANCE, ETC.) SERA ENREGISTRÉE SOUS "REMARQUES".

QUESTION N° 16 : SI L'ÉLEVEUR A ESSAYÉ INFRUCTUEUSEMENT DE VENDRE UN ANIMAL OU SI UN ACHETEUR A ESSAYÉ INFRUCTUEUSEMENT D'ACHETER UN DE SES ANIMAUX, NOTEZ-LE. DÉCRIVEZ LA VENTE TENTÉ, AVEC QUI, L'ENDROIT, L'ESPÈCE D'ANIMAL, POURQU'OI L'ÉLEVEUR NE L'A PAS VENDU.

QUESTION N° 17 : POSEZ LA QUESTION EN EMPLOYANT LE NOM DU MARCHÉ PRINCIPAL DANS VOTRE RÉGION ET ENCERCLEZ-LE SI LA RÉPONSE EST NON" PROCÉDEZ DIRECTEMENT À LA DERNIÈRE QUESTION N° 18. AUTREMENT, CONTINUEZ AVEC LA DEUXIÈME ET TROISIÈME PARTIES DE CETTE QUESTION.

QUESTION N° 18 : SI LA RÉPONSE EST "OUI" VOUS POUVEZ ESSAYER DE DEMANDER POURQU OI ET QUELLE SORTE.

S'IL DIT QU'IL NE SAIT PAS MARQUEZ "SAIT PAS".

REMARQUE : - NOTEZ DANS CETTE RUBRIQUE TOUTE INFORMATION SPÉCIFIQUE ET IMPORTANTE NE FIGURANT PAS SUR LE QUESTIONNAIRE.

Village Herders' Monthly Livestock Marketing Questionnaire p. 1

QUESTIONNAIRE AU NIVEAU DES VILLAGES
à propos de la vente des animaux

Village _____ Distance _____ Date _____ Enquêteur _____

Nom de sujet _____ Ethnie _____ Age _____

1. Avez-vous vendu des animaux pendant le mois passé (ou, depuis notre dernière rencontre)? Oui _____ Non _____ (procédez à 15)

2. Quelles sortes d'animaux et combien de chaque espèce?
Taureaux _____ Boeufs _____ Vaches _____ Veaux _____ Taurillons _____
Bouvillons _____ Génisses _____ Chèvres _____ Moutons _____ Autres _____

(Pour chaque animal vendu posez les questions suivantes:)

Identification de l'animal :			
3. Quel âge l'animal avait-il?			
4. Qui a acheté l'animal? ("C", "B", "E", ou "Remis au courtier")			
5. D'où vient l'acheteur (courtier)?			
6. Est-ce que vous vous connaissiez avant la vente?			
7. Avez-vous déjà vendu (remis) d'autres animaux à lui? Combien de fois? ("rarement", 'souvent", "habituellement")			
8. Où a-t-il emmené l'animal?			
9. Où est-ce que la vente a eu lieu? ("au village", "au marché de -", "en brousse")			
10. Qui a vendu l'animal?			
11. Qui a assisté à la vente ? ("courtier", "témoins",...)			
12. A combien avez-vous vendu l'animal?			
13. L'acheteur a-t-il payé au comptant? L'a-t-il acheté à crédit? Pour combien de temps?			
14. Avez-vous accepté des marchandises à la place (-) ou bien en plus (+) de l'argent? Quelles sortes de marchandises? Quelle est la valeur approximative?			

15. Combien de gens sont venus au village le mois passé pour chercher des animaux à acheter? Qui? Pour chercher quelles sortes d'animaux?

16. Avez-vous discuté avec quelqu'un de la vente de quelques-uns de vos animaux et qui n'ont pas été vendus? Avec qui? Sur quels animaux?

17. Est-ce que vous êtes informé sur les prix actuels de bétails au marché de -- Djibo -- Kaya -- Ouagadougou -- Pouytenga --? (encerclez un)

Oui_____ Non_____

Le niveau de prix est actuellement: bas_____; moyen_____; haut_____
Comment vous êtes-vous renseigné?

18. Avez-vous l'intention de vendre des animaux ce mois?

Remarques:

Village Herders' Personal Questionnaire p. 1

QUESTIONNAIRE AUX ELEVEURS

LIEU DATE
ENQUÊTEUR

I. GENERALITES

A. NOM : AGE :
ETHNIE : RELIGION :

B. Où êtes-vous né ?
(s'il n'est pas né dans son village actuel)

Depuis quand êtes-vous dans cette région ? :

C. Combien de membres votre famille comprend-elle ? (ceux qui sont à votre charge normalement et ceux qui demeurent avec vous et qui sont alimentés par vous)

Femmes : Fils : Filles :

Vieux : Autres :

D. Quelle est votre profession principale ?

Eleveur : Cultivateur :
Boucher : Commerçants d'animaux :
Commerçant (autre, spécifier)
Tailleur Tisserand
Autre (spécifier) :

Quelles sont vos occupations secondaires

Village Herders' Personal Questionnaire p. 2

E. Parlez-vous français ? :

Est-il lettré ?
Français :
Arabe :
Chiffres :

Avez-vous suivi l'école ?

Quel niveau ?

Où :

II. RESSOURCES AGRICOLES

A. CULTURES

1. Avez-vous des champs de cultures ?

2. Où sont-ils ?

3. Que cultivez-vous ? (marquer "X")

Petit mil	Sorgho	Maïs	Riz
Arachide	Coton	Haricots	
Pommes de terre	Cultures maraîchères		

Arbres fruitiers :
Autres (spécifier) :

4. Qui cultive vos champs ?

a) vous-même :
b) des membres de votre famille :
c) des salariés :
d) invitation collective des villageois :

5. Quels produits agricoles vendez-vous ?

B. ELEVAGE

1. Qu'élevez-vous (demandez si possible le nombre) :

a) bovins

S T F V, Tn, Sn, G

b) Moutons

c) Chèvres

d) Volaille

e) Autres (spécifier) :

2. Qui s'occupe de vos animaux ?

a) Vous-même :

b) Vos fils : (indiquer combien et leurs âges)

c) d'autres parents (spécifier) :

d) Les gardez-vous avec ceux d'autres éleveurs

e) Les confiez-vous à d'autres ? :

3. (Pour ceux qui confient leurs animaux à d'autres)

a) A qui confiez-vous vos animaux ?

b) Que reçoit-il pour ses services de gardiennage ?

i) A-t-il le droit de prendre du lait ?

ii) Lui donnez-vous des animaux (combien de fois, Quelles espèces ?) :

iii) Lui donnez-vous des céréales ? (combien et quand ?)

iv) Lui donnez-vous des champs pour ses propres cultures ?

v) Lui donnez-vous de l'argent (combien et quand ?)

vi) Autres :

c) Pourquoi confiez-vous vos animaux à quelqu'un ?:

4. Gardez-vous des bovins pour quelqu'un d'autre ?

a) Pour qui ?

b) Combien d'animaux gardez-vous pour lui ?

c) Depuis quand gardez-vous ses animaux ?

d) Que vous donne-t-il pour vos services de gardiennage ?

i) Avez-vous le droit de prendre du lait ?

ii) Vous donne-t-il des animaux (combien de fois et quelles espèces)

iii) Vous donne-t-il des céréales ? (combien et quand)

iv) Vous donne-t-il des champs pour vos propres cultures ?

v) Vous donne-t-il de l'argent ? (combien et quand)

5. Comment alimentez-vous vos animaux ?

a) Après la récolte ?

b) Pendant la saison sèche ?

c) Pendant l'hivernage ?

d) Pendant la période de culture ?

e) Donnez-vous un supplément à l'alimentation naturelle de vos animaux ?

Avec quoi :

Quand

Village Herders' Personal Questionnaire p. 7

-7-

6. Vos animaux font-ils la transhumance ?

a) Où ? :

b) Pendant quelle saison :

c) Qui les emmène ? :

7. Faites-vous vacciner vos bovins ?

a) Tous La plupart

La moitié : Quelques-uns :

Aucun :

b) Chaque année ?

c) Qu'est-ce qui vous empêche de les faire vacciner ?

Village Herders' Personal Questionnaire p. 8

-0-

III. QUESTIONS ECONOMIQUES

A. Besoins alimentaires

1. Combien de mil utilisez-vous (avec votre famille) par

   jour : semaine :
   mois :

2. Vous arrive-t-il d'être obligé d'acheter des céréales ? :

   a) Quand :

   b) Chez qui vous approvisionnez-vous en céréales ?

   c) Combien coûtent les céréales (précisez la quantité et la saison)

   d) Comment financez-vous ces achats ?

B. Vente du bétail

1. Quand vendez-vous vos animaux ? Pour quelle raison ?

2. Quels animaux vendez-vous ? (âge, espèce, taille) :

3. Comment choisissez-vous l'animal que vous vendez ? :

4. Où vendez-vous vos petits ruminants ? :

Village Herders' Personal Questionnaire p. 9

5. Où vendez-vous vos bovins ?

6. Avez-vous un courtier habituel ?

a) Comment l'avez-vous choisi :

b) Etes-vous un de ses parents ? :

c) Est-il le courtier de tous ceux qui viennent de votre village ? :

7. Vendez-vous quelquefois à crédit ?

a) A qui :

b) Quelle est la durée ordinaire de ce crédit.

8. Empruntez-vous quelquefois à un commerçant en bétail en payant l'animal plus tard :

a) Quand le faites-vous ?

b) Combien de temps après le prêt prend-il l'animal?

c) Comment choisissez-vous l'animal qui remboursera le prêt :

9. Combien de fois par an allez-vous au marché du bétail de (Djibo, Kaya, Pouytenga) :

a) Comment vous renseignez-vous sur le prix du bétail ?

b) Essayez-vous de vendre vos animaux quand le prix est élevé ?

10. Qu'est-ce qui vous empêche de vendre plus d'animaux :

a) le prix est trop bas

b) le manque d'animaux

c) peur de perte en cas de sécheresse, etc..

d) vous n'avez pas besoin d'argent :

e) autres

Market Reports p. 1

RAPPORT DU MARCHE DE BETAIL

Lieu_____ Date_____ Jour_____

Préparé par_____ Poids : par bascule_____
estimé_____

Nombre de bovins présentés_____ Remarques généraux:
Nombre de bovins vendus_____
Nombre de groupes présentés_____
Nombre de bouchers _____
Nombre de commerçants _____

Abréviations : S - bouvillon B - boucher R - par train
T - taureau BG - groupe de bouchers P - par pied
F - vache C - commerçant L - par camion
V - veau CG - groupe de commerçants

Groupe : ## de bovins ## de vendeurs provenance	sexe	âge	poids	prix	acheteur	destination et moyen de transport	Remarques : (provenance, forme et santé, conditions de vente)

Market Reports p. 2

Groupe : ## de bovins ## de vendeurs provenance	sexe	âge	poids	prix	acheteur	destination et moyen de transport	remarques : (provenance forme et santé conditions de vente)

Export Reports p. 1

RAPPORT D'EXPORTATION

Export vers_____ Lieu de départ_____

Date_____ Préparé par_____ Poids : Par Bascule_____
Estimé_____

Nom ou numéro du Propriétaire_____

Nombre de propriétaires_____

Nombre de convoyeurs_____

Nombre de Bovins_____

Moyen de Transport :
R - par train
P - à pied
L - par camion

Composition de Troupeau

Taureaux_____ Taurillons_____

Boeufs_____ Bouvillons_____

Vaches_____ Génisses_____

Itinéraire : Départ_____

_____ Destination finale

Dépenses

Remarques :

Patente _____

Droit de parc _____

Droit de Marque _____

Terme (courtier) _____

Visite sanitaire _____

Certificat d'origine _____

D'autres taxes ou frais_____

Convoyeurs et bergers _____

Transport _____

Douane _____

D'autres _____

TROUPEAU	_____
TOTAL	_____

Export Reports p. 2

Espèce	Age	Poids	Prix	Date et lieu d'achat

Export Arrival Instructions p. 1

INSTRUCTIONS RELATIVES AUX RELEVES DES DONNEES STATISTIQUES, DES ARRIVAGES DES WAGONS A BESTIAUX A ABIDJAN

L'EN-TETE

Donne des renseignements sur le lieu où le rapport a été écrit, et aussi le nom de l'enquêteur. Ici, le lieu est ABIDJAN PORT BOUET. L'enquêteur portera son nom et son prénom devant

Préparé par.....

Exemple d'en-tête rempli :

Préparé par DIALLO Amadou, enquêteur
A ABIDJAN Port Bouet Le 14-9-76

COLONNE 1

On inscrira dans cette colonne la date effective d'arrivée des wagons. Cette date ne correspond pas forcément avec la date de l'enquête. Il est souhaitable cependant que l'arrivée ait lieu en présence de l'enquêteur pour qu'aucun détail ne lui échappe. Il n'est pas superflu d'ajouter -si on le peut- l'heure exacte de l'arrivée. Les agents de RAN aussi bien que le convoyeur pourront donner ce renseignement.

Exemple :

Date d'arrivée des wagons : 14-9-76 à 07h30

COLONNE 2

On portera dans cette colonne le n° porté sur le wagon et qui permet de l'identifier. Tous les n° des wagons des bestiaux seront portés sur la feuille de rapport.

Si le nombre de wagons dépasse le nombre de lignes, on prendra une autre feuille de rapport sur laquelle on

reportera la même en-tête. Il ne doit pas exister un numéro identique pour 2 wagons.

Exemple : n° des wagons :

H 12 - 614
H 12 - 408
H 13 - 514

COLONNE 3

Il s'agit d'inscrire dans cette colonne le nom de la ville où le wagon a été chargé en bovins. On s'informera auprès du convoyeur ou de l'agent, de l'abattoir.

COLONNE 4

Donner ici la date effective de départ des wagons de leur lieu de chargement. Des informations peuvent être données à ce sujet par les agents de la RAN ou le convoyeur.

Exemple : Date de départ

Ouagadougou le 13-9-76 à 23 h 30.

COLONNE 5

Porter dans cette colonne le nombre effectif de bovins chargés dans chaque wagon au lieu de départ ici compris les pertes éventuelles même pendant le chargement.

Il est très important de signaler qu'on ne doit pas se référer à la feuille de route de la RAN, qui donne souvent le même nombre de bovins chargés. Seul le convoyeur doit donner un chiffre correct de bovins chargés.

COLONNE 6

Cette colonne concerne le nombre de bovins vivants déchargés. Si des cadavres de bovins sont déchargés, on portera le nombre dans la colonne 7 sous cadavres de bovins dans le wagon

COLONNE 7

On portera dans cette colonne le nombre exact de cadavres de bovins découverts à l'arrivée du wagon.

COLONNE 8

Il s'agit comme pour la colonne 7 du nombre de mortalité, seulement dans cette colonne on portera les cadavres jetés hors du wagon en cours de voyage avant l'arrivée à destination. Seul le convoyeur peut donner des renseignements exacts à ce sujet.

COLONNE 9

Il s'agit de porter le nombre exact de bovins vendus en cours de route avant l'arrivée à destination. Cela n'a pas lieu généralement ; on ne manquera pas de le noter si cela a lieu.

VERSO DE LA FEUILLE

Au verso de votre feuille de rapport, vous pouvez mentionner les remarques qui vous semblent intéressantes. Vous pourrez par exemple noter le motif qui a occasionné la vente de certains bovins en cours de voyage. Il n'est pas sans intérêt de mentionner le nom du convoyeur et aussi les noms des propriétaires des bovins, ou même le nom des représentants des propriétaires des bovins.

NOTA : Nous insistons sur le fait qu'il faut tout d'abord chercher à remplir correctement le rapport, avant de songer aux remarques du verso car ces remarques sont de 2ème ordre et les relevés statistiques du rapport sont d'une importance capitale.

Export Arrival Forms

RAPPORT SUR LES ARRIVAGES DES WAGONS A BESTIAUX

Préparé par .....

Le ..... A.....

1	2	3	4	5	6	7	8	9
Date d'arrivée des wagons	N° des wagons	Provenance	Date de départ	Nbre de bovins chargés	Nbre de bovins déchargés	Nbre de mortalité		Vente au cours du voyage
						Cadavres dans le wagon	Cadavres jetés en cours de route	

Abattoir Weighing Forms

ETUDE SUR LE RENDEMENT DE CARCASSE

Nom du Boucher	N° Commercial	Espèce	Poids vif	Robe	Prix	Poids de carcasse	Prix par kilo

METHODOLOGIE
DE L'ETUDE SUR LA COMMERCIALISATION ET LA CONSOMMATION INTERIEURE DE LA VIANDE DE BOEUF

BUT DE L'ETUDE:

Cette étude est un volet de l'étude générale entreprise par le Centre de Recherche sur le Développement Economique de l'Université de Michigan avec la coopération de la Société Africaine d'Etudes et de Développement sur la commercialisation du bétail en Haute Volta.

Cette étude aura pour ambition de dégager les différents coûts et profits marginaux des différents agents économiques de la chaîne commerciale depuis l'abattoir jusqu'au consommateur.

METHODOLOGIE:

La collecte des données se fera en deux parties:

a) A l'abattoir, avant embarquement de la viande vers la boucherie, les boutiques, les hôtels et les établissements publics ou privés. A ce niveau les entretiens avec les commerçants et les bouchers permettront de saisir la distribution des différentes composantes des prix et aussi peut-être les relations qui les affectent.

b) A partir de la boucherie, l'observation et les pesées des découpes, des différentes parties de l'animal faciliteront une étude comparative des prix de détail et de gros de l'animal abattu, de la carcasse, et du 5ème quartier.

Les observations hebdomadaires des poids et des prix des carcasses se feront ainsi que la suivie de la distribution des carcasses, des arrières et des avants dirigés vers la Côte d'Ivoire, les hôtels, les boutiques et la boucherie.

La distribution des prix du 5ème quartier sera recherchée mensuellement à l'abattoir frigorifique.

En détail, nous verrons les ventes opérées dans les boutiques, les super-marchés, notamment au Grand Marché où l'animal sera divisé en ses parties vendues au détail. Les pièces, telles que foie, coeur, reins, etc... ne seront pas pesées sauf si elles sont vendues par morceau. Pour la viande vendue par morceaux (bosse, viande, tas) nous ferons des pesées des différentes composantes du morceau (chair, graisse, abats et os).

CONCLUSION:

Avec cette étude en faisant la différenciation des tas avec os, tas sans os, abats, nous espérons évaluer la demande et la consommation des protéines animales, et aussi les différentes échanges de protéine. Ainsi un consommateur qui achète tant de francs d'abats au lieu de tant de francs de chair par exemple, perd ou gagne tant de grammes de protéines animales pour le même prix.

Il sera, d'autre part, beaucoup plus facile de faire la comparaison de la commercialisation des animaux vivants avec celle de la viande.

On pourra mesurer l'influence des variations des prix des animaux en amont de l'abattoir et sa répercussion au niveau du consommateur.

Conjointement avec l'étude du marché ivoirien menée par un confrère, il sera possible de dégager des enseignements précieux en intéressant l'exportation de la viande.

PIECE	DETAIL				GROS		
	UNITE VENDUE	ANALYSE	FREQUENCE	COUT/MOIS	UNITE VENDUE	ANALYSE	FREQUENCE
Cervelle	Unité	Observations	1 par semaine	-	Unité ou avec la tête	Observations	1 par mois
Coeur	Unité	Achats et Observations	1 par semaine	-	Unité ou avec des abats	Observations	1 par mois
Foie	Unité ou morceau	Achats-pesages	2 par mois	-	Unité ou avec des abats	Observations	
Langue	Unité	Achats et Observations	1 par semaine	-	Unité ou avec la tête	Observations	
Rognon	Unité	Achats et Observations	1 par semaine	-	Le paire ou avec des abats	Observations	1 par mois
Queue	Unité	Observations	1 par semaine	-	Unité ou avec des abats	Observations	1 par mois
Gorge et morceaux de la bouche	Ensemble	Observations	1 par semaine	-	Avec la tête	Observations	1 par mois
Pattes	Unité ou les quatre (4)	Observations	1 par mois	-	Les 4 ou avec des abats	Observations	1 par mois
Tête	Unité	Observations	1 par mois	-	Moitié ou avec des abats	Observations	1 par mois
Tripes et autres abats	Tas	Achats-pesages	4 par mois	400 F	Les abats ensemble	Observations	1 par mois
Bosse	Morceau	Achats-pesages	4 par mois	400 F	Avec la carcasse	-	-
Filet	Unité, morceau par Kg (1)	Achats-pesages Observations	1 par mois	-	Unité	Observations	1 par semaine
Viande sans os (2)	morceau, par Kg (1)	Achats-pesages	2 par mois	-	Avec la carcasse	-	-
Viande avec os (3)	Morceau ou par Kg	Achats-pesages Décomposition	2 par mois	-	Avec la carcasse	-	-

PIECE	DETAIL				GROS		
	UNITE VENDUE	ANALYSE	FREQUENCE	COUT/MOIS	UNITE VENDUE	ANALYSE	FREQUENCE
Tas (viande-abats-os) ( )	25F, 50F, 100F	Achats-pesages Décomposition ( )	6 par semaine	1400-1800F	Avec carcasse	-	-
Tas avec os	25F, 50F 100F	Achats-pesages Décomposition ( )	6 par semaine	1400-1800F	Avec carcasse	-	-
Tas sans os	25F, 50F 100F	Achats-pesages Décomposition ( )	6 par semaine	1400-1800F	Avec carcasse	-	-
Avants	-	-	-	-	Quartier	Observations et pesages à l'abattoir	5 carcasses par semaine
Arrières	-	-	-	-	Quartier	Observations et pesages à l'abattoir	5 carcasses par semaine
Abats	-	-	-	-	Ensemble	Observations à l'abattoir	5 carcasses par semaine

(1) La viande n'est presque jamais vendue par kilogramme au marché comme dans les boutiques.

(2) Bifteck, faux filet, et d'autres découpes sans os.

(3) Côtelette et d'autres découpes avec os.

(4) Préparation et pesage de la viande, des os, de la graisse et des abats.

(5) Compris les morceaux de viande, d'os, de poumons, de reins, de bouyou, etc...

Retail Meat Price Study Form

ETUDE SUR LA VENTE AU DETAIL DE VIANDE

							COMPOSITION								
							CHAIR		GRAISSE		ABATS		OS		
DATE	MARCHÉ	ACHAT	PIÈCE	PRIX	KG	F/KG	KG	%	KG	%	KG	%	KG	%	REMARQUES

Butcher, Merchant and Intermediary Questionnaire p. 1

Questionnaire de Bouchers, Commerçants et Courtiers

Lieu_____ Date_____ Enqueteur_____

I Generalités

A. Nom_____ Age_____ Ethnie_____ Religion_____

B. Profession principale_____ Secondaire_____

C. Resources Agricoles:

1) Elevez-vous des animaux?

bovins_____ ovins et caprins_____ porcins_____ autres_____

où gardez-vous vos animaux?

Qui garde vos animaux?

2) Avez-vous des champs de cultures

où sont-ils?

Que cultivez-vous? (Indiquez 'vendu' ou'consumation')

mil ou sorgho_____ maïs_____ riz_____

arachide_____ coton_____ cultures maraicheres_____

arbres fruitiers_____ autres_____

Qui cultive vos champs? a) les membres de votre famille

b) des salariers

c) invitation collective des villageois

D. Investisements:

1) Avez-vous des proprietés?

terrain_____ immeuble_____ vehicules de commerce_____

2) Etes-vous actionaire dans une société?

E. Renseignements individuels:

1) ancien combattant; pension utilizé pour commerce?

2) nombre de membres de votre famille

3) vehicules personnels

4) lettré

5) domicile Eaux? Courant?

Butcher, Merchant and Intermediary Questionnaire p. 2

(2)

II Le Passé

A. Où êtes-vous né?

B. Quelle est la profession de votre père?

C. Avez-vous fait l'école? Quel niveau?

D. Quelle était votre premiere profession?

E. Entrée dans la profession principale:

1) Quand avez-vous commencé de travailler dans la profession?

2) En quelle qualité avez-vous commencé?

3) Etiez-vous apprenti boucher? Où?

4) Etiez-vous convoyeur ou agent pour un autre commerçant? Où?

5) Comment avez-vous financé votre entrée dans la profession?

6) Avez-vous fait la boucherie (commerce de bétail) ailleurs?

.Butcher, Merchant and Intermediary Questionnaire p. 3

(3)

III Ravitaillement

A. Vous arrive-t-il d'employer quelqu'un pour acheter des animaux pour vous?

1) qui?

2) comment?

B. Où achetez-vous des animaux?

1) en brousse directement des éleveurs

2) au quels marchés (indiquez lq proportion des achats)

3) Achetez-vous à d'autres bouchers ou commerçants hors du marché?

4) Utilisez-vous les courtiers (intermediaires)?

Combien donnez-vous au courtier par bête? (Indiquez le marché)

5) Avez-vous des fournisseurs de bêtes habituels (c.a.d. vendeurs— soit commerçants; soit courtiers, soit éleveurs)?

Expliquez.

6) Achetez-vous des animaux pour d'autre bouchers ou commerçants?

Expliquez.

C. Combien de bovins achetez-vous par semaine?

par mois?

D. Gardez-vous un stock d'animaux de boucherie (de commerce)?

1) Combien de bêtes aimez-vous garder? Maximum?

2) Est-ce que vos stocks varient selon la saison?

Comment et pourquoi?

Butcher, Merchant and Intermediary Questionnaire p. 4

(4)

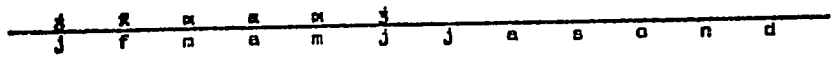
E. Quelles sortes d'animaux achetez-vous? (Indiquez la proportion)

1) boeufs_____ taureaux_____ vaches_____ veaux_____

2) jeunes_____ animaux d'embouche_____ animaux de reforme_____

3) gross_____ moyen_____ maigre_____

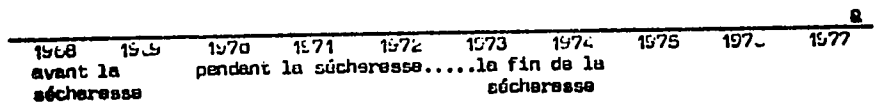
F. Quelles sont les variations saisonnieres que vous rencontrez pour vous approvisionner en bêtes?



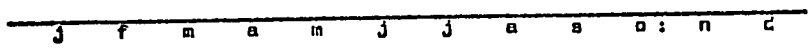
Comment venez-vous à bout de cette difficulté?

G. Prix d'animaux; Prennant le cas d'un boeuf d'embouche de six ans et de bonne qualité, à combien estimez-vous son prix dans les situations suivantes:

1) evolution de prix



2) variations saisonnieres



3) variations spatiales: à présent aux marchés suivants

a) Markoye Déou Gorom-Gorom Seytenga Djibo

b) Ouagadougou Kaya Pouytenga Léo

c) Koudougou Yatenga Lobo-Dioulasso

d) Niger (Téra) Ghana (Paga) Côte d'Ivoire (Abidjan)

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(5)

H. Achetez-vous à crédit?

1) Quelle proportion de vos achats sont à crédit?

2) Quelle est la durée ordinaire de ce crédit?

I. Quels sont les frais d'approvisionnement d'animaux?

1) courtier

2) commission au agent

3) movement d'animaux et gardinage

4) autres

IV Abattage

A. Combien d'animaux abattez vous par jours?

par semaine?

B. Qui prépare la carcasse?

1) abattoir frigorifique

2) des apprentis (combien)

3) lui-même

C. Quelles sont les frais d'abattage?

1) ~~[illegible]~~ Patente de boucherie

2) Droit d'abattage

3) paiement à l'égorgeur

(6)

4) paiement aux apprentis ou ouvriers

5) inspection sanitaire

6) transport de carcasse au marché

7) autres

V Vente de Viande en Gros

A. Vendez-vous en gros?

B. Vos clients comprennent-ils (précisez dans la measure possible)

1) ~~Institutions~~ Hotels (européens)

2) Super marchés ou boucheries européens

3) Institutions

4) Restaurants (Africains)

5) Vendeurs de viande grillé

6) bouchers détaillants

7) étrangers

8) autres

Butcher, Merchant and Intermediary Questionnaire p. 7

(7)

- Repartition de produits animaux

Partie	Acheteurs	Prix
peaux		
avants		
arrieres		
filet		
tête		
pattes		
boyaux		
langue		
rognons		
foie complet		
autres parties		

D. Vendez-vous sur contrat?

A qui?

E. Vendez-vous à crédit?

1) A qui?

2) Quelle est la durée ordinaire de ce crédit?

VI Vente de Viande au Détail

A. Quelle proportion de vos ventes sont au détail?

B. Où vendez-vous de viande au détail?

C. Quelle proportion de vos ventes au détail représentent les tas?

Butcher, Merchant and Intermediary Questionnaire p. 8

(d)

D. Avez-vous des agents (apprentis) qui s'occupent de vos ventes au détail?

Comment sont-ils rétribués?

E. Confiez-vous de la viande à vendre à d'autres personnes?

1) Aqui?

2) Les recettes de la vente de cette viande, comment sont-elles partagées?

F. Vendez-vous au détail à crédit?

G. Comment écoulez-vous les invendus?

H. Vendez- vous la viande grillé?

Quelle proportion de vos ventes au détail représentent la viande grillé?

VII Exportation de Viande

A. Exportez-vous de la viande?

1) où?

2) Quelles parties?

3) Comment transportez-vous la viande?

B. Combien exportez-vous? (carcasses, arrieres, quartiers, ou kilo par semaine ou par mois)

C. Comment vendez-vous la viande exportée?

1) Avez-vous un agent qui vend pour vous à la destination?

2) A qui vendez-vous? Sur contat? Expliquez.

3) A quelle prix vendez-vous cette viande?

(%)

D. Quelle sont les frais d'exportation de la viande?

1) droit de chambre froide à l'abattoir

2) transport à la gare R (aéroport) et chargement de viande

3) transport (train, avion ou camion) à la destination

4) douane et taxes

5) coûts de débarquement

6) autres dépenses

VIII Revente d'Animaux—Exportation

A. Où revendez-vous vos animaux?

B. Vendez-vous avec un courtier?

1) Utilisez-vous toujours le même courtier?

2) Etes-vous parentées?

3) Est-il le logeur pour vos convoyeurs ou pour vous?

4) Est-ce que vous le payez pour ses services? Combien?

C. Vendez-vous vous mêmes ou par un agent (convoyeur)?

Est-ce que le convoyeur peut discuter le prix?

D. A qui vendez-vous?

1) Bouchers grossistes

2) Bouchers détaillant

3) Exportateurs

E. Combien d'animaux exportez-vous par mois?

1) Exportez-vous pendant toute l'anée?

2) Quelle est l'époque le plus active?

....le moins active?

F. Comment vous renseignez-vous sur les prix aux marchés où vous vendez?

G. Comment transportez-vous vos animaux?

1) Quelle est la fréquence de mortalités?

2) A combien estimez-vous la perte de poid (en valeur ou en kg perdu) pour un boeuf transportú

a) à pied (pour un durée...)

b) par train (pour un durée...)

3) Quels sont les problems que vous rencontrez en transpotant vos animaux?

H. Quels sont les frais d'exportation d'animaux?

1) Patente de marchand de bétail

2) Gardinage en trousse avant le voyage

3) Preparation du wagon et chargement des bêtes

4) Transport à destination

5) douane et taxes

6) convoyeur (salaire et dépense)

7) coûts de débarquement (gardinage, droit de marché, etc.)

8) Autres

(11)

IX Organisation des Affaires

A. Travaillez-vous pour votre propre compte?

Comment financez-vous vos achats?

B. Travaillez-vous pour le compte de quelqu'un d'autre?

1) Pour le compte de qui?

2) Celui-ci finance-t-il vos achats?

3) Paie-t-il des frais pour vous? (Patents, taxe d'abattage, frais de marché)

4) Combien lui remettez-vous en échange du service qu'il vous rend?

C. Combien d'employées avez-vous? (Ceux qui travaillent exclussivement pour vous)

1) convoyeurs

2) bergers

3) apprentis

4) agents

D. Faites-vous partie d'un syndicat?

1) lequel?

2) Que fait-il?

3) Quelle cotisation payez-vous au syndicat?

X Questions Sociales

A. Avez-vous des parents dans la profession?

Qui	metier	où	relations

L. Qui vous succédera dans la profession?

Le financerez-vous?

C. Quelles sont les fonctions des courtiers?

1) Quels services fournissent-ils?

2) Comment choisit-on un courtier?

D. Echangez-vous de renseignements (prix, conditions de marchés, etc.) avec d'autres commerçants, bouchers ou courtiers?

XI Questions Intéressantes

A. Quels sont les changements apportés par l'abattoir frigorigique?

1) Le nombre de bouchers qui abattent

2) Combien d'apprentis ont travailé pour vous à l'ancien abattoir?

Combien d'apprentis travaillent pour vous actuellement?

3) L'abattoir frigorifique a fait chômé combien d'apprentis?

Que sont-ils devenus?

B. Quels sont les problems qui empêchent l'exportation de bêtes:

1) en Côte d'Ivoire (transport, agripac, crédit)

2) au Ghana (cedi, crédit, delai de paiement par la banque, pesage)

3) au Nigeria (Nyra , courtiers-logeurs, distance)

C. Voudriez-vous peser vos animaux si c'était possible?

Voudriez-vous acheter et vendre les animaux par kilogramme?

APPENDIX B

REPORT ON INVESTIGATOR'S EXPERIENCE OF CONVOYING CATTLE TO ABIDJAN

In January of 1977 the investigator had the opportunity to participate in one of the most important operations in the livestock marketing circuit, the convoying of cattle to Abidjan by train. The opportunity came about through the good will of one of the largest cattle exporters in Ouagadougou; Georges[1]. The task is acknowledged to be one of the most arduous among the many occupations in the livestock industry. Although the investigator was well acquainted with the stories told by many convoyeurs, or drovers, about the hardships and risk to personal safety inherent in the job, it was thought important enough to see firsthand the conditions under which cattle are transported. The following account is a first-person description of the experience which, it is hoped, will give the reader a better feel for this aspect of cattle marketing.

Day One

The schedule called for loading the cattle into the cattle car for departure the following morning. The railroad wagon, however, which was also used as a regular freight car, had not yet been unloaded of its cargo, bananas from Ivory Coast.

Additional delay resulted since, in preparation for the trip, I was required to give my identity card to the railroad so that they could make out my papers. The rest of the day was spent with other convoyeurs, who were similarly delayed. They spent most of the waiting time asleep.

Day Two

At the start of the second day my enumerator and I visited the home of my patron, Georges. He was very young, and though I knew him to be quite wealthy, his home and lifestyle did not reflect this affluence as I had seen with other important traders and butchers. His "brother" Salif, my enumerator's former employer, was also scheduled to ship that evening. Salif and my enumerator engaged in conversation for my benefit: "How is it that when other cattle merchants cannot obtain cattle wagons very easily during this season Georges has little difficulty in getting three very quickly?" Both laughed at their own joke and responded to my question about the "gift" that Georges had to pay to the cattle car broker by saying that everyone had to "donate" but that they did not know how much more than the standard 10-15,000 CFA franc per wagon contribution was required for special treatment.

All of Georges' drovers gathered at his home for a meeting before leaving on the journey. Two key assistants are responsible for different aspects of his trade: one, the leader of the convoyeurs, makes sure that the animals were properly cared for in the bush prior to the shipment to Abidjan, organizes the short trek to the trainloading area in the city, and pays the Arabs who load the animals into the wagons. The second major assistant is stationed in Abidjan, in charge of the resale operation.

In addition to his two assistants at the time of this trip, Georges employed seven permanent drovers. They not only convoyed cattle to Abidjan, but also assisted in the market by herding the cattle that Georges bought and and by performing miscellaneous tasks. In general, they earned 5,000 francs per trip and were fed regularly by Georges or were given money for food, amounting to about 3,000 CFA F in food money monthly for each drover.

According to the drovers, average costs for an H 12 wagon (25 head) amounted to:

straw matting (séko) 7 x 400 francs each	2,800
loose straw (paille)	1,250
loading fee (paid to Arab specialists)	500
gardinage (2 herders per wagon)	3,000
living money, 200 francs per day per herder while the cattle are held in the bush before being shipped south.	

I became acquainted with two of the other convoyeurs leaving with me, Salifou and Salam. I was given sole responsibility for one H 12 wagon. At 5:00 p.m. I left to meet the cattle that were to arrive from the bush for loading later in the evening. The Fulani herders, who cared for the cattle while the exporters waited for a wagon, were told earlier that morning to bring the cattle into town in the early evening. Georges' cattle were kept near a small dam about fifteen km outside of town[2]. They allow the cattle unlimited access to drinking water until 3:00 p.m., after which the cattle are no longer permitted to drink at all. All available drovers of each exporter with a shipment that evening came to help in trekking the cattle through town. Besides Georges' three carloads, there were three other herds.

We trekked the cattle through the northern "suburbs," and then across the causeway to the center of town. There were no accidents, but several frustrated motorists were forced to wait while we led 185 head of cattle through the streets. The herders, as well as myself, worked hard to make sure that the animals did little damage to the property adjacent to the street; however, several vending stands, bicycles, and open sheds were knocked down. The local residents seemed unperturbed by the disruption.

Once in the railroad holding area we waited for the customs officials to count the number of cattle to be loaded, which was difficult because by the time they arrived it was dark. Counting a herd of twenty-five or more cattle, even in daylight, is a difficult task, unless the animals are separated, or standing still so as to be counted one by one. On most occasions the customs officials do not appear; my enumerator explained that their absence is usually part of the affaire arranged by the train intermediary. On this evening, however, there were two

douaniers, or customs officials, who appeared intent on counting the animals one by one. The herders and convoyeurs were not cooperative. All but one of the herds were larger than declared on the export report, so the herders did their best to confuse the customs agents. They succeeded in passing three of the overstocked herds, but two of Georges' herds were caught. One of these was mine, and we were not allowed to load our cattle. Discussion of the matter lasted until 2:00 a.m., by which time all four of the herds which had passed inspection had already been loaded onto the train cars. Georges' two herds were "quarantined" until the following morning, and were led back to the bush.

Day Three

When I went to see Georges during the morning, he had already paid the "fine" and had arranged for the two herds' departure in the evening. Both herds were permitted to have an excess number of animals. Georges claimed that he was asked, initially, to pay a 200,000 CFA F "fine," but eventually settled the matter for less than half that amount. Since the normal tax per animal was about 6,500 CFA F, and there were three extra animals in the two herds, he paid a "fine" of something less than 80,000 francs for the underdeclaration. Many merchants overload virtually every shipment. Since they are rarely caught, they come out well ahead in the long run.

After the "fine" had been paid, the customs official allowed the herds to be taken back out to the bush to graze and find water, so, as on the previous day, we walked our two herds into town from the bush in the late afternoon. There were five herds scheduled for loading that night:

1. Wagon #J 14010
   Convoyeur: Rasmané
   Owner: a Ouagadougou exporter
   Origin: Ouagadougou
   Declared: 37 head
   Douane: Official Estimated Value = 30,000 F CFA/head
   x 37 head = 110,000 F CFA x (17% + 3% + .5%)
   x 6% = 241,203 F CFA
   RAN: 142,330

2. Wagon #H 121224
   Convoyeur: Issa
   Owner: same Ouagadougou exporter but papers showed a different name
   Origin: Ouagadougou
   Declared: 23 head
   Douane: Official Estimated Value = 690,000 F CFA
   Est. Wt. = 5,750 kg (250 kg/hd)
   Douane = 149,937 F CFA
   RAN: 95,253 F CFA

3. Wagon #H 121122
   Convoyeur: Abdoulaye Sana
   Owner: a Kaya exporter
   Origin: Kaya
   Declared: 25 head
   Douane: Official Estimated Value = 750,000 F CFA
   Douane = 162,975 F CFA
   RAN: 126,640 F CFA

4. Wagon #H 13005
   Convoyeur: Salam
   Owner: Georges
   Origin: Ouagadougou
   Declared: 35 Head (37 loaded)
   Douane: Official Estimated Value = 1,050,000 F CFA
   Official Est. Wt. = 8,750 kg
   Douane = 288,165 F CFA
   RAN: 126,640 F CFA

5. Wagon #H 12088
   Convoyeur: Larry Herman
   Owner: Georges (paper showed a different name)
   Origin: Ouagadougou
   Declared: 25 head (26 loaded)
   Douane: Official Estimated Value = 750,000 F CFA
   Official Est. Wt. = 6,250 kg
   Douane = 162,975 F CFA
   RAN: 95,255 F CFA

There was no trouble with the custom agents on this night. Each herd was moved to the loading pen, and the wagons pushed by hand into place. The Arab specialists cut off the horns of those animals most likely to cause injury to the others. They charged 50 CFA F per head for doing so, then loaded the cattle into the wagons. It was a difficult job, complicated by the dilapidated condition of the corral and the loading ramp.

After the cattle loading was completed we slept until 4:00 a.m.; at that time we went to the main train station and found an empty wagon in which to ride and leave our baggage on the trip to Abidjan. The RAN is required to provide one empty car for the convoyeurs of cattle, small ruminants, and fowl. Most convoyeurs carry little baggage.

Day Four

The train left Ouagadougou station at 8:00 a.m. We arrived in Koudougou at 11:00 a.m., travelling at a rate of about 30 km per hour. Each time the train stopped, the convoyeurs went to their wagons to check the animals. We arrived in Bobo-Dioulasso at 10:30 p.m., rather late compared to normal trips. The tardy arrival was due to engine trouble; we were forced to change engines in Bobo-Dioulasso. Between Ouagadougou and Bobo-Dioulasso we made four prolonged stops, fewer than I had anticipated. At Koudougou we picked up another wagon:

Wagon #G 12102
Convoyeur: Ouenda
Owner: exporter from Koudougou
Origin: Koudougou
Declared: 29 head
Douane: Official Estimated Value = 870,000 CFA F
Official Est. Wt. = 7,250 kg
Douane = 189,051
RAN: 80,855 CFA F

At Bobo-Dioulasso we picked up two other wagons, an H12 and an H13, but the convoyeurs of these wagons were not friendly; thus I acquired little information about their cargo.

Day Five

We left Bobo-Dioulasso at about 1:00 a.m. I slept until 4:30 a.m., at which time we arrived at the border stop of Niangoloko. Almost immediately the customs agents began to inspect the train. An extended discussion took place concerning the number of cattle aboard; the drovers believed it was because of my presence -- either the agents did not want to be found lax in my eyes, or they felt a larger "gift" was possible with a non-African present. The amount of payment was finally agreed upon, but we had been delayed six hours. We finally left Niangoloko at 10:30 a.m.

Daytime temperatures were over 35 degrees C, and inside the cars must have been over 40 degrees C. Even in the chilly evenings the temperature inside the cattle-filled wagons remained fairly high.

We arrived at Ferkessédougou at about 1:00 p.m. and did not depart until 3:30 p.m. During the wait the train engineer spotted me sitting on one of the cars and invited me to ride with him in the engineer's cabin. He explained that the speed of the train was limited more by the track conditions than by the condition of the engines. He also complained that the system was not run efficiently; he never noticed priority being given to trains with live animals aboard, contrary to what RAN officials claimed. Ironically, we soon pulled into Tafiré, where we were forced to remain on a siding for more than two hours. During that time two passenger trains and one freight train passed. The latter traveled south, and consisted primarily of tanker cars which were undoubtedly empty. Thus, a freight train of empty wagons was given priority over a trainload of live animals.

We arrived in Bouaké at 10:45 p.m., about seven hours behind schedule. We departed after an hour and a half, but failed to travel very far. Though I slept through most of the night, it was clear that we did not cover much ground that evening. It turned out that another train had broken down and blocked a single track section of the line. After it was removed we had to wait while higher priority trains passed us in both directions, Most, but not all, were passenger trains.

Day Six

While we were delayed at the siding, a steer died. The convoyeur responsible for that wagon climbed into the wagon and slit its throat in the Moslem fashion and its belly to prevent the belly from swelling. The steer was sold in Boli, our next stop, which took place at around noon. Thus, the animal was sold an hour after it had been found dead, but no one knew how long after it had actually died. The apprentice of the butcher who bought it dressed the carcass right next to the train track; apparently they were not allowed to sell such meat legally, so could not bring it into the town slaughterhouse.

We arrived in Dimbokoro at 3:00 p.m. The cattle appeared to be very weak and tired. The convoyeurs entered the wagons with increasing frequency in order to get the animals standing, because of the danger of the other animals stepping on or kicking an animal already down. If none of the convoyeur's tactics to raise an animals work, he must watch the animal constantly to make sure it is not injured by the others. This sometimes means riding in the wagon throughout the remainder of the trip.

During the sixth day the convoyeurs slept whenever they got the chance, but they checked their wagons at each stop. The previous two days seemed like days of leisure compared to the final twenty-four hours. In my wagon, a black steer was in particularly bad shape and was down at every station. Salam did his best to keep him standing until we got to Agboville, but then gave up and hoped that it would survive the rest of the way. A white steer fell down also and was motionless. All Salam could do was to prop it up against the wagon wall. There

appeared to be a vast difference between the condition of the animals in the cars from Ouagadougou and Koudougou and those originating in Ferkessédougou and Bobo-Dioulasso. The additional day en route must have accounted for most of the difference.

Day Seven

We arrived at the Treichville railyard at 2:00 a.m. and slept until 6:00 a.m., when we rechecked the cattle. Within the hour each convoyeur left to find his intermediary to pick up the funds for payment of the rail transport fees. The RAN neither moves the cattle cars to the cattle park at Port Bouet nor releases the animals until payment is made.

Salam, another convoyeur, and I taxied to Port Bouet, where Georges rents a small place for his convoyeurs and agent. Because he carries on such a large business, this cattle owner, unlike most other traders, keeps his own home and agent in Abidjan, but is nevertheless obligated to sell through an intermediary. The agent is responsible for seeing that the cattle are sold at a fair price, that credit is repaid quickly, that all fees are paid properly, etc. Most of these jobs are normally the intermediary's responsibility It seems, however, that Georges operated this way to assure himself greater control over his business. Towards this end, he also changes agents every month or two.

I spoke to Georges' agent about the problems we had encountered at the border, and about the unofficial fee that had been paid. He claimed that such payments were normal, and that even wagons which were not overloaded were almost always required to pay the customs men between 500 and 1,000 CFA F to be assured that the wagons were not pulled out for inspection. He believed that the officials were probably uncertain how to handle the situation with a non-African, and my presence was the reason that such a large "gift" was required.

The convoyeur, the agent, and I returned to the Treicheville station to wait for the cattle to be taken to Port Bouët. Though all the wagons were paid for, they could not leave until just before noon. The agent related the story of a train which arrived in Treicheville at about 1:00 p.m., only one hour after the previous day's wagon had been moved out. Still, the cattle were forced to wait until noon of the following day to be transported to and unloaded at Port Bouët. He claimed that two wagons on that train had belonged to Georges, and that three head had been lost.

While we were waiting for the start of the short trip out to the cattle market I recognized a young boy who had been my guide during one of my trips to the northwest of the country. He said that he had heard that a white man was coming down with the cattle, and suspected that it was me. John Staatz had also heard through the grapevine that I was coming, and he was waiting for me at Port Bouët when we finally arrived with the cattle. Both are good examples of how well information flows along the railroad line from north to south.

Information also flows quickly from south to north. The day I arrived in Abidjan I telegraphed my wife in Ouagadougou to let her know all was well. She said later, however, that she had heard of my arrival even before receiving the telegram; convoyeurs from Ouagadougou returning on the evening train on the day I had arrived in Abidjan had passed the word of my arrival to my enumerator, who told my wife. Thus, my wife received the information thirty-six hours after my arrival. The telegram did not arrive until two days later.

Similarly, news of the sale price of my herd and the story of the steers who had died got back to my enumerator well before I did. When I returned to Ouagadougou, my enumerator had filled out the export report, and all the information it contained was correct.

At Treicheville each convoyeur was required to give a 500 CFA F "gift" to the engineer of the shuttle train that took the cattle to Port Bouët. Just before we left, the black steer died -- minutes before the journey's end. The dead steer was sold for 35,000 CFA F. Considering its size, and the price received for the other cattle in my wagon of similar size, I estimated the loss in revenue to be about 32,500 CFA F, or almost 50 percent.

As in Ouagadougou, where there were specialists who loaded the cars, in Port Bouët there were Fulani who unloaded the cars. They charged 1,000 CFA F per car. In addition, for each day the cattle remained unsold, we paid 1,000 CFA F per day per herd for the animals to be watered and guarded by the Fulani.

Georges' agent was upset that Salam had not brought the purchase prices with him, as is the usual practice. These are used as a basis for bargaining. Salam claimed to know the prices approximately, but the agent was worried that Salam would make a mistake and that Georges would be angry. He said that Georges was usually satisfied with the profit margin, unless it was negative

Both the intermediary and the agent participated in the bargaining process. It was the convoyeur, however, who was responsible for approving the price, unless the owner himself was present. In this respect the market is similar to the northern primary markets, where the intermediaries do the bargaining, but the herders have to approve the prices. Salam refused several offers made for the entire shipment.

The white steer from my wagon, which was unable to get up, was sold for 52,500 CFA F. This was a loss of about 10,000 CFA F relative to the sale price of similar animals in my wagon. The sale was for cash, which may explain why Salam accepted so large a loss on an animal that was still alive.

The agent explained that they sent the money back with the returning convoyeurs instead of using the banking system, because using banks was too time-consuming. The banking system was unable to beat the single day that it took to return cash via the convoyeurs returning to Ouagadougou by train.

Day Eight

On this day most of the animals on my wagon were sold. We had to wait several days, however, for payment from the butchers. Each day we went to the cattle park to mingle with the other buyers and sellers. Salam followed closely the sale of Voltaic animals in order to be able to report market conditions to Georges. Several animals arrived each day from Ouagadougou, and the convoyeurs exchanged information openly.

Day Eleven

Finally, all credit was paid, and Salam and I took the evening train back to Ouagadougou. He carried the money from the sale of our cattle (less expenses), as well as an accounting of all revenues and costs, tied up in a cloth money belt sewn around his waist; on top of that he wore two long robes. The agent said that it was necessary to be wary of thieves, and suggested that Salam remain seated for the entire trip. Salam, however, used his salary from the trip to make more money by acting as a petit commerçant -- he was up and about, buying agricultural produce along the way and reselling it in northern Ivory Coast and in Upper Volta. His purchases included: bananas, pineapples, avacados and other fruits in the Ivory Coast; as well as onions, yams and guavas bought in Upper Volta. By the time we reached Ouagadougou the following evening he had resold everything, rotated his capital several times, and at least doubled his money.

Once in Ouagadougou we went immediately to Georges' house to report to him. He already had received most of the information concerning the prices received for the cattle. He was not at all upset about the two deaths nor about the poor condition of the white steer, perhaps the fact that both shipments turned out to be profitable allowed him to unconcerned about three casualties. I went home for dinner and then went to sleep in my own bed, two things I appreciated that night more than at any other time during my stay in Upper Volta.

Table B.1 and Figure B.1 give an indication of the time table of the entire journey.

Tables B.2 and B.3 present the cost, revenue, and margin information for the shipments discussed in the narrative.

FIGURE B.1: Diagramatic Timetable of Cattle Shipment: Ouagadougou - Abidjan, January 11-15, 1977

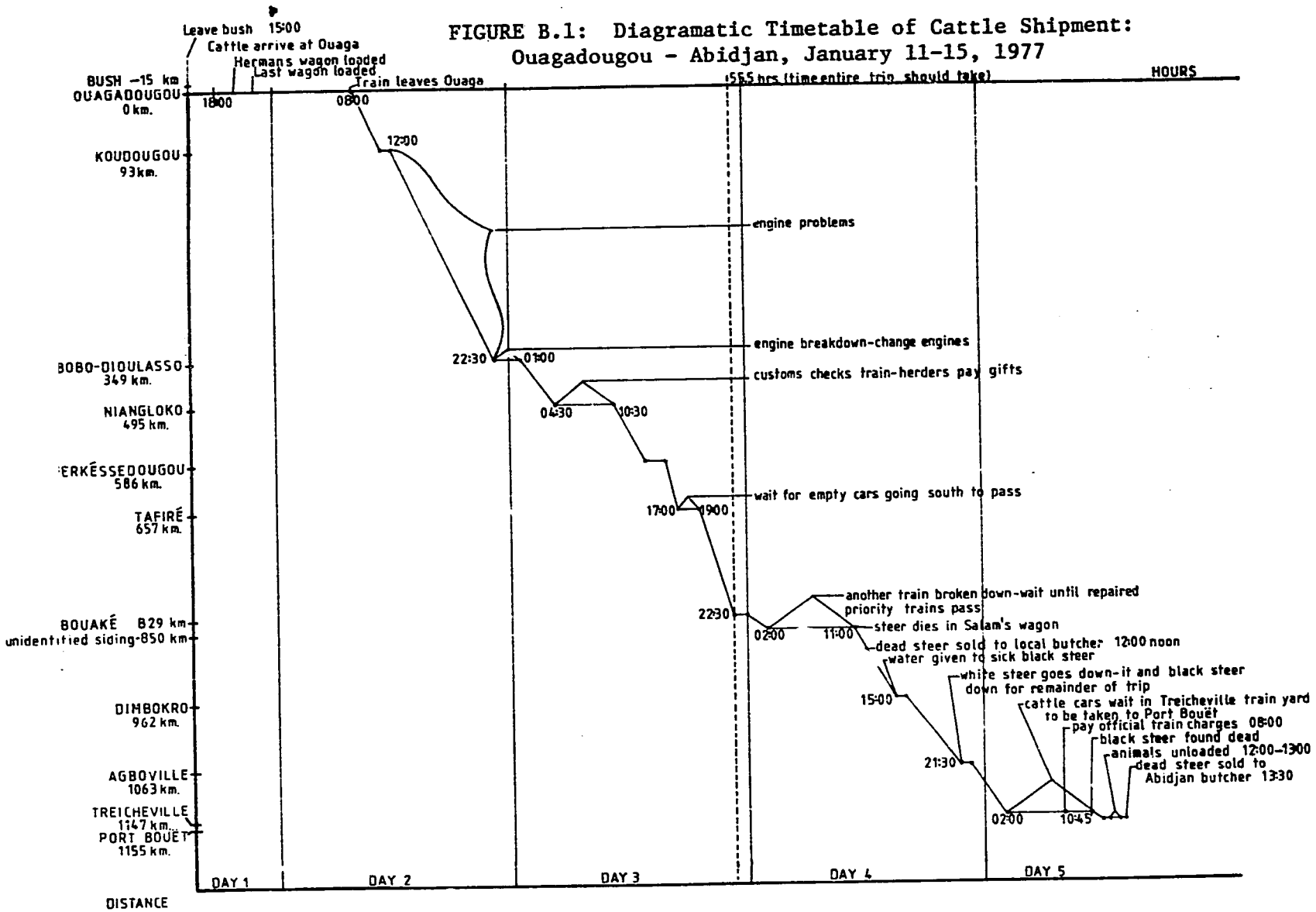

TABLE B.1

SCHEDULE FOR CATTLE SHIPMENT ACCOMPANIED BY INVESTIGATOR, OUAGADOUGOU-ABIDJAN, JANUARY 11-15, 1977

Day	Hours	Total Hours	Location	KM	Δ KM	KM/HR
1	3:00pm	0	Leave Bush	-15		
1	6:00pm	3	Arrive Ouagadougou	0	15	5
2	8:00am	17	Leave Ouagadougou	0		
2	11:00am	20	Arrive Koudougou	93	93	31
2	12:00n	21	Leave Koudougou	93		
2	10:30pm	31.5	Arrive Bobo-Dioulasso	349	256	24.4
3	1:00am	34	Leave Dioulasso	349		
3	4:30am	39.5	Arrive Niangoloko	495	146	41.7
3	10:30am	43.5	Leave Niangoloko	495		
3	1:30pm	46.5	Arrive Ferkéssédougou	586	91	30.3
3	3:30pm	48.5	Leave Ferkéssédougou	586		
3	5:00pm	50	Arrive Tafiré	657	71	47.3
3	7:00pm	52	Leave Tafiré	657		
3	10:45pm	55.75	Arrive Bouaké	829	172	45.9
4	12:15am	57.25	Leave Bouaké	829		
4	2:00am	57	Arrive undentified siding	250	21	12
4	11:00am	68	Leave undentified siding	250		
4	3:00pm	72	Arrive Dimbokro	962	112	28
4	4:00pm	73	Leave Dimbokro	962		
4	9:30pm	78.5	Arrive Agboville	1063	101	18.4
4	11:00pm	80	Leave Agboville	1063		
5	2:00am	83	Arrive Treicheville	1147	84	28
5	10:45am	91.75	Leave Treicheville	1147		
5	11:30am	92.5	Arrive Port Bouët	1155	8	10.7
5	12:00n	93	at Port Bouët	1155		
5	1:00pm	95	Unloaded Port Bouët	1155		

Total time of operation (animals without food and water): 94 hours

Total time in cattle wagons . . . . . : 86-89 hours

Total time en route . . . . . : 66 hours

TABLE B.2

CASE STUDY: EXPENSES, REVENUES, AND MARGINS FOR EXPORT OF 26 HEAD OF CATTLE FROM OUAGADOUGOU TO ABIDJAN BY RAILROAD, JANUARY 14, 1977

I. Composition of Herd: Purchased in the Ouagadougou cattle market, January 10-11, 1977

	5 Bulls	21 Steer	26 Head Total
Estimated average age	8 years	7 years	7 years
Estimated average weight	311 kg	323 kg	321 kg
Average price	40,000 F CFA	40,762 F CFA	40,615 F CFA
Estimated price/kg liveweight	129 F/kg	126 F/kg	127 F/kg
Estimated price/kg net weight	257 F/kg	252 F/kg	253 F/kg

II. Export Costs:

Item	Cost per Head (CFA)	Cost of Herd (CFA)
Purchase price	40,615	1,056,000
Intermediary's commission (Ouagadougou)	250	6,500
Identification mark	10	260
Gardinage before export	115	3,000
Payment to secure cattle car without delay	385	10,000
Loading wagon	19	500
Wagon preparation	153	4,000
Cattle car rental (RAN)	3,664	95,255
Voltaique export tax	6,268	162,975
Unload wagon (Abidjan)	19	500
Tips to RAN assistants	29	750
Gardinage in Abidjan	38	1,000
Market tax (Port Bouet)	500	13,000
Food and salary for convoyeur	269	7,000
Custom's penalties	1,769	46,000
TOTAL	54,105	1,406,740
Total costs net of purchase price	13,490	350,740

III. Sale Revenues: All 26 animals sold at Municipal Cattle Market, Port Bouet

1 Steer (sold dead)		35,000 F CFA
1 Steer (sold injured)		52,500 F CFA
15 Steer @ 67,500 F CFA ea.	=	1,012,400 F CFA
4 Steer, 5 Bulls @ 54,000 F CFA ea.	=	486,000 F CFA
TOTAL REVENUES		1,586,000 F CFA = 61,000 F/head

IV. Margins:

	Per Head	Total Herd
Gross Margin	20,385	530,000
Export Costs	13,490	350,740
Profit for expedition	6,895	179,260

TABLE B.3

CASE STUDIES: MARGINS FOR CATTLE EXPORTERS SHIPPING CATTLE BY RAIL
OUAGADOUGOU-ABIDJAN, JANUARY 1977 (PRICES IN F CFA)

Name of convoyeur:	Salam		Issa		Abdoulaye		Rasmane	
Number of head of cattle shipped:	36[a]		23		25		37	
Place of purchase: Market (number)	Ouagadougou (36)		Yako (23)		Kaya (25)		Ouagadougou (25) Kaya (11)	
Costs	Total	Per Head	Total	Per Head	Total	Per Head	Total	Per Head
1. Purchase price of herd	1,584,000	44,000	810,750	35,250	999,500	39,980	1,612,000	43,568
2. Export costs	450,160	12,504	322,065	14,003	310,705	12,428	418,185	11,302
3. Total expenditures	2,034,160	56,504	1,132,815	49,253	1,310,205	52,408	2,030,185	54,870
Revenues (sale price)	2,342,500	65,070	1,204,000	52,348	1,612,500	64,500	2,342,000	63,297
Margins								
1. Gross (purchase price less resale price)	758,500	21,070	393,250	17,098	613,000	24,520	730,000	19,730
2. Net (revenues less total expenditures)	308,340	8,565	71,185	3,095	302,295	12,092	311,815	8,427
Turn around time in days (from date of purchase to convoyeur's return with money)	12 days		31 days		Not known (estimated 15-20 days)		25 days	

[a]Includes one steer dead and sold en route.

[b]Excludes costs of capital.

FOOTNOTES TO APPENDIX B

[1]The identities of this merchant and some of the other individuals described in this report are protected by the use of fictitious names.

[2]There are several alternative sites where Fulani herders keep exporters' and butchers' stocks. The government is proposing to build a permanent facility for all cattle waiting to be brought into Ouagadougou or waiting for a railroad cattle wagon for export. The proposed site is at Loumbila, approximately 15 kilometers northeast of the cattle market and 22 kilometers from the rail depot.

[3]Other convoyeurs have told me that their salary often depends on the profits of the shipment. While the average is about 5,000 francs CFA, a very profitable trip may net 10,000 francs CFA in salary while an unprofitable one can result in the convoyeur receiving no salary. The latter case is especially true when the trader feels that the drover has been delinquent in his duties of keeping the animals alive and healthy.

APPENDIX C: BUTCHERING AND MEAT MARKETING IN, AND BEEF EXPORTS FROM OUAGADOUGOU[1]

Ouagadougou's new modern abattoir, financed by FED at 625 million francs CFA, has an operating capacity of about 13,000 tonnes per year. However, during 1976, the first full year of operation, tonnage was only 30 percent (3880 tonnes) of capacity. Clearly, the Voltaic government had hopes for a far more impressive performance, especially concerning meat exports, which were about 40 percent of the previous year's total. This appendix briefly describes the organization of butchering, meat marketing, and meat exporting, and presents the results of the meat market survey on wholesale and retail beef prices.

The Organization of Trade

Butchers in Ouagadougou can be classified as wholesalers (chevillards), wholesaler-retailers, retailers, and exporters. All but the retailers buy cattle in the Ouagadougou market adjacent to the abattoir. Some take advantage of the proximity of and good roads to the active Kaya and Pouytenga cattle markets where cattle are often purchased at advantageous prices. Butchers who buy cattle in any of these markets are obligated to pay the intermediary's commission of 250 francs CFA per head. Most butchers who slaughter keep a stock of cattle which is watched over by Fulani herders. The reserve makes butchers less susceptible to day-to-day variations in the supply of cattle in the Ouagadougou market. The size of the reserve varies according to season, shrinking during the dry season when fewer cattle are brought to market. During the rest of the year stocks for all butchers may amount to as much as three or four hundred head of cattle, about one week's worth of slaughter. Butchers often trade among themselves when individual stocks are either depleted or felt to be excessive. The cost of keeping an animal in the common reserve is 100 francs CFA.

Cattle are not slaughtered by the butchers but by abattoir personnel. Animals are delivered to the slaughterhouse in the early evening and slaughtered during the night. The abattoir employs about 90 laborers for its four slaughter lines (two for cattle--though only one is used at a time, one for small ruminants, and the last in a separate part of the building for pork). Previously, the butchers' apprentices were responsible for preparing the carcass. It is estimated that about 300 young men were involved in this operation. While many did find jobs as laborers at the new abattoir, most became underemployed, continuing to work for their butcher part time or going into retailing. The cost of slaughtering is 1000 francs CFA per head for cattle. Carcasses and the fifth quarter are delivered at the abattoir to the butchers beginning at six in the morning.

Chevillards and wholesaler-retailers sell meat to retailers, restaurants, institutions (schools, military camps, etc.), butcher shops, and meat grillers. The meat is displayed on the ground in front of the abattoir and is purchased wholesale in whole quarters or in combinations of fifth-quarter parts. Many wholesalers have regular customers and this is especially true for the casseurs de têtes and tripiers who purchase the head and tripe respectively. Wholesalers appear to bargain more competitively with the retailers who purchase carcass quarters. Though all carcasses are weighed by the slaughterhouse, butchers do not avail themselves of this information. Thus, like the sale of live cattle, wholesale meat sales are based on the estimating abilities of the butchers.

Exporters and wholesalers who sell to European style butcher shops (there are three in Ouagadougou) and hotels specialize in heavy, better quality meat. They usually retain long hind quarters for these customers and sell the front and fifth quarters at the abattoir. The butchers often make use of the slaughterhouse's cold rooms before delivering the meat. The fee for storage is 500 francs CFA per carcass for the first three days and 5 francs CFA per kilogram for each day thereafter.

Whether bought by retailers or kept by the wholesaler, carcasses are transported to the various markets in Ouagadougou by small trucks and motor bikes. It is an interesting scene along the road to the abattoir between 7 and 7:30 in the morning as a caravan of Mobylettes carrying dripping beef quarters and small ruminant carcasses makes its way into town. Meat is sold in the retail markets by butchers' apprentices.

Wholesale Beef Sales

Table C.1 presents the breakdown of a sample of 532 cattle slaughtered in Ouagadougou between January and March 1977. The prices were collected from the butchers and verified when possible from market survey data. Prices for steers were highest, 252.4 francs CFA per kilogram of carcass weight. The price of calves (actually often more than one year old) was next highest at 248.7 francs CFA per kilogram. The fact that the price of bulls (237 francs CFA per kilogram) is considerably lower than that for steers, even though their weights are relatively close, is likely due to the higher quality of the meat of the castrated males which is often sold to European-style butcher shops or exported to the Ivory Coast. Cow prices were lowest at 223 francs CFA per kilogram.

The average prices for the fifth quarter for the period from January to March 1977 are shown in Table C.2. Hides are purchased at 45 francs CFA per kilogram by one of two skin and hide export firms. Other parts are sold to either specialists (casseurs de têtes), retailers, restauranteurs, and griliers of meat. It is interesting to note that the return from the sale of the fifth quarter calculated per kilogram of carcass weight is fairly constant (41-42 francs CFA per kilogram) for different sized animals.

Butchers who sell only wholesale, generally follow a strategy of trying to recoup the purchase price of the animal from the sale of the four quarters. Thus wholesale carcass prices can be estimated at between 225 and 250 francs CFA per kilogram. Margins for wholesalers can be computed as the difference between revenue from fifth quarter sales and costs. These costs include:

TABLE C.1 CATTLE DRESSING WEIGHTS AND PRICES: OUAGADOUGOU SLAUGHTERHOUSE

TYPE	NUMBER OF OBSERVATIONS	AVERAGE LIVE WEIGHT	AVERAGE DRESSED WEIGHT	DRESSING PERCENTAGE[1]	AVERAGE ANIMAL PRICE[2]	AVERAGE PRICE PER KG DRESSED
Castrated Male	260	288.6 kg	142 kg	49.2%	35,873 F	252.4 F/kg
Bulls	118	291.8 kg	138 kg	47.3%	32,661 F	237.0 F/kg
Cows	140	261.7 kg	112 kg	42.8%	25,000 F	223.2 F/kg
Calves	14	185.3 kg	83 kg	44.8%	20,607 F	248.7 F/kg

[1]Weight of carcass cut at third vertebrae without hide, head, hooves, or offals.

[2]Does not include cost of intermediary, transport from market to slaughterhouse, keeping animal between time of purchase and slaughter, taxes, or refrigeration.

TABLE C.2 AVERAGE WHOLESALE PRICES: FIFTH QUARTER: OUAGADOUGOU SLAUGHTERHOUSE

	LARGE CATTLE, GOOD QUALITY, 150-200 KG DRESSED WEIGHT	MEDIUM CATTLE 120-150 KG DRESSED WEIGHT	SMALL OR THIN CATTLE, POOR QUALITY MEAT, 80-120 KG DRESSED WEIGHT
Hides (45 F/kg)	750 F	550 F	400 F
Head and hooves	2,500 F	2,000 F	1,500 F
Tripe (stomach and intestines)	2,000 F	1,500 F	1,000 F
Tongue and tail	500 F	400 F	300 F
"Foie complet" (liver, heart, lungs, and spleen)	1,500 F	1,250 F	1,000 F
Total for fifth quarter	7,250 F	5,700 F	4,200 F
Price of fifth quarter per kg of dressed carcass	41 F/kg	42 F/kg	42 F/kg

Intermediary's commission	250 francs CFA/head
Fee for holding animal	100 francs CFA/head
Slaughter tax	1,000 francs CFA/head
Loss through condemnation of meat (one-half percent calculated from statistics of meat condemnations in Ouagadougou, 1976)	150 francs CFA/head
Apprentices' salaries (6-10,000 francs CFA per month, 1 apprentice per 30 to 60 head per month)	200 francs CFA/head
Total cost of slaughtering	1,700 francs CFA/head

Thus margins for wholesalers range from 2500 francs CFA to 5500 francs CFA per head.

The cost of meat delivered to retail markets in Ouagadougou for butchers who both slaughter cattle and sell meat in retail markets is shown in Table C.3. This cost does not include a factor for loss through condemnation which is about 1 franc CFA per kilogram. Neither does it include apprentices' salaries since for retailers these are usually paid in kind or through commission on retail meat sales.

Retail Meat Prices

As part of the marketing survey, a retail meat price study was carried out in Ouagadougou between November 1976 and March 1977. Meat samples were purchased daily in the Grand Marché of Ouagadougou. These samples were then separated into quantities of skeletal meat, fat, and bone and weighed. The results are given in Tables C.4 through C.7.

Several interesting observations may be made based on the data on these tables.

1. Beef is most commonly purchased by African households in the form of 50 francs CFA tas (piles of beef) which sell for 280 francs CFA per kilogram with bone. While there is no data on the subject, interviews with retail butchers indicate that tas comprise about two-thirds of retail carcass meat sales in the traditional meat market. The 50 francs CFA tas accounts for probably close to 50 percent of all beef sales.

2. There is no significant difference in composition among the 25, 50, or 100 francs CFA tas of beef. Skeletal meat accounts for two-thirds of the quantity, fat one-tenths, and bone one-fourth. In addition, a subjective evaluation of the quality of beef (amount of bone splinters, appearance, size of beef chunks, etc.) led to the conclusion that there was no qualitative difference among the three sizes of tas. This seems reasonable since butchers, in fact, often redistribute meat between large and small tas to suit the purchaser.

The higher price associated with large tas is suggestive of implicit price discrimination by butchers. Knowing that higher income buyers are more likely to purchase large size tas, and that their demand for beef is likely less elastic than that of low income buyers, butchers set prices higher for large tas. One of the African researchers involved in the study suggested alternatively, that this phenomenon is attributable to the butchers' social conscience.

3. The same type of behavior (higher price per kilogram for larger quantities) was found in the sale of bosse, fatty hump of Zebu cattle, (Table C.6-VIIA) which is one of the preferred parts of the animal, and also in the sale of tripe (Table C.6-VIIB).

4. The price per kilogram of boneless beef sold in piles of 100 francs CFA is lower than the price per kilogram of deboned beef in normal 100 francs CFA tas. The differential seems to indicate a 60 francs C FA per kilogram premium for bone.

5. Boneless beef cuts (filet, steaks, etc.) are substantially more expensive (close to 600 francs CFA per kilogram) than beef sold in piles.

6. The average price for organ parts is 370 francs CFA per kilogram.

7. Mutton and goat meat are sold in tas for 377 francs CFA per kilogram (with bone), about 25 percent more expensive than beef sold in similar quantities.

8. The price of beef sold in tas can be compared to beef prices since 1966 (SEDES, Recueille Statistique, 1975):

Year	1966-67	1970	1974	1976
Price of Beef sold in tas with bone	104 F CFA	126 F CFA	250 F CFA	280 F CFA

Once again it can be seen that as with the price of live cattle, the greatest increases in price have occurred since 1970, with prices more than doubling.

Meat Exports

With the opening of Ouagadougou's new Abattoir Frigorifique it was hoped that meat exports might be stimulated. In its first full year of operation this was not the case and the facility currently operates at less that 1/3 of its capacity. Meat is exported to the Ivory Coast by rail in refrigerated wagons provided by CODEPAG and operated by the RAN. One of the major problems for meat exported in this way is the unreliability of the refrigerated equipment on the rail cars. Breakdown occur frequently, often resulting in spoilage. At times these

TABLE C.3 DELIVERED PRICE OF MEAT: OUAGADOUGOU

TYPE OF ANIMAL	PURCHASE PRICE OF ANIMAL PER KG DRESSED CARCASS	COSTS OF PURCHASE AT OUAGADOUGOU CATTLE MARKET PER KG DRESSED CARCASS [1]	SLAUGHTER TAX PER KG DRESSED CARCASS [2]	TRANSPORT OF CARCASS TO RETAIL MEAT MARKET PER KG DRESSED CARCASS [3]	SALE OF FIFTH QUARTER PER KG DRESSED CARCASS	NET PRICE OF DRESSED CARCASS DELIVERED PER KG DRESSED CARCASS
Castrated male (average weight: 142 kg)	252.4	+2.5	+7.0	+2.1	-42	222 F/kg
Bulls (average weight: 138 kg)	237.0	+2.5	+7.2	+2.2	-42	206.9 F/kg
Cows (average weight: 112 kg)	223.2	+3.1	+8.9	+2.7	-42	195.9 F/kg
Calves (average weight: 83 kg)	248.7	+4.2	+12.0	+3.6	-42	226.5 F/kg

[1] 250 francs for the intermediary; 100 francs for holding the animal before slaughter.

[2] 1000 francs per animal.

[3] 75 francs per quarter = 300 francs per carcass.

TABLE C.4 RETAIL MEAT PRICES
OUAGADOUGOU: NOVEMBER 1976-MARCH 1977

I. Piles of Beef: 25 Franc Purchases n = 33

	Total	Skeletal Meat	Fat	Bone
Average weight	116.4 gm.	73.0 gm.	10.6 gm.	27.6 gm.
Standard deviation	(14.7)	(18.2)	(10.0)	(10.4)
Percent of total composition	100%	67%	9%	24%

Gross price (with bone) : 215 F/kg
Net price (without bone): 282 F/kg

II. Piles of Beef: 50 Franc Purchases n = 88

	Total	Skeletal Meat	Fat	Bone
Average weight	178.7 gm.	114.9 gm.	15.6 gm.	48.2 gm.
Standard deviation	(24.5)	(27.1)	(13.2)	(17.45)
Percent of total composition	100%	64%	9%	27%

Gross price (with bone) : 280 F/kg
Net price (without bone): 383 F/kg

TABLE C.5 RETAIL MEAT PRICES
OUAGADOUGOU: NOVEMBER 1976-MARCH 1977

III. Piles of Beef: 100 Franc Purchases n = 60

	Total	Skeletal Meat	Fat	Bone
Average weight	278.6 gm.	179.6 gm.	22.0 gm.	76.6 gm.
Standard deviation	(59.6)	(41.9)	(16.9)	(28.2)
Percent of total composition	100%	64%	8%	28%

Gross price (with bones) : 359 F/kg
Net price (without bones): 495 F/kg

IV. Piles of Boneless Beef: 100 Franc Purchases n = 25

	Total	Skeletal Meat	Fat
Average weight	230.2 gm.	207.4 gm.	918 gm.
Standard deviation	(48.6)	(51.4)	(23.5)
Percent of total composition	100%	90%	10%

Net price: 434 F/kg

V. Boneless Beef Cuts

Cut	Sample Purchases	Average Weight	Average Price	Price/kg
Filet (poor quality)	4	988 gm.	569 F	576 F/kg
Faux filet	3	969 gm.	642 F	663 F/kg
Beefsteak	4	792 gm.	475 F	550 F/kg

Net Price: 593 F/kg

TABLE C.6 RETAIL MEAT PRICES
OUAGADOUGOU: NOVEMBER 1976-MARCH 1977

VI. Beef Cuts with Bone Average Price = 608 Francs n = 6

	Total	Skeletal Meat	Fat	Bone
Average weight	1.735 gm.	731 gm.	86 gm.	918 gm.
Percent of total composition	100%	42%	5%	53%

Gross Price (with bone) : 350 F/kg
Net price (without bone): 744 F/kg

VII. Beef By-Products

A. Pieces of Bosse (Hump of Zebu)

	Sample Purchases	Average Weight	Average Price	Price/kg
Large piece	6	971 gm.	588 F	605 F/kg
Medium piece	6	447 gm.	238 F	531 F/kg
Small piece	6	308 gm.	142 F	461 F/kg

Net price: 533.3 F/kg

B. Tripe (Stomach and Intestines)

	Sample Purchases	Average Weight	Average Price	Price/kg
Small pile	4	405.5 gm.	50 F	123 F/kg
Medium pile	8	596.5 gm.	100 F	168 F/kg
Large pile	4	723.5 gm.	150 F	207 F/kg

Net price: 171 F/kg

TABLE C.7 RETAIL MEAT PRICES
OUAGADOUGOU: NOVEMBER 1976-MARCH 1977

VII. Beef By-Products (Cont.)

C. Organs

	Sample Purchases	Average Weight	Average Price	Price/kg
Liver	6	816 gm.	371 F	454 F/kg
Tongue	4	731 gm.	250 F	342 F/kg
Kidney	3	303 gm.	192 F	634 F/kg
Heart	1	925 gm.	350 F	378 F/kg
Brain	2	352 gm.	100 F	284 F/kg
Tail	1	1,201 gm.	450 F	375 F/kg
Muzzle	1	3,017 gm.	450 F	149 F/kg

Gross price: 360 F/kg

VIII. Mutton: Piles of 50 and 100 Francs n = 7

	Total Price	Total Weight	Skeletal Meat	Fat	Bone
Total	500 F	1,325 gm.	910 gm.	65 gm.	350 gm.
Percent of total composition		100%	69%	5%	26%

Gross price (with bone) : 377 F/kg
Net price (without bone): 549 F/kg

losses can be devastating. One of Ouagadougou's largest butchers has ceased operation as a meat exporter because of the substantial losses he incurred when refrigerated cars twice malfunctioned spoiling 2 large shipments of beef. He has since turned to live cattle exports.

When breakdowns do occur losses are not necessarily total. When the meat arrives in Abidjan it is inspected by the Ivorien veterinary service. Provided that it is not condemned, exporters may sell meat that is unacceptable to the quality butcher shops for which it was oroginally intended, to other butchers who sell it retail in traditional markets. The prices offered by these buyers (300-350 francs CFA per kilogram) are considerably lower than those paid by quality butcher shops (400-450 francs CFA per kilogram).

Referring back to Table C.3, it can be seen that the price of meat delivered to the train station is about 225 francs CFA per kilogram for good quality animals. Additional costs for export include:

Refrigeration tax - Ouagadougou Slaughter House	4 F CFA per kilogram
Labor to prepare carcasses for export	2 F CFA per kilogram
Transportation - refrigerated car	40 F CFA per kilogram
Voltaique export tax (10.07% @ 80 F CFA per kilogram)	8 F CFA per kilogram
Sanitary inspection	1 F CFA per kilogram
Total	55 F CFA per kilogram

Thus, the cost of delivering meat to Abidjan by train is approximately 280 francs CFA per kilogram exclusive of losses through spoilage and condemnation.

FOOTNOTE TO APPENDIX C

[1]This appendix is based on a report funded by USAID under a contract (REDSO/WA 77-100) when the investigator was still in Africa.

APPENDIX D

THE CEBV LIVESTOCK PROTOCOLS

During the course of their field investigations into the livestock marketing systems in Upper Volta and Ivory Coast, the author and fellow CRED researcher John Staatz had the opportunity to witness first hand the implementation of the CEBV Livestock Protocols in those two countries. What follows is a brief summary of their findings.

The six Protocols of interest are those concerning: the Collection and Distribution of Statistics (#2); Meat Grading (#3); Livestock Classes (#4); Cattle Routes (#5); the Regulation of Livestock Marketing Professionals (#8); and Customs Harmonization (#9).

Certainly the Entente states need mutual agreement on these issues if they are to meet the objective of regional integration of the livestock distribution system. Yet the means chosen for attaining regional integration, set forth in the Protocols, appear inadequate. The Protocols often fall short in conception, appear inappropriate to the current livestock marketing conditions in these countries, and suggest interventions for which economic justification is lacking. Furthermore, the CRED researchers found widespread lack of implementation. Almost all livestock marketing professionals and most livestock service field agents were unaware of the rudiments of the protocols.

The major conceptual criticisms of the Protocols are:

1. The statistical protocol failed to establish a common base of information to be shared. It also failed to account for the fact that the coastal states have little interest in providing demand information (especially prices) to their northern suppliers.
2. The system of meat grading is not economically justified. Grading is of interest only to exporters, importers, and institutions which purchase large quantities of meat for which they need some proof of the quality. It is of little consequence to the vast majority of traditional buyers who place no importance on such classifications.
3. The classification of livestock by weight necessitates the weighing of individual animals, an impossible task under current marketing techniques, even where scales are available.
4. The agreement on livestock trails fails to establish any common standards such as uniform trail markers or trucking regulations, and appears to take much consideration of the implicitly imposed costs to traders.
5. The question of regulation of market professionals seems to be more of a national than a regional issue. The advantages of the plan laid out in the agreement center on tax collection and some amount of sanitary control. On the other hand, the economic justification of the plan is unclear. The proposed organization restricts entry into the professions and outlaws vertical integration (e.g. butchers who sell both wholesale and retail), which is prevalent throughout the system and has not been shown to be inefficient or harmful.

The lack of application of the protocols in Upper Volta and Ivory Coast is almost total. Briefly, the situation may be summarized as follows:

a. Statistics are not passed on to the CEBV with any regularity with the exception of annual statistics, which are usually reported after a delay of a year or more.
b. The passport system is not used in Upper Volta and is regarded as a substitute for a Laissez-Passer Sanitaire in the Ivory Coast; copies are not returned to the point of origin nor to the CEBV.
c. Meat is not regularly graded in any of the major abattoirs in either country.
d. In Upper Volta there is no enforcement of the established cattle trails.
e. In both countries there has been some attempt to "organize" marketing professionals, especially butchers, but there is little enforcement of the guidelines in terms of restricting activities.
f. There is no application of the agreed reduced tariff regulations for exports to Entente member states from Upper Volta. All livestock and meat is taxed at a uniform rate regardless of desgination.

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