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CATTLE AND BEEF MARKETING IN IVORY COAST

Report to USAID - REDSO/WA

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PREFACE

This report presents preliminary results of research I carried out on cattle and meat marketing in Ivory Coast between March 1976 and July 1977. This research was done as part of a larger study being conducted by the University of Michigan's Center for Research on Economic Development (CRED) under a contract with USAID. This larger study, the Entente Livestock Project (ELP), involved four field studies, located in Upper Volta, Niger, and Ivory Coast, as well as analysis and synthesis of existing data, carried out in Ann Arbor. While in Ivory Coast, I had the opportunity of being associated with the Centre Ivoirien de Recherche Economique de Recherche Economique et Sociale (CIRES) of the Université Nationale de Cote d'Ivoire. I would like to thank both CRED and CIRES for the support they gave me in carrying out this research. Special thanks go to the Director of CIRES, M. Jacques Pegatienan, and the Associate Director, Jean Chataigner. I am also very grateful for the excellent cooperation I received from all the personnel of the Ministry of Animal Production and the Municipal Veterinary Service of Abidjan. Especially helpful were Mr. Pierre Hennebert and Dr. Pierre Aloui at the headquarters of the Ministry in Abidjan. They spent long hours providing me with statistics and discussing cattle and meat marketing in Ivory Coast.

ABSTRACT

Ivory Coast has traditionally represented an important market for Sahelian cattle, especially from Mali and Upper Volta. Since 1975, however, the meat supply situation has changed radically, with a sharp fall in live animal imports from the Sahel and the beginning of large-scale frozen meat imports from the Sahel and the beginning of large-scale frozen meat imports from non-West African suppliers. Whereas in 1974 almost the entire Ivorian beef supply was either produced domestically or imported from the Sahel, by 1976 over 37% of it came from non-West African areas, primarily from South America. While the Ivorian government is promoting many projects designed to boost domestic livestock production and reduce dependence on imports, it appears that the country will remain dependent either on meat or live animal imports to supply much of its animal protein needs in the foreseeable future.

Transport data collected during the study indicate that trekking is often the most economical means of transporting cattle in the Guinea Savanna zone. Mortality is very low and in the rainy season the animals may even gain weight. Truck transport, due to the high freight rates charged, is often not a profitable means of transporting cattle between producing regions and Southern Ivory Coast.

Cattle prices in Bouake and Abidjan showed an upward trend throughout the period July 1976 - June 1977, as did retail meat prices. Cattle prices also showed a strong seasonal peak in November-December, corresponding to a period of peak demand in the forest zone and a time when cattle supplies in the major markets are reduced by a seasonal transportation bottleneck. Transportation problems, especially in rail transport of cattle and meat from Upper Volta to Abidjan, seem to be an important factor in explaining the declining share of the Ivoirian market held by the Sahelian countries.

While cattle are sold in the consumption markets of Southern and Central Ivory Coast at prices considerably above those at which they were purchased in the producing regions, the price differential is largely due to transport costs and export taxes and not to the cattle merchants' profit margins. These margins appear to be fairly modest, as do traditional butchers' margins. (These latter are roughly one half of those earned by European-style butchers.) This suggests that the traditional cattle and meat marketing system is fairly competitive.

Despite the large inroads made by frozen meat sales, most consumers still have a strong preference for fresh meat and would buy it rather than frozen meat were the prices equal. The preference of consumers for fresh meat explains why a price differential is maintained between fresh and frozen meat. Analysis of price data collected during the study also indicates a clear consumer preference for a better-quality (fattier) meat. One can expect that if the economy continues to expand in Ivory Coast, so too will the demand for well-fed cattle.

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CHAPTER I: THE MEAT SUPPLY IN IVORY COAST: RECENT EVOLUTION AND CURRENT TRENDS

INTRODUCTION

The Ivory Coast has traditionally represented a major market for Sahelian livestock and meat, particularly from Mali and Upper Volta. Throughout the 1960's and early 1970's over 80% of the country's beef supply was imported, largely in the form of live animals from the Sahel. The relative economic prosperity of Ivory Coast resulted in a strong demand for meat and made it an important outlet for Sahelian livestock production. For example, SEDES estimated that in 1970 67% of Upper Volta's total cattle exports and 82% of its small ruminant exports went to Ivory Coast, while in the same year Mali sent 60% of its cattle exports and 49% of its small ruminant exports to Ivory Coast (19, pp. 96-97, 159-60).

In recent years, the meat supply situation in Ivory Coast has changed radically, characterized by an abrupt fall in live animal imports from traditional suppliers and the massive importation of meat from Europe and South America. This chapter will discuss both the historical supply pattern and these recent changes, as well as analyze the probable trends in the near future.

DEMAND FOR ANIMAL PROTEIN IN IVORY COAST

Three factors have tended to boost total demand for animal protein in Ivory Coast since Independence in 1950: the population growth of the country, increasing urbanization, and increases in per capita real income.

POPULATION GROWTH

The Ivory Coast's population has grown very rapidly in recent years, increasing by an average of 3.8% per annum between 1965 and 1975. This growth is attributable to two factors: a reduction in death rates resulting from improved sanitary conditions and medical care which has been unaccompanied by a corresponding decline in birth rates (this is a situation common to most developing countries), and substantial immigration to the country by non-Ivorian Africans, particularly Voltaics and Malians, attracted by employment possibilities in the rapidly expanding Ivoirian economy. Official figures on the recent growth of the Ivoirian population are shown in Table 1.

Table 1 — Official Estimates of the Ivory Coast's Population 1960-75 (in thousands)

Year	Population	Year	Population
1960	3,735	1969	4,940
1961	3,340	1970	5,115
1962	3,945	1971	5,264
1963	4,050	1972	5,423
1964	4,165	1973	5,809
1965	4,300	1974	6,064
1966	4,430	1975 a/	6,670
1967	4,560		
1968	4,765		

Average Annual Growth Rates: 1960-1965 - 2.8%
1965-1975 - 3.8%

a/ Preliminary figure

Source: Ministère du Plan, La Côte d'Ivoire en Chiffres, Edition 75, pp. 11, 37.

As Table 1 makes clear, the Ivoirian population is increasing at an increasing rate: betwee 1960 and 1965 the annual rate of increase was 2.8%, while for the following decade it was 3.8%; between 1970 and 1974 the annual rate of increase reached 4.2%. It should be noted, however, that the population figures for years prior to 1975 are estimates; in 1975, a population census was taken which showed that the population in earlier years had been underestimated. (For example, if one accepted both the estimate for 1974 and the population figure established by the census in 1975, the growth rate between 1974 and 1975 would be nearly 10%). Assuming that the 1975 census figure is correct and that the annual growth rate has been 3.8% in recent years, the following population estimates can be made:

Table 2 Revised Estimates of the Ivoirian Population

Year	Population	Year	Population
1970	5,495,400	1974	6,416,540
1971	5,712,500	1975	6,670,000
1972	5,938,150	1976	6,923,500
1973	6,172,700		

Source: Estimates based on census figure of 6,670,000 in 1975 and a 3.8% annual growth rate.

URBANIZATION

The Ivoirian population not only grew rapidly between 1965 and 1975; it also became increasingly urbanized. Urbanization tends to increase total demand for animal protein handled by the marketing system, as per capita consumption is higher in the cities than in the countryside and a much smaller proportion of the animal protein consumption of urban dwellers is met by game and non-commercially-caught fish. Table 3 compares the urban-rural structure of the Ivoirian population in 1965 and 1975 and clearly shows the very rapid rate of urbanization taking place in the country. Table 4 presents annual rates of growth for various cities during this period.

During the decade 1965-75, while the total Ivoirian population increased 55%, urban population (defined as the number of people living in cities of over 10,000 inhabitants) grew by 174%, from 722,300 to 1,976,300. Abidjan paced this increase, growing at an annual rate of 10.5%, while the average growth rate of all areas classified as urban in 1975 was 7.7%.

As a result of this rapid influx to the cities, the urban-rural distribution of the population shifted considerably between 1965 and 1975. Whereas only 16.8% of the total population lived in urban areas in 1965, nearly 30% were urban dwellers in 1975. Both the absolute and relative population of semi-urban areas (towns with populations of from 3,000 to 10,000) declined during the decade; this represented not out-migration from these towns, however, but rather the growth of these towns into population centers classified as urban in 1975. 1/

1/ 23 of the 41 towns classified as "semi-urban" in 1965 had populations of over 10,000 (and hence were classified as "urban") in 1975.

In the same period, the proportion of the population living in rural areas fell by nearly 10%, from 78.0% to 68.2%. This rapid influx to the cities had an impact not only on total demand for animal protein (for the reasons discussed earlier) but also, by changing the relative proportions of various income classes in the cities, probably changed the average per capita amount of meat consumed by urban dwellers. For this reason, it is somewhat dangerous to forecast urban demand for meat in Ivory Coast based on consumption patterns observed in the mid-sixties.

The Ivoirian government feels that this increasing urbanization will continue for the foreseeable future, with roughly 50% of the total population living in urban or semi-urban areas by 1990. Two different projections of the population growth and distribution have been made by the Planning Ministry. The first projection assumes a continued high level of immigration from neighboring countries and strong in-migration to Abidjan; the second assumes a slower overall growth rate due to reduced foreign immigration into Ivory Coast, and a slower rate of urbanization, particularly for Abidjan, as social services improve in rural areas. Both projections, however, show roughly 50% of the population living in urban and semi-urban areas by 1990 (see Table 5). This continuing urbanization will undoubtedly put great demands on the meat marketing system in the coming years.

INCREASING REAL INCOME

Since Independence in 1960, the Ivory Coast has experienced perhaps the most steady economic growth of any country in West Africa. The average growth rate of the gross domestic product (P.I.B.) 2/ in current prices for the decade 1960-70 was 11% per year; during this period, inflation was estimated at 3% per year and population growth at 3.2%, thus implying an increase in GDP per capita of 4.3% per annum (10, p. 37). During the period 1970-75, gains were more modest, but still impressive, real GDP rising at a real rate of 6.2% per year. Since population growth during this period was approximately 4.2% per annum, real GDP per capita rose at 2% per year (12, Vol. III, Part II, pp. 143-4). In 1975, GDP per capita stood at 115,560 F CFA ($462 @ 250 F CFA/$1) and per capita disposible income was 79,160 F CFA ($316) (12, Vol. III, Part IV, p. 220). In recent years, inflation has become a serious problem (it was estimated at 22% in 1974 (10, p. 42), and Montgomery (17) has suggested that this, coupled with what he says is a worsening income distribution, has led to stagnation of the growth of real incomes of most consumers in Abidjan. 3/ Nonetheless, for the country as a whole, it is clear that in the last 17 years real income has increased substantially and that this has undoubtedly increased demand for red meat in the country.

THE IVOIRIAN MEAT SUPPLY

The Ivory Coast's meat consumption is met by three sources of supply: domestic production, imports of live animals from the Sahel and imports of fresh, chilled

2/ Production Interieure Brute: the value of all final goods and services except government salaries.

3/ Data on changes in income distribution in the country are very weak and it is difficult to draw conclusions from them. One may question Montgomery's use of an index of only food prices as his measure of inflation.

Table 3 Urban-Rural Distribution of the Ivoirian Population: 1965 and 1975

	1965			1975		
	Number of Cities in this Class	Population	% of Total	Number of Cities in this Class	Population	% of Total
Total Population		4,300,000	100.0		6,670,000	100.0
Urban Centers						
Abidjan	1	340,000	7.9	1	921,000	13.8
Bouaké	1	85,000	2.0	1	173,000	2.6
Other Cities with Pop. over 30,000	2	65,000	1.5	9	362,000	5.4
Cities with Pop. of 10,000 to 30,000	15	232,300	5.4	33	520,300	7.8
Total Urban Centers	19	722,300	16.8	44	1,976,300	29.6
Semi-Urban Centers						
Towns with Pop. of 3,000 to 10,000	41	221,800	5.2	23	144,400	2.2
Rural Areas		3,355,900	78.0		4,549,300	68.2

Source: Ministère du Plan, La Côte d'Ivoire en Chiffres, Edition 76, pp. 11, 13, 37.

Table 4 Annual Rates of Growth of Urban Centers in Ivory Coast 1965-75

City	Population 1965	Population 1975	Average Annual Growth Rate 1965-75
Abidjan	340,000	921,000	10.5%
Bouaké	85,000	173,000	7.4%
Other Cities having Pop. Greater than 30,000 in 1975 a/	169,000	362,000	7.9%
Cities (N-33) having Pop. between 10,000 and 30,000 in 1975	276,300	520,300	6.5%
All Cities having a Pop Greater than 10,000 in 1975	870,300	1,976,300	7.7%

a/ Daloa, Man, Korhogo, Gagnoa, Divo, Yamoussoukro, Dimbokro, San Pedro and Abengourou

Source: Ministère du Plan, La Côte de Ivoire en Chiffres, Edition 76, p. 13.

Table 5 Projected Growth and Distribution of Population in Ivory Coast: 1975-1190

Hypothesis 1: Continued High Rates of Immigration and Urbanization

	1975	1980	Annual Growth Rate 1975-80 (%)	1985	Annual Growth Rate 1980-85 (%)	1990	Annual Growth Rate 1985-90 (%)
Urban & Semi-Urban							
Abidjan	921,000	1,545,000	10.50	2,300,000	8.30	3,150,000	6.5
Other Urban and Semi-Urban Centers	1,200,000	1,685,000	6.80	2,300,000	6.40	3,150,000	6.5
Total Urban and Semi-Urban Areas	2,121,000	3,230,000	8.50	4,600,000	7.30	6,300,000	6.5
Rural							
Savanna	1,565,000	1,625,000	0.70	1,705,000	0.95	1,790,000	1.0
Forest	2,986,000	3,390,000	2.50	3,715,000	1.85	4,025,000	1.6
Total Rural	4,551,000	5,015,000	1.90	5,420,000	1.40	5,815,000	1.4
Total Population	6,672,000	8,245,000	4.20	10,020,000	4.00	12,115,000	3.9
% Urban & Semi-Urban	31.8	39.2		45.9		52.0	

Hypothesis 2: Reduced Rates of Immigration and Urbanization

	1975	1980	Annual Growth Rate 1975-80 (%)	1985	Annual Growth Rate 1980-85 (%)	1990	Annual Growth Rate 1985-90 (%)
Urban & Semi-Urban							
Abidjan	921,000	1,330,000	7.25	1,780,000	6.00	2,315,000	5.40
Other Urban and Semi-Urban Centers	1,200,000	1,635,000	6.10	2,200,000	6.10	2,900,000	5.70
Total Urban and Semi-Urban Areas	2,121,000	2,965,000	6.60	3,980,000	6.05	5,215,000	5.55
Rural							
Savanna	1,565,000	1,625,000	0.70	1,715,000	1.10	1,840,000	1.40
Forest	2,986,000	3,335,000	2.15	3,600,000	1.55	3,875,000	1.50
Total Rural	4,551,000	4,960,000	1.65	5,315,000	1.40	5,715,000	1.45
Total Population	6,672,000	7,925,000	3.35	9,295,000	3.25	10,930,000	3.30
% Urban & Semi-Urban	31.8	37.4		42.8		47.7	

Source: Ministère du Plan, Projet de Plan Quinquennel de Développement Economique, Social et Culturel 1976-80 (Abidjan, May 1976), Tome III, Fasicule III, pp. 36-37.

and frozen meat. Up through 1974 live animal imports, especially cattle, were by far the most important source of supply, with domestic beef production providing only about 20% of the country's beef consumption throughout the 1960's and early 1970's. Fresh, frozen, and chilled meat imports were until recently directed almost exclusively towards a high-income clientele in Abidjan. The situation has changed dramatically since 1975, as the figures discussed below will demonstrate.

DOMESTIC LIVESTOCK PRODUCTION

Historically, livestock, and particularly cattle production has played a minor role in the Ivoirian economy, as shown in Table 6.

Table 6 Estimated Value of Livestock Production in Ivory Coast--1974 (in millions of F CFA)

	Cattle	Sheep/Goats	Swine	Poultry	Eggs, Milk, Hides, etc.	Total
Value	[illegible]	1,447	1,207	5,260	753	10,227
% of GDP	0.4	0.3	0.3	1.3	0.2	2.5

Source: Ministère du Plan, La Côte d'Ivoire en Chiffres, Edition 76, pp. 34,149.

In 1974, total livestock production accounted for only 2.5% of the country's GDP, with 1.0% of this being attributable to red meat production and merely 0.4% to cattle production. In contrast, agriculture contributed 26.9% of the GDP in this same year (10, p. 84). Livestock production in Ivory Coast has been limited both by health problems and economic factors. Trypanosomiasis as well as many parasitic diseases are endemic in most of the country; these have prevented until recently the development of widespread cattle raising in the country. The development of the cash-crop economy in the forest regions of the country, based on coffee and cocoa production, also demonstrated the comparative advantage of the Ivory Coast in export crop production. Many Ivoirians thus found it more profitable to concentrate their efforts on crop production and use the receipts from this production to buy their meat, rather than producing it themselves. Because of these health and economic factors, there has been little tradition of cattle raising in the Ivory Coast, and the country's meat requirements (especially beef) have been met through import of live animals from the Sahel.

DOMESTIC BEEF PRODUCTION

Two slightly different official estimates of the Ivory Coast's cattle population in 1975 are available: that of the Ministry of Animal Production (14, p. 10) and that of the Planning Ministry (11, Table 3). These estimates are provided in Table 7.

I feel that the figures advanced by the Ministry of Animal Production are more realistic than those of the Planning Ministry. According to Mr. Van Binsbergen, Director of the SODEPRA 4/ extension programs in the north, a SODEPRA census counted roughly 230,000 taurins in Northern Ivory Coast in 1975, and the total number covered by their programs by early 1977 was roughly 120,000 (1).

4/ Société Pour le Développement de la Production Animale, a state-owned corporation under the Ministry of Animal Production which is in charge of increasing domestic livestock production.

Table 7 Official Estimates of Ivory Coast's Cattle Population--1975

Location	Estimated Cattle Population (thousand heads) Planning Ministry	Ministry of Animal Production
Taurins		
Villages covered by extension projects	145	255 (Northern Ivory Coast)
Villages not yet covered by extension projects	205	70 (South and Central Ivory Coast)
Total Villages	350	325
State Ranches	8	10
Palm Plantations	2	
Total Taurins	360	335
Zebus	105	115
Total	465	450

Source: 14, p. 10; 11, Table 3

The Plan's estimate of the zebu population appears low, as a detailed census of the zebus in Ivory Coast in 1975 established a figure of roughly 115,000 (2). Thus the figures of the Ministry of Animal Production will be used in this study.

These figures show that in 1975 a great majority of the Ivoirian cattle (370,000 head, including all the zebus)were in the northern part of the country, while 70,000 head were found in the central and southern regions and 10,000 head were in government ranches and palm plantations. Taurins (trypano-tolerant cattle without humps) are numerically more important than zebus, and have increased in recent years at an estimated annual rate of 3%. Three distinct breeds of taurins are found in Ivory Coast.

The Boualés

Numerically the most important, the Boualé breed accounts for nearly 300,000 head of cattle, found mainly in the northern and central regions of the country. Relatively small, liveweights at four years of age average approximately 255 kg. for males and 175 kg. for females. Weight gains are relatively low, averaging roughly 200 g/day during the rainy season and 100 g/day in the dry season on natural pastures. Despite their very modest capacity for weight gains, the Boualés exhibit two important advantages: their strong resistance to trypanosomiasis and other diseases endemic in the Ivory Coast and their early age of first calving. Their rusticity allow them to be raised in both northern and central Ivory Coast with a minimum of veterinary care, while their early calving implies a numerical productivity higher than the other breeds found in Ivory Coast. The fecundity of Boualés is estimated at 82%, with the first calving taking place at roughly 26 months (15, p. 13).

N'damas

Originally from Guinea, the N'dama breed is found largely in the northwest area of the country, around Odienné. Though numerically less important than the

Boualés (their numbers in Ivory Coast have been estimated between 40,000 and 60,000), they are taller, heavier and perform better in fattening trials. An unselected herd of N'dama raised on natural pasturage in Bouaké showed average liveweights at four years of 308 kg. for males and 279 kg. for females. The N'dama are, however, less trypano-tolerant than the Boualé and thus require more careful management; and while their rate of fecundity is slightly higher than the Boualé (86.5%), they calve later (age at first calving is roughly three years) and hence have a lower numerical productivity than the Boualé (15, pp. 19-20). Most Ivoirian government cattle projects (ranches, selection programs) have been based on the N'dama breed.

Lagune Cattle

Along the coast is found the breed of lagune cattle, which accounts for only about 1% of the total cattle population of the country. Extremely small (liveweights vary between 120 and 175 kg.), the main advantage of the "laguniers" is their extremely strong trypano-tolerance which permits them to survive in a milieu too demanding for the other cattle breeds.

In addition to the taurins, roughly 115,000 zebus are found in the northern part of the country. The number of zebus in the country has greatly increased in recent years (SEDES estimated the zebu population of Ivory Coast at 38,000 in 1966 (18, p. 107)) as the result of Peulh herders moving their animals south from Mali and Upper Volta in the early 1970's to escape the drought conditions further north. Many of these herders appear to have permanently settled in the region around Korhogo and Boundiali, and the Ivoirian government is taking steps to further encourage this migration of Peulh animals into the Ivory Coast.

It is, however, somewhat misleading to speak of separate breeds of cattle in the Northern Ivory Coast, as there has been a tremendous amount of cross-breeding in this region. The most common practice among sedentary cattle raisers in the north is to cross Boualé females with an N'dama bull in order to increase the size of the animals in the herd while retaining most of the rusticity inherent in the Boualé breed. The Peulh herders in Northern Ivory Coast have also cross-bred their zebus with taurins to increase their resistance to trypanosomiasis, bovine pleuro-pneumonia, etc. Those engaged in the meat trade (e.g., those who have settled around Boundiali) cross N'dama and zebus in order to obtain a degree of disease resistance while maintaining the general size of their animals. Those who move their herds south of Korhogo into areas where tsetse infestation becomes greater cross-breed zebus and Boualés to get a greater degree of trypano-tolerance in their herds, albeit at the cost of smaller animals. Such cross-breeding is continued over many generations, so it is not uncommon to see animals from Northern Ivory Coast having characteristics of all three breeds found in the region (zebus, N'dama, and Boualé).

VOLUME OF DOMESTIC BEEF PRODUCTION

The official Ivorian government estimate of domestic beef production stood at 7,200 metric tons in 1975, as shown in Table 8.

A more detailed estimate reveals a slightly lower level of domestic beef production in 1975, as shown in Table 9. The difference stems from a lower estimate in Table 9 of meat production from the taurin herd (4.2 vs. 4.7 thousand metric tons); the estimated production from the zebu herd in 1975 is identical in Tables 8 and 9 (2.5 thousand tons). Table 9 also shows that domestic beef production increased from 4700 T. to 6923 T. between 1970 and 1976, an increase of 46%, or approximately 6.5% per year. One reason for this

relatively rapid growth has been the fact that many Peulh herders moved their animals into Ivory Coast during the early 1970's to avoid drought conditions further north in Mali and Upper Volta; between 1970 and 1976, the number of zebus in Ivory Coast increased by 140%. Many of these herders appear to have settled permanently in Ivory Coast, a move encouraged by the Ivorian government as it increases national beef production.

Table 8 Official Estimate of Domestic Ivoirian Beef Production--1975

Region/Breed	Number of Animals (in thousands)	Production of Meat and Edible Offals (thousand m.t.)
Northern Ivory Coast:		
Taurine	255	4.0
Zebus	115	2.5
Ranches and cattle raising in palm plantations	10	0.1
Other (peasant production in Central and Southern Ivory Coast)	70	0.6
Total	450	7.2

Source: Ministère de la Production Animale, Bureau des Projets, L'Elevage en Cote d'Ivoire, Programme de Developpement, (Abidjan, June, 1976), p. 10

PRODUCTION OF SMALL RUMINANTS

No very solid statistics exist on the number of small ruminants in Ivory Coast, with estimates running from the roughly 1.3 million head found by the National Agricultural Census in 1975 (cited in 16) to the 1.3 million estimated by the Ministry of Animal Production (14, p. 14). The Planning Ministry estimated there were 1,000,000 sheep and 760,000 goats in the country in 1975, the sheep producing 3500 T. of meat and edible offals and the goats producing 2000 T. (11). 5/ Lacking any more accurate statistics, I will use the figures of the Planning Ministry in this report.

PORK PRODUCTION

Pork production in Ivory Coast takes place both in villages and in a few modern pig farms. The official estimate of pork production in 1975 was 5000 T., as shown in Table 10.

It should be noted that in contrast to other types of red meat, Ivory Coast is largely self-sufficient in pork, producing 90% of its domestic consumption mentioned, annual production of game, snails, and other "viande de brousse" was estimated at 16,000 T. in 1975 (11, Table 10). This figure must be taken with caution, however, as there are practically no data on which to base such an estimate.

5/ These estimates of production are apparently based on an offtake rate of 30% for both goats and sheep, carcass weights of 10 kg. for sheep and 7.5 kg. for goats, and edible offals being equal to 15% of carcass weight.

Table 9 Estimate of Ivoirian Domestic Beef Production 1970-76 (in metric tons)

Year	Cattle Population a/	Exploitation Rate	Number Slaughtered	Avg. Carcass Weight	Meat Production (m.t.)	Edible Offals b/ (m.t.)	Total (m.t.)
Taurins							
1970	289,000	10%	28,900	100 kg.	2,890.0	722.5	3,612.5
1971	297,600	"	29,760	"	2,976.0	744.0	3,720.0
1972	306,600	"	30,660	"	3,066.0	766.5	3,832.5
1973	315,800	"	31,580	"	3,158.0	789.5	3,947.5
1974	325,200	"	32,520	"	3,252.0	813.0	4,065.0
1975	335,000	"	33,500	"	3,350.0	837.5	4,187.5
1976	345,000	"	34,500	"	3,450.0	862.5	4,312.5
Zebus							
1970	59,000	12%	6,000	145 kg.	870.0	217.5	1,087.5
1971	70,000	"	8,400	"	1,218.0	304.5	1,522.5
1972	77,000	"	9,240	"	1,339.8	335.0	1,674.8
1973	85,000	"	10,200	"	1,479.0	369.8	1,848.8
1974	105,000	"	12,600	"	1,827.0	456.8	2,283.8
1975	115,000	"	13,800	"	2,001.0	500.3	2,501.3
1976	120,000	"	14,400	"	2,088.0	522.0	2,610.0
Total Production							
1970	339,000		34,900		3,760.0	940.0	4,700.0
1971	367.600		38.160		4,194.0	1,048.5	5,242.5
1972	383,600		39,900		4,405.8	1,101.5	5,507.3
1973	400,800		41,780		4,637.0	1,159.3	5,796.3
1974	430,200		45,120		5,079.0	1,269.8	6,348.8
1975	450,000		47,300		5,351.0	1,337.8	6,688.8
1976	465,000		48,900		5,538.0	1,384.5	6,922.5

Notes: Based on data from the Ministère de la Production Animale and the following assumptions

a/ Cattle population:

1) Taurins: Based on a population of 335,000 in 1975 and a 3% annual growth rate

2) Zebus: Figures provided by Ministry of Animal Production

b/ Edible offals estimated at 25% of carcass weight.

Parameters for carcass weights and exploitation rates provided by Ministry of Animal Production (Dr. Alloui).

Table 10 Estimated Pork Production in Ivory Coast--1975

	Traditional	Modern Farms	Total
Number of Animals	173,000	27,000	200,000
Offtake rate per year	75%	74%	
Annual Rate of Growth	2%	30%	
Available for slaughter annually	77%	104%	
Number slaughtered annually	130,000	20,000	
Average Wt: Meat and offals	27.5 kg.	70 kg.	
Production: Meat and edible offals	3,600 T.	1,400 T.	5,000 T.

Source: Ministère du Plan, "Objectifs du Plan 1976-1980: Secteurs Elevage et Peche, Tableaus" (DDP/PP-1, March 1977), Table 6.

Ivoirian red meat production in 1975 can thus be summarized as follows:

Table 11 Estimated Ivoirian Red Meat Production--1975 (metric tons of meat and edible offals)

Beef	6,689 T.
Sheep	3,500 T.
Goats	2,000 T.
Pork	5,000 T.
Subtotal	17,189 T.
Game a/	16,000 T.

a/ Figure for game of questionable reliability.

Source: Tables 8, 9, 10

IMPORTS OF LIVE ANIMALS

Imports of live animals from the Sahel have traditionally provided the bulk of Ivory Coast's red meat supply, particularly its beef. This is illustrated in Table 12, which presents officially recorded imports of cattle into Ivory Coast from 1965 through 1976.

CATTLE IMPORTS

Between 1965 and 1970 cattle imports increased steadily, rising from 80,200 to 198,000 head. The annual average rate of increase of cattle imports during this period was 20%. Real per capita income was increasing rapidly during this period and undoubtedly was one of the main factors boosting demand for meat and hence cattle. Although the official statistics do not give the origin of imports for 1966 and 1967, it appears that larger exports from Mali accounted for much of the increase during this period, with Mali's relative share of the market increasing from 30.5% to 65.8% between 1965 and 1969; at the same time, the number of cattle imported from Upper Volta actually fell by about 12,000 and the Voltaic share of the market fell from 67% to 24%. 6/

6/ Stryker, cited in Eriksen (6, p. 14), shows the Malian share of Ivoirian cattle imports increasing from 33.4% in 1965 to 55.4% in 1969. It is not clear where Stryker got his statistics, however; in some years (e.g., 1966-69) his total import figures are the same as the official figures cited in Table 12, but in other years his figures differ substantially from the official statistics.

Table 12 Officially Recorded Imports of Cattle into Ivory Coast 1965-76

Year	Mali No.	Mali % of Total	Mauritania No.	Mauritania % of Total	Upper Volta No.	Upper Volta % of Total	Niger No.	Niger % of Total	France No.	France % of Total	Total No.	Total % of Total a/
1965	24,446	30.5	1,914	2.4	53.828	67.1	10	—	—	—	80,198	100.0
1966	---	---	---	---	--	--	--	--	—	—	101,662	100.0
1967	---	---	---	---	--	--	--	--	—	—	119,634	100.0
1968	67,836	41.2	16,356	9.9	80,566	48.9	—	—	—	—	164,758	100.0
1969	113,234	65.8	16,903	9.8	41,335	24.0	567	0.3	—	—	172,064	100.0
1970	143,080 b/	72.1 b/	b/	b/	51,199	25.8	4,121	2.1	—	—	198,400	100.0
1971	--	--	--	--	--	--	--	--	—	—	175,896	100.0
1972	137,074 b/	64.5 b/	b/	b/	73,658	34.7	1,746	0.8	—	—	212,478	100.0
1973	117,942	52.7	29,001	13.0	73,054	32.6	3,938	1.7	—	—	223,935	100.0
1974	123,148	63.6	31,397	16.2	39,084	20.2	—	—	—	—	193,629	100.0
1975	77,065	54.7	5,069	3.6	58,441	41.5	395	0.3	—	—	140,970	100.0
1976	75,[illegible]	67.5	830	0.7	35,264	31.4	—	—	369	0.3	112,314	100.0

a/ Totals may differ slightly from sum of subtotals due to rounding.
b/ Figures for Mauritania included in the figures for Mali.
-- Not Available
— None or Negligible
Source: Ministére de la Production Animale

While part of this apparent growth in the Malian share of the market may reflect an improvement in the statistics gathered along the Malian-Ivoirian border, part of it is also tied to the growth of urban centers such as Daloa, Yamoussoukro, San Pedro, and Bouaké, whose meat supply is met by Malian animals transported south on hoof. 7/

In 1971, total recorded imports fell by almost 23,000 head, apparently reflecting the impact of the drought in the Sahel. Faced with increased mortality, Sahelian herders apparently held back animals and tried to maintain their herds. This was followed in 1972 through 1974 by a destocking of herds in the Sahel as the drought became more severe, and herders were obliged to sell even young males and cows to meet their cash needs. This destocking of the Sahel is reflected in increased cattle imports into Ivory Coast during 1972-1973, particularly a sharp increase in imports from Mauritania, where the effects of the drought were quite severe. In 1974, total imports fell by 30,000 compared to the previous year, and this decline continued at an accelerating rate into 1975. Imports fell in 1975 not only because the marketable surplus of animals in the Sahel had been greatly reduced by the drought and the subsequent destocking of herds in 1972-74, but also due to the fact that Mali and Niger closed their borders to livestock exports during part of the year (which, while it did not cut off the trade completely, certainly reduced it). Imports were also reduced because of the hostilities between Upper Volta and Mali, which essentially ended the transit of Malian animals through Upper Volta along the route Mopti-San-Bobo-Dioulasso-Ouangolodougou (Ivory Coast). 8/ This is reflected in the 37% drop in recorded imports from Mali between 1974 and 1975, which fell from 123,148 head to 77,065. As a result, Mali's relative share of the import market fell from 63.6% to 54.7%. Mauritanian cattle exports to Ivory Coast also fell precipitously in 1975. It was in response to this drop in total cattle imports that the Ivorian government, through its state-owned company AGRIPAC, began importing large amounts of frozen meat, mainly from Europe, in September 1975.

The decline in total imports continued in 1976, falling to 112,314 head. While Malian imports remained at their 1975 level, imports from Upper Volta fell by 23,000 head, and Niger and Mauritania virtually ceased to export to Ivory Coast. 9/ Two factors appear to account for the continued fall in imports

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7/ The bulk of Malian cattle imported into Ivory Coast enters the country on hoof, and it is likely that a larger proportion of these animals are not recorded in official statistics than is the case with Voltaic animals, most of which are imported by train and thus cross the border only at one point. As shown later in this report, Abidjan is largely supplied by Voltaic animals, while Bouaké, Daloa, and other cities in the center and west of the country rely largely on Mali for their supply of cattle.

8/ The transit trade along this route does not seem to have reestablished itself despite the resolution of the Malian-Voltaic territorial dispute. Based on personal observations and those of Larry Herman, another ELP researcher, it seems that trade along the route Mopti-Ouahagouya (Upper Volta)-Djibo-Ouagadougou and Djibo-Niger has been reestablished, however.

9/ In 1976, 369 Normandy cull cows from France were also imported into Ivory Coast by ship. These animals were available at very low prices in France due to the drought during the summer of 1976, and were imported by AGRIPAC as an experiment to see whether live animal imports from Europe could compete with frozen meat imports. There are no plans to continue such imports.

in 1976. First, the effects of the drought continued to be felt (many of the young animals which died in 1969-71 normally would have been marketed in 1976); secondly, there seems to have been a diversion of part of Ivory Coast's "normal" supply, particularly from Upper Volta, towards the more profitable markets in Niger and Nigeria. The high prices offered in Niger stem from two causes: the national herd reconstitution program, which resulted in high prices being paid for young animals, especially heifers; and the strong demand for slaughter animals in Nigeria. 10/ There are unfortunately no estimates of the volume of this new trade between Upper Volta and Niger, although it seems to involve at least several thousand animals per year. Larry Herman, another Michigan ELP researcher, and I have spoken with several cattle merchants in Upper Volta who had abandoned the Abidjan market to sell their animals at Téra, on the border between Niger and Upper Volta. This trade involves above all animals from Northern Upper Volta (the regions around Djibo, Markoye, and Dori) and Eastern Mali; many of these animals, instead of going south to the Ouagadougou market as in the past, travel east to be sold at Téra. It thus appears that the Ivoirian government's policy of importing large amounts of cheap frozen meat to keep "the lid on meat prices" in the major retail markets had the effect of diverting part of the traditional supply of slaughter animals, particularly from Upper Volta, to more profitable markets elsewhere. 11/

Data from the first few months of 1977 show a slight rise in cattle imports in relation to 1976. Total imports for the months of January, February, April, and May, 1977 (the data for March are being revised) stood at 35,383 head, compared to 33,631 for the same months in 1976.

The fact that Sahelian cattle raisers were destocking their herds during the period 1972-76 was reflected in the sex structure of animals slaughtered at Abidjan. Being one of the most important consumption markets in West Africa, Abidjan traditionally attracted the best quality slaughter animals, typically steers from 5-8 years old. But as Table 13 shows, the sex distribution of animals in Abidjan changed radically between 1970 and 1976, reflecting increased sales of females and young uncastrated males by Sahelian herders. Between 1970 and 1975, while the total number of animals slaughtered fell by 32%, the number of steers slaughtered fell by 62% while the number of uncastrated males (generally young animals) increased by 55% and the number of cows increased 80%. In relative terms, steers represented 76.5% of the animals slaughtered in 1970 and only 42.3% in 1975, while the percentage of the slaughter accounted for by uncastrated males increased from 14.4% to 32.7% and that by cows from 9.1% to 25%. In 1976, the number of cows slaughtered in Abidjan dropped sharply (accounting for nearly half the total decrease in slaughters between 1975 and 1976) as did the proportion of slaughter accounted for by cows. It appears that the pre-drought pattern is starting to reestablish itself, with the 1976 sex distribution being roughly the same as that in 1972; however, the proportion of the slaughter accounted for by uncastrated males in 1976 was still more than double that in 1970 (although the absolute numbers were about the same) and seems to point to earlier exploitation of males than in the pre-drought period.

10/ Because the port of Lagos was blocked throughout 1976, Nigeria was not able to adopt the Ivoirian expedient of importing large quantities of frozen meat by sea in order to hold down retail meat prices in the face of a declining supply of slaughter animals from the Sahel and increasing demand resulting from rapidly rising incomes. As a result, prices for live animals in Lagos reportedly rose to approximately 300 F CFA per kg. live-weight near the end of 1976, compared to roughly 210 F CFA per kg. live-weight in Abidjan. (Information received from Mr. Montenez, Planning Ministry, Abidjan.)

11/ Many Voltaic cattle merchants complained to both Herman and me that the Abidjan market had been "ruined" by frozen meat imports.

Table 13 Recorded Cattle Slaughter at Abidjan by Sex of Animal 1970-76

Year	Steers		Uncastrated Males		Cows		Total	
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total
1970	38,456	76.5	7,262	14.4	4,578	9.1	50,296	100.0
1971	35,122	70.7	9,898	19.9	4,635	9.3	49,655	100.0
1972	28,621	52.0	16,138	29.3	10,318	18.7	55,077	100.0
1973	24,491	47.0	14,473	27.8	13,109	25.2	52,073	100.0
1974	20,944	48.6	12,955	30.0	9,221	21.4	43,120	100.0
1975	14,561	42.3	11,268	32.7	8,592	25.0	34,421	100.0
1976	13,113	53.5	7,594	31.0	3,814	15.5	24,521	100.0

Source: Ministère de la Production Animale.

The increase in the proportion of females and young males slaughtered meant that the average weight per animal slaughtered in Abidjan declined. Unfortunately, no actual weight statistics exist for animals slaughtered at Abidjan; however, the Ministry of Animal Production estimates the average carcass weights of steers, uncastrated males and cows at 160 kg., 130 kg., and 110 kg., respectively. Applying these weights to the slaughter proportions indicated in Table 13 results in the following average carcass weights for animals slaughtered in Abidjan from 1970 to 1976:

1970:	151 kg.	1974:	140 kg.
1971:	149 kg.	1975:	138 kg.
1972:	142 kg.	1976:	143 kg.
1973:	139 kg.		

These figures underline the fact that not only did the number of animals imported into Ivory Coast drop sharply during the period 1970-76, but so did the average weight per animal. If we assume that the average slaughter weights for all imported animals were the same as those in Abidjan, the tonnage of beef imported on the hoof can be estimated as in Table 14.

Table 14 Estimated Tonnage of Beef Imported into Ivory Coast on the Hoof 1970-76 (in metric tons)

Year	Number of Cattle Imported	Average Carcass Weight	Meat (m.t.)	Edible a/ Offals (m.t.)	Total (m.t.)
1970	198,400	151 kg.	29,958	7,490	37,448
1971	175,896	149 kg.	26,209	6,552	32,761
1972	212,478	142 kg.	30,172	7,543	37,715
1973	223,935	139 kg.	31,127	7,782	38,909
1974	193,629	140 kg.	27,108	6,777	33,885
1975	140,970	138 kg.	19,454	4,863	24,317
1976	112,314	143 kg.	16,061	4,015	20,076

a/ Estimated at 25% of carcass weight.

Sources: Tables 12, 13 and average slaughter weights (see text).

According to Table 14, the total tonnage imported fell by nearly half between 1970 and 1976, from 37,448 m.t. to 20,076 m.t. A small part of this decline was offset by an increase in domestic production resulting from Peulh herders moving their zebu herds south into Ivory Coast to escape drought conditions further north (Table 9), but most of it was not met by a corresponding increase in other fresh beef supplies. The result was a decreasing total and per capita fresh beef supply throughout this period. 12/

12/ I believe the official import statistics on which Table 14 is based are fairly accurate. There are some unrecorded imports into the west of the country from Guinea, but these are partly offset by unrecorded exports of animals to Liberia. There is no import duty on animals entering Ivory Coast, hence there is little incentive for an importer to avoid the veterinary control stations; on the contrary, herders are subject to numerous police and other "checks" in Ivory Coast and it is in their interest to have their papers (e.g., laissez-passer sanitaire) in order. These papers are available at low cost, and there is no reason to believe that the decline in recorded imports between 1970 and 1976 reflects an increase in the proportion of unrecorded imports.

Table 15 Officially Recorded Imports of Sheep and Goats into Ivory Coast 1965-76

Year	Mali		Mauritania		Upper Volta		Niger		Total	
	Number	% of Total	Number	% of Total	Number	% of total	Number	% of Total	Number	% of Total a/
1965	39,902	28,1	4,936	3.5	86,347	60.8	10,780	7.6	141,965	100.0
1966	--	--	--	--	--	--	--	--	181,258	100.0
1967	--	--	--	--	--	--	--	--	180,517	100.0
1968	27,605	12.3	15,568	6.9	182,015	80.8	___	___	225,188	100.0
1969	89,503	32.0	29,928	10.7	159,929 b/	57.4 b/	b/	b/	279,360	100.0
1970	122,673	39.6	36,135	11.7	128,490	41.5	22,104	7.1	309,402	100.0
1971	--	--	--	--	--	--	--	--	303,479	100.0
1972	--	--	--	--	--	--	--	--	394,044 c/	100.0
1973	147,295	34,5	23,991	5.6	241,137	56.5	14,636	3,4	427,059	100.0
1974	165,710	42.9	29,919	7.8	187,804	48.7	2,397	0,6	385,830	100.0
1975	96,005	27.2	2,811	0.8	253,517	71.9	309	0.1	352,642	100.0
1976	130,744	43.5	___	___	167,264	55.7	2,263	0.8	300,305	100.0

a/ Totals may differ slightly from sum of subtotals due to rounding

b/ Figures for Niger included in the figures for Upper Volta

c/ Recently revised figure, differs from figure previously published by Ministry of Animal Production

-- Not Available

___ None or Negligible

Source: Ministère de la Production Animale

IMPORTS OF SHEEP AND GOATS

Table 15 presents officially recorded imports of sheep and goats from 1965 through 1976. In general, the pattern followed was the same as that for cattle; imports more than doubled between 1965 and 1970, they declined slightly from 1970 to 1971, increased sharply in 1972 and 1973, and then declined markedly from 1973 through 1976. It appears that the same factors that affected cattle imports influenced sheep and goat imports as well. Rapidly rising incomes in the period 1965-1970 stimulated demand for meat and imports grew accordingly; the effects of the drought started to be felt in 1971, resulting in a slight reduction of imports in that year, followed by a massive destocking of herds in 1972 and 1973. This destocking boosted imports into Ivory Coast during these two years, but was followed by a decline in imports from 1973 through 1976 as the number of animals available for sale from Sahelian herds dropped as a result of this destocking. It should be noted that imports of sheep and goats fell proportionally less than did cattle imports, declining by roughly 30% from 1973 to 1976, compared with a 50% drop in cattle imports during the same period. In 1976 sheep and goat imports stood at the same level as in 1970, while cattle imports were considerably below their 1970 levels. Sheep and goat imports have probably been less affected by frozen meat imports than have cattle imports, as the bulk of the frozen meat imported is beef and practically no frozen sheep or goat meat is sold on the traditional African market.

As with cattle imports, the relative market shares of the exporting countries have changed in recent years, with Mauritania and Niger virtually disappearing as important suppliers in the market, and with Mali taking over their share of the market (even though total exports from Mali declined slightly from 1973 to 1976).

Unfortunately, data on the sex distribution of sheep and goats slaughtered in Abidjan (such as exist for cattle) are not available. If we accept the SEDES figure of an average carcass weight of 17 kg. and edible offals equal to 15% of carcass weight for imported sheep and goats (13, p. 117), the tonnage of meat represented by these imports can be seen in Table 16.

Table 16 Estimated Tonnage of Mutton and Goat Meat Imported into Ivory Coast on the Hoof 1970-76 (metric tons)

Year	Number of Animals Imported	Average Carcass Wt.	Meat (m.t.)	Edible Offals (m.t.) a/	Total (m.t.)
1970	309,402	17 kg.	5,260	789	6,049
1971	303,479	"	5,164	744	5,908
1972	394,044	"	6,699	1,005	7,704
1973	427,059	"	7,260	1,089	8,349
1974	385,830	"	6,559	984	7,543
1975	352,642	"	5,995	899	6,394
1976	300,305	"	5,105	766	5,871

a/ Estimated at 15% of carcass weight

Sources: Table 15 and SEDES, Approvisionnement en Viandes de l'Afrique Centre Ouest, 1969, p. 121.

Table 16 reveals that the tonnage of meat represented by small ruminant imports rose from roughly 6000 metric tons in 1970 to 8300 tons in 1973, then fell back to 6000 tons in 1976. Throughout this period this tonnage was equivalent to between roughly one sixth to one quarter of the beef imported on the hoof.

It should be pointed out that the figures in Table 16 are less than those given by the Planning Ministry, which estimated imports at 6.8 tons in 1970 and 8.0 tons in 1975 (11, Table 10); the Planning Ministry apparently felt that the official figures understate the real volume of imports.

IMPORTS OF FRESH, FROZEN AND CHILLED MEAT

In addition to national production and imports of live animals, imports of fresh, chilled and frozen meat is the third main source of meat supply for Ivory Coast. Until 1975 these imports represented a modest volume and were destined almost exclusively for a high-income, largely expatriate clientele in Abidjan. Since 1975, however, the pattern has completely changed, with massive imports of frozen meat (mainly beef) being sold on the traditional African market. Table 17 and Figure 1 present the evolution of fresh, chilled, and frozen meat imports into Ivory Coast from 1960 through 1976.

From 1960 to 1965, total chilled and frozen meat imports tripled from 523 tons to 1,567 tons; throughout most of this period beef accounted for roughly 66% of the total, mutton and goat meat made up about 20% and pork and horse meat accounted for the rest. In 1966 the total climbed to 1,911 tons, and it remained between 1,900 and 2,000 tons from 1966 through 1970. Most of the increase compared to the previous period was due to a rise in beef imports, which accounted for 73% of the imports during this period, while mutton and goat meat accounted for 17%. In 1971 imports began to fall, with imports in the period 1972-74 being at roughly the same level as a decade earlier. This decline reflected falling imports of chilled meat from Niger and the end of frozen meat imports from Mali. Imports of pork also fell during this period as the country moved towards self-sufficiency in pork production. The downward trend in chilled and frozen meat imports continued through the first half of 1975. The abrupt drop in live animal imports in 1975 reduced the total meat supply on the market and in order to check the resulting price rise, the Ivoirian government began importing surplus frozen meat from the EEC beginning in the second half of 1975. These imports are reflected in the huge increase in the figure for 1975 as compared to 1974; in one year, imports jumped from 1,473 tons to 6,329 tons. In 1976, imports increased even more rapidly, reaching 17,030 tons, much of it from South America. Almost all this "new" frozen meat was beef; as a result, beef accounted for over 97% of the imports in 1976 compared with 81% in the 1971-74 period.

Preliminary figures for 1977 point to a reduction in frozen and chilled meat imports. During the first six months of the year, 4,912 tons of meat were imported by ship, while during the first five months, air imports totalled 335.6 tons, imports by rail equalled 71.6 tons, and imports by truck stood at 10.8 tons. Assuming air, rail, and truck imports in June were at their January-May average levels, the total frozen and chilled meat imports for the first six months of 1977 can be estimated at 5,436 tons, broken down as follows:

	Sea	Air	Rail	Truck	Total
Beef:	4,966.4 T	338 T	71 T	12 T	5,237.4 T
Goat/Sheep:	17.1 T	77 T	7 T	1 T	102.1 T
Horse:	10.1 T	9 T	4 T	--	23.1 T
Pork:	13.5 T	2 T	3 T	--	23.5 T
Total:	4,912.1 T	426 T	85 T	13 T	5,436.1 T

Note: Figures for imports by sea are actual figures; other imports estimated from data for January-May, 1977.

Source: Ministére de la Production Animale

Table 17 Imports of Chilled and Frozen Red Meat into Ivory Coast--1960-77 (in metric tons)

Year	Beef m.t.	Beef % of Total	Goat/Sheep m.t.	Goat/Sheep % of Total	Pork m.t.	Pork % of Total	Horse m.t.	Horse % of Total	Total a/ m.t.	Total a/ % of Total
1960	406	76.9	73	13.8	35	6.6	15	2.8	528	100.0
1961	570	65.3	171	19.6	88	10.1	43	4.9	873	100.0
1962	741	66.5	217	19.5	62	5.6	96	8.6	1,115	100.0
1963	956	64.0	319	21.4	79	5.3	141	9.4	1,494	100.0
1964	1,015	63.2	350	21.8	127	7.9	112	7.0	1,605	100.0
1965	983	62.7	360	23.0	131	8.4	93	5.9	1,567	100.0
1966	1,289	67.5	391	20.5	141	7.4	90	4.7	1,911	100.0
1967	1,352	70.3	345	17.9	128	6.7	100	5.2	1,924	100.0
1968	1,466	74.1	339	17.1	78	3.9	95	4.8	1,978	100.0
1969	1,521	76.1	269	13.5	120	6.0	89	4.4	1,998	100.0
1970	1,477	73.8	305	15.2	123	6.1	97	4.8	2,001	100.0
1971	1,405	76.4	240	13.1	107	5.8	87	4.7	1,839	100.0
1972	1,204	80.6	163	10.9	78	5.2	48	3.2	1,494	100.0
1973	1,077	83.2	135	10.4	47	3.6	35	2.7	1,294	100.0
1974	1,243	84.4	145	9.8	39	2.6	47	3.2	1,473	100.0
1975	6,093	96.3	122	1.9	72	1.1	42	0.7	6,329	100.0
1976	16,611	97.5	339	2.0	47	0.3	33	0.5	17,030	100.0

a/ Totals may differ slightly from sum of subtotals due to rounding.

Source: Ministère de la Production Animale.

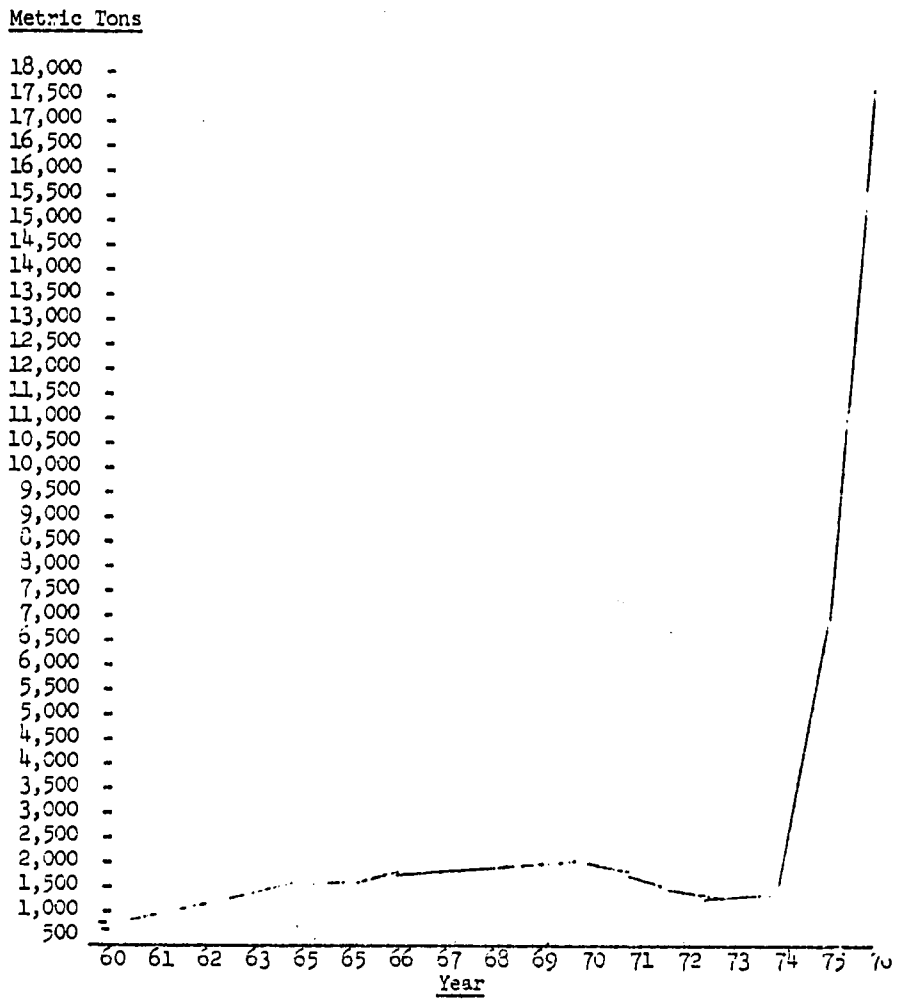
Table 18 Imports of Chilled and Frozen Meats by Country of Origin 1960-77 (in metric tons)

Year	Mali		Upper Volta		Niger		Other African Countries		Total African Countries		Europe		South America		Total a/	
	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total
1960	77	14.6	260	49.2	42	8.0	—	—	379	71.8	149	28.2	—	—	528	100.0
1961	—	—	471	54.0	179	20.5	—	—	650	74.5	223	25.5	—	—	873	100.0
1962	—	—	782	70.1	186	16.7	—	—	968	86.8	147	13.2	—	—	1,115	100.0
1963	95	6.4	910	60.9	270	18.1	—	—	1,275	85.3	219	14.7	—	—	1,494	100.0
1964	181	11.3	979	61.0	220	13.7	—	—	1,380	86.0	225	14.0	—	—	1,605	100.0
1965	167	10.7	960	61.3	236	15.1	—	—	1,363	87.0	203	13.0	—	—	1,567	100.0
1966	309	16.2	935	48.9	473	24.8	—	—	1,717	90.9	194	10.1	—	—	1,911	100.0
1967	57	3.0	1,317	68.5	363	18.9	—	—	1,737	90.3	188	9.7	—	—	1,924	100.0
1968	95	4.8	1,304	65.9	418	21.1	—	—	1,817	91.9	160	8.1	—	—	1,978	100.0
1969	179	9.0	1,232	61.7	406	20.3	—	—	1,817	90.9	181	9.1	—	—	1,998	100.0
1970	153	7.6	1,176	58.8	487	24.3	—	—	1,816	90.7	186	9.3	—	—	2.001	100.0
1971	—	—	1,326	72.1	340	18.5	—	—	1,666	90.6	173	9.4	—	—	1,839	100.0
1972	—	—	1,065	71.3	234	15.7	—	—	1,299	87.0	194	13.0	—	—	1,494	100.0
1973	—	—	915	70.7	194	15.0	—	—	1,109	85.7	185	14.3	—	—	1,294	100.0
1974	—	—	1,078	73.2	187	12.7	8	0.5	1,273	86.4	199	13.5	—	—	1,473	100.0
1975	—	—	591	9.3	277	4.4	891	14.1	1,759	27.8	3,990	63.0	580	9.2	6,329	100.0
1976	—	—	247	1.5	162	1.0	896	5.3	1,305	7.7	2,669	15.7	13.056	76.7	17,030	100.0

a/ Totals may differ slightly from sum of subtotals due to rounding.

Source: Ministère de la Production Animale

Figure 1 Imports of Chilled and Frozen Meat into Ivory Coast 1960-76



It should be noted that no frozen meat was imported during January or February, 1977, as AGRIPAC and DISTRIPAC the two state-owned companies which have the exclusive import rights, both overstocked in December, 1976, and were selling from these stocks during the first two months of 1977. The small amount of meat imported in January and February (121 tons) consisted of chilled meat imported by air. If imports of frozen beef (by sea) continue at their March-June levels (roughly 1,200 T/month) for the rest of the year, they will total approximately 12,000 tons by the end of the year. Assuming imports of "first choice" meat (imports by rail, air, and truck, and also non-beef imports by sea) fall by 50% during the months of July and August, when much of the expatriate population is out of the country, but continue at their January-May levels (roughly 100 T/month) for the rest of the year, total imports for 1977 can be projected at roughly 13,100 T:

Total Imports, January-June, 1977:	5,436 T
Frozen Beef Imports (by sea), 1,200 T/month during July-December:	7,200 T
First Class Meat Imports,	
50 T/month during July and August:	100 T
100 T/month during September-December:	400 T
Total Projected Imports for 1977:	13,136 T

It should be noted that this figure is somewhat higher than the 11,000 ton figure one would get by simply extrapolating from the total figure for January to June. This is because it takes account of the fact that imports during January and February were abnormally low.

In contrast to chilled and frozen meat imported in previous years, the bulk of the meat imported in 1975 and 1976 was destined for the traditional African market and not a high-increase urban clientele. Most of the beef imported previously had been either rear quarters, veal, or select cuts (filet, etc.), much of it chilled and imported by air. In contrast, the beef imports of 1975 and 1976 were mostly frozen front quarters, imported by refrigerated ships. 13/ This meat was and is sold on the African market (with bones) from between 50 and 100 F CFA less than locally slaughtered meat. It is important to stress that initially these large imports of frozen meat were a reaction to and not the cause of the decline in live animal imports. Imports of live animals fell sharply in mid-1975 and it was not until September 1975 that the massive frozen meat imports began. Once started, however, the sales of cheap frozen meat had the effect of checking the price increase of fresh meat and, as mentioned earlier, may have served to reduce live animal imports, particularly from Upper Volta.

Not only did the quantities of frozen and chilled meat increase tremendously between 1974 and 1976, but the pattern of supply changed radically as well, as shown in Table 18, which outlines chilled and frozen meat imports by country of origin. As this table makes clear, up until 1975 the Sahelian countries usually accounted for between 35 and 90% of the Ivory Coast's frozen and chilled meat imports, with Europe (mainly France) making up the rest. Upper Volta was the most important supplier, accounting for between 50 and 73% of the total between 1960 and 1974. Most of the Voltaic meat was transported by refrigerated rail car between Ouagadougou, Bobo-Dioulasso and Abidjan, while imports from Mali and Niger were made by air and refrigerated truck.

13/ Chilled meat is meat which has been cooled to 0° C.; it can be stored for one to two weeks. Frozen meat has been refrigerated to -20° and can be kept for months or even years.

European imports, both by ship and air, accounted for between 8 to 14% of total imports during the period 1962-74, while imports from non-Sahelian Africa were non-existent until 1975 (the 8 tons imported from "other African countries" in 1974 came from Senegal). Malian exports to Ivory Coast stopped in 1970, while imports from Upper Volta and Niger dropped fairly steadily from 1970 onward, as did total imports. In 1975 the entire supply pattern changed, with large imports arriving from Europe, non-Sahelian Africa and, for the first time, South America. In one year, the combined market share of Mali, Upper Volta and Niger fell from 35.9% to 13.7%, and by 1976 it represented only 2.5% of total meat imports.

The increased imports from Europe in 1975, as mentioned earlier, represented surplus EEC stocks dumped on the market because the cost of storage had become prohibitive with the increase in oil prices in 1975. This meat, mainly front quarters, arrived by ship at Abidjan at roughly 230 F CFA/kg. (c.i.f.) and thus could be sold competitively on the African market. In addition to the European meat, imports of frozen meat also began arriving from South America in 1975. Most of this meat was also destined for the traditional market. In contrast, imports from "other African countries" represented first quality meat which was sold mainly in supermarkets and European-style butcher shops. In 1975 this meat came almost exclusively from Rhodesia; it was imported by plane through Gabon and marketed under the name "Boeuf de la Zambeze." These imports from Rhodesia continued through April 1976, when they were stopped due to political reasons after the collapse of the Smith-N'komo constitutional talks in Salisbury. (In early 1977, AGRIPAC began to import meat from Botswana and market it under the name "Boeuf de la Zambeze." It isn't clear whether this meat is actually from Botswana or Rhodesia.)

In 1976, both AGRIPAC and DISTRIPAC, the state-owned companies holding the monopoly import rights to meat, began to import heavily from South America, mainly Argentina. DISTRIPAC, which imported slightly over half the total, shipped "matched" front and rear quarters, while AGRIPAC dealt almost exclusively in front quarters. Most of this meat was destined for the traditional African market, particularly in Abidjan, although some first choice meat was also imported by air from Argentina, especially after the suspension of meat imports from Rhodesia. Some imports of relatively cheap frozen meat continued from France, especially following the summer drought which led to increased cattle slaughter in Europe, but the total amount was less than in 1975. By the end of 1976, South America, and particularly Argentina, completely dominated the chilled and frozen meat market, accounting for 76.7% of the total, while the Sahel, Ivory Coast's traditional supplier of chilled and frozen meat, had ceased to be a significant source of supply. Table 19 provides a detailed picture of the supply pattern in 1976, and shows the degree to which non-Sahelian suppliers dominated the market. For the deluxe market, which includes mainly that meat imported by air, rail and truck, Rhodesia was the most important supplier, followed by Argentina; Argentina and France dominated the trade in frozen meat destined for the traditional market.

Particularly noteworthy is the decline in Upper Volta's share of the deluxe market in recent years, after having dominated this market for most of the sixties. Upper Volta's share of the market rose rapidly from 1960 to 1967; its total meat exports to Ivory Coast increased five times during this period, while its market share climbed from 49 to 68%. Voltaic exports to Ivory Coast varied between 1,176 and 1,326 tons during the period 1967-71 and then fell to 900-1,100 tons in the period 1972-74. Since 1974 imports from Upper Volta have

Table 19 Meat Imports into Ivory Coast by Country of Origin and Transport--1976 (in metric tons)

Transport	Country	Beef	Goat/Sheep	Pork	Horse	Total
AIR	Gabon (Rhodesia)	865.0	3.7	—	—	868.7
	Argentina	273.0	45.4	—	—	318.4
	Romania	60.0	—	—	—	60.0
	Niger	43.0	58.4	—	16.6	118.0
	Chad	25.0	—	—	—	25.0
	France	15.0	6.5	1.5	2.0	25.0
	Upper Volta	10.0	—	—	—	10.0
	Kenya	2.0	—	—	—	2.0
	Subtotal--Air	1,293.0	114.0	1.5	18.6	1,427.1
SEA	Argentina	11,686.0	195.0	—	—	11,881.0
	France	2,549.0	—	34.5	—	2,583.5
	Uruguay	857.0	—	—	—	857.0
	Subtotal--Ship	15,092.0	195.0	34.5	—	15,321.5
RAIL	Upper Volta	189.0	23.0	11.0	14.0	237.0
TRUCK	Niger	37.0	7.0	—	—	44.0
	TOTAL	16,611.0	339.0	47.0	32.6	17,029.6

Source: Ministère de la Production Animale

fallen precipitously, with the 1976 figure of 247 tons being less than the Ivory Coast imported from Upper Volta in 1960. According to both importers and retail butchers interviewed in Ivory Coast as well as exporters contacted by Herman in Upper Volta, this fall is due almost entirely to a marked decline in the quality of refrigerated rail transport between Upper Volta and Ivory Coast. The refrigerated wagons are owned by a private company, the Fruitiere Ivoirienne (formerly CODAPAG) which, through its contact with the RAN 14/ has the monopoly on refrigerated rail transport between the two countries. Because the refrigerated wagons have not been maintained, breakdowns of the compressors are frequent, resulting in heavy losses for the exporters, who are only paid for their meat once it arrives safely in Abidjan. 15/ This has had two results: first, fewer butchers in Ouaga and Bobo are willing to take the risk of shipping meat to the Ivoirian market; and secondly, European-style butchers in Abidjan and Bouaké, unable to have assured supplies of this meat, have turned to other sources, notably southern Africa and Argentina. It should be stressed that the decline in imports from Upper Volta has been due primarily to transport problems rather than price competition from non-Sahelian imports. All the meat importers, wholesalers, and European butchers I contacted in Abidjan and Bouaké felt that the Voltaic meat was a good quality product appreciated by their customers, and that it represented a class intermediate in quality and price between locally slaughtered beef and the more expensive imports from southern Africa and South America.

In order to overcome these transport problems, the Voltaic and Ivoirian governments created a joint state-owned company for refrigerated rail transport in 1976. This company, the Société pour le Transport Frigorifique (SOTRAF) is due to begin trial meat shipments from Upper Volta to Abidjan by refrigerated containers in late 1977; if these trials are a success, additional containers will be purchased and regular service will begin in 1978. While a demand for perhaps between 1,500 and 2,000 tons per year of quality meat exports from Upper Volta exists in Ivory Coast and could be tapped through improved refrigerated rail transport, a note of caution should be added. The Ivory Coast government, through its animal production agency SODEPRA, has started a feedlot operation near the sugar refinery at Ferkéssédougou, based on a molasses-cotton-seed ration, and a refrigerated abattoir is planned for 1978 at the site. By 1980, plans call for the fattening of 16,000 animals per year, which will then be slaughtered at the new abattoir. The meat will be transported to Abidjan by refrigerated truck (since by 1980 the entire route between Ferké and Abidjan will be paved). Assuming 50 kg. per rear quarter, this implies a production of 1,600 tons of meat (rear quarters) per year of roughly the same quality as that shipped previously from Upper Volta. This means that Upper Volta may soon lose the "intermediate" quality market. This also points out a larger problem, that of producing more "quality" meat than can be absorbed by the market. In addition to the feedlot currently in operation near Ferkéssédougou, the Ivory Coast is planning a second feedlot, with an animal capacity of 20,000 head (2,000 tons of rear quarters) for 1980. Upper Volta is constructing a feedlot near Bobo-Dioulasso to supplement the production of fattened animals currently carried out by individuals in and around Ouagadougou, and Mali is planning to export roughly 10,000 fattened animals by 1980, the equivalent of 1,000 tons of choice rear quarters (12, Vol. III, Part 1, pp. 184-5; 22). Most of these projects are based on the supposition that these

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14/ Regie de Chemin de Fer Abidjan-Niger, the Ivoirian-Voltaic railroad linking Ouagadougou and Abidjan.

15/ In the case of a breakdown, the meat, originally destined for first class (European-style) butcher shops, is either seized by the Veterinary Service or, if it isn't too badly damaged, sold at a loss on the African market.

animals and/or meat can be sold at a premium on the Ivoirian market; given the current size of the "quality market" in Ivory Coast, this seems somewhat doubtful.

The most marked change in the meat supply situation in the Ivory Coast in recent years, however, has not been the loss of the deluxe market by the Sahelian countries to other exporters, but the rapid penetration of the traditional African market by non-African suppliers. Prior to 1975, virtually no non-West African meat was sold on the traditional market; by 1976, frozen meat, most of it from South America, was being sold on this market at the rate of approximately 15,000 tons per year. The rapid increase in frozen meat imports for the traditional market is seen in Table 20, which shows frozen and chilled meat imports by means of transport. Although a small quantity of first quality meat is imported by sea (roughly 100 tons/year, mainly from France), the bulk of the meat imported by sea in 1975 and 1976 was frozen meat destined for the "popular" market. Imports by ship jumped from 77 tons in 1974 to 4,502 tons in 1975 and 15,322 tons in 1976; and imports by sea increased from 5% of total frozen and chilled meat imports in 1974 to 90% in 1976.

The inroads made by frozen meat imports in supplying the traditional market were due primarily to the low price of this meat. According to the Ministry of Animal Production, frozen front quarters ("2eme choix") from Argentina arrived in Abidjan at the following prices during 1976 and early 1977:

	Price c.i.f. Port of Abidjan	
	U.S. $/Ton	F CFA/Kg.
Most of 1976·	$ 600	144 F
December 1976	750	188
Jan-Feb 1977:	1,100	275
March 1977:	1,260	315
April 1977:	870	217

(Note: Exchange rates used 1976, $1 - 240 F CFA; 1977, $1 - 250 F CFA)

Thus, throughout most of 1976, frozen meat arrived in Abidjan at an extremely low price; it was resold wholesale to butchers at 230-240 F/kg. and sold retail (with bones) between 280 and 300 F/kg. At the same time locally slaughtered meat was sold retain at 350 F/kg. with bones. As will be shown later there is a marked preference by consumers for fresh meat, which allows a price margin between fresh and frozen meat to be maintained. Nonetheless, the lower price of the frozen meat attracted many customers including most of the institutions (hospitals, schools, army, etc.) in the major cities. It is not clear whether the price at which meat was sold to Ivory Coast during 1976 reflects a "dumping" price or merely a "destocking price" (i.e., cost of production several years ago plus accumulated storage costs). As the price rise in late 1976 and early 1977 seems to indicate, the price of $600/ton c.i.f. Abidjan probably does not reflect current production costs; however, more data are needed to be certain of this.

From December 1976 through early March 1977, the wholesale price of frozen meat rose rapidly; but it fell again in late March to roughly $870/ton. During this period, the retail price of frozen meat rose; however, the 50-100 F/kg. margin between its price and that of fresh meat was maintained. During this period, the gross margins of butchers who sold frozen meat fell considerably (from 60F/kg. to 25F/kg. at Bouaké) which led many butchers to switch back to selling fresh meat. It should be noted that roughly 80% of the frozen meat is sold in Abidjan.

THE IVOIRIAN MEAT SUPPLY

Based on the statistics for national production and imports of live animals and meat discussed above, an estimate of the Ivoirian red meat supply in 1976 can be made, as well as estimates of the changing beef supply from 1970 to 1976. Table 21 provides a picture of the Ivoirian red meat supply in 1976.

Table 20 Imports of Chilled and Frozen Meat by Means of Transport 1960-77 (in metric tons)

	Air		Sea		Rail		Truck		Total a/	
Year	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total
1960	213	40.3	120	22.7	195	36.9	—	—	528	100.0
1961	347	39.7	187	21.4	338	38.7	—	—	873	100.0
1962	340	30.5	122	10.9	651	58.4	3	0.3	1,115	100.0
1963	476	31.9	164	11.0	843	56.4	11	0.7	1,494	100.0
1964	324	20.2	165	10.3	958	59.7	158	9.8	1,605	100.0
1965	340	21.7	148	9.4	944	60.2	135	8.6	1,567	100.0
1966	827	43.3	142	7.4	930	48.7	12	0.6	1,911	100.0
1967	429	22.3	136	7.1	1,309	68.0	50	2.6	1,924	100.0
1968	517	26.9	91	4.7	1,275	66.3	95	4.9	1,978	100.0
1969	491	24.6	105	5.3	1,222	61.2	179	9.0	1,998	100.0
1970	563	28.1	109	5.4	1,176	58.8	153	7.6	2,001	100.0
1971	441	24.0	85	4.6	1,313	71.4	—	—	1,839	100.0
1972	360	24.1	83	5.6	1,051	70.3	—	—	1,494	100.0
1973	394	30.4	87	6.7	813	62.8	—	—	1,294	100.0
1974	469	31.8	77	5.3	922	62.6	5	0.3	1,473	100.0
1975	1,295	20.5	4,502	71.1	503	7.9	29	0.4	6,329	100.0
1976	1,427	8.4	15,322	90.00	237	1.4	44	0.2	17,030	100.0

a/ Totals may differ slightly from sum of subtotals due to rounding.
Source: Ministère de la Production Animale

Table 21 Ivoirian Red Meat Supply-1976 (in metric tons of meat and edible offals)

	National Production		Imports: Live Animals		Imports: Meat		Total	
	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total
Beef	6,923	11.9	20,076	34.4	16,611	28.4	43,610	74.7
Goats/Sheep a/	3,500	6.0	5,871	10.1	339	0.6	9,710	16.6
Pork a/	5,000	8.6	—	—	47	—	5,047	8.7
Horse	—	—	—	—	33	—	33	—
Total	15,423	26.5	25,947	44.5	17,030	29.0	58,400	100.0

a/ 1976 national production of goats, sheep and pork estimated at same levels as 1975

Source: Tables 9, 10, 14, 16, 17.

As seen in Table 21, beef is by far the most widely consumed red meat in Ivory Coast, accounting for three fourths of the total supply, while meat from small ruminants made up 16.6% and pork 8.7%. The bulk of the meat supply is imported; national production accounted for only about a fourth of total red meat consumption in 1976, while imports of live animals from the Sahel supplied about 45% and imports of frozen and chilled meat accounted for the remaining 30%. Based on an estimated 1976 population of 6,923,500 (see Table 2), the figures in Table 21 imply the following per capita meat consumption in 1976:

Beef:	6.3 kg.
Goat/Sheep:	1.4 kg.
Pork:	0.7 kg.
Total:	8.4 kg.

It is striking to note that this is exactly the same level of per capita beef consumption (6.3 kg.) found by the SEDES study in 1966 (18, pp. 119-24); SEDES found a higher goat/sheep consumption, however (2.5 kg.) and a slightly lower pork consumption (0.5 kg.).

Looking at changes in the beef supply in recent years (Tables 22 and 23), one can see that while the volume of total supply was the same in 1970 and 1976 (approximately 43,600 metric tons), the pattern of supply had changed considerably between these two years. As shown in Table 22, the share of the total supply met by national production increased gradually over the period from 11% to 16%; the major change, however, was the large increase in the relative share of frozen and chilled meat imports. From supplying an average of three percent of the total beef supply during the period 1970-74, chilled and frozen meat imports increased to 16% of the total supply in 1975 and 38% in 1976. During the same time, the proportion of total supply met by live animal imports from the Sahel fell from 84% in the 1970-74 period to 65.5% in 1975 and 46% in 1976. As shown in Table 23, this massive increase in frozen meat imports in 1975 and 1976 represents the "opening" of the Ivoirian market to non-West African suppliers. Prior to 1975, the West African meat market was essentially a closed system, with few imports into or exports from the region. This is reflected in the Ivoirian statistics; up until 1975, 99.7% of the Ivoirian beef supply was met by national production and imports from neighboring Sahelian countries. By 1976, however, 37.5% of the total supply came from outside the West African region: 29.4% from South America, 6.2% from Europe and 2.0% from Southern and Eastern Africa. The total amount of non-West African meat imported in 1976 equaled 16,424 metric tons; this was the equivalent of roughly 91,880 head of Sahelian cattle. 16/

A striking feature of Tables 22 and 23 is that contrary to most of the projections made during the mid-sixties and early seventies (for a review of these projections, see 6, pp. 24-37), the total beef supply in Ivory Coast did not increase over the period 1970-76. Total supply rose in 1972 and 1973, reflecting the destocking of Sahelian herds described earlier, then fell abruptly in 1974 and in 1975. By 1976 the large imports of frozen meat boosted supply back up to its 1970 level. Since total supply did not increase from 1970-76, while population was growing steadily, per capita beef consumption fell more or less steadily over this period, as shown in Table 24.

Table 24 Estimated Per Capita Beef Consumption 1970-76

Year	Total Beef Supply (metric tons)	Population	Per Capita Beef Consumption (kg./person/year)
1970	43,625	5,495,400	7.9
1971	39,409	5,712,500	6.9
1972	44,426	5,938,150	7.5
1973	45,782	6,172,700	7.4
1974	41,477	6,416,540	6.5
1975	37,100	6,670,000	5.6
1976	43,610	6,923,500	6.3

Source: Table 2 and Table 22.

16/ Based on an average carcass weight of 143 kg. plus edible offals equivalent to 25% of carcass weight (see Table 14).

Table 22 The Ivoirian Beef Supply: 1970-76 (in metric tons): Meat and Edible Offals

	IMPORTS						NATIONAL PRODUCTION		TOTAL a/	
	Live Animals		Fresh, Chilled and Frozen Meat		Total Imports a/					
Year	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total	m.t.	% of Total
1970	37,448	85.8	1,477	3.4	38,925	89.2	4,700	10.8	43,625	100.0
1971	32,761	83.1	1,405	3.6	34,166	86.7	5,243	13.3	39,409	100.0
1972	37,715	84.9	1,205	2.7	38,920	87.6	5,507	12.4	44,426	100.0
1973	38,909	85.0	1,077	2.3	39,986	87.3	5,796	12.7	45,782	100.0
1974	33,885	81.7	1,243	3.0	35,128	84.7	6,349	15.3	41,477	100.0
1975	24,317	65.5	6,093	16.4	30,410	82.0	6,689	18.0	37,100	100.0
1976	20,076	46.0	16,611	38.1	36,687	84.1	6,923	15.9	43,610	100.0

a/ Totals may differ slightly from sum of subtotals due to rounding.

Source:

Tables 9, 14, 18.

Table 23 The Ivoirian Beef Supply by Origin: 1970-76 (in metric tons): Meat and Edible Offals

Year	National Production m.t.	National Production % of Total	Sahelian Countries a/ m.t.	Sahelian Countries a/ % of Total	Other African Countries m.t.	Other African Countries % of Total	Total: African Imports m.t.	Total: African Imports % of Total	Europe m.t.	Europe % of Total	South America m.t.	South America % of Total	Total b/ m.t.	Total b/ % of Total
1970	4,700	10.8	38,825	89.0	—	—	38.825	89.0	102	0.2	—	—	43,625	100.0
1971	5,243	13,3	34,062	86.4	—	—	34,062	86.4	104	0.3	—	—	39,409	100.0
1972	5,507	12,4	38,786	87.3	—	—	38,786	87.3	133	0.3	—	—	44,426	100.0
1973	5,796	12,7	39,848	87.0	—	—	39,848	87.0	138	0.3	—	—	45,782	100.0
1974	6,3[illegible]	15,3	34,977	84.3	8	—	34,985	84.3	143	0.3	—	—	41,477	100.0
1975	6.689	18.0	25,052	67.5	891	2.4	25,943	69.9	3,888	10.5	580	1.6	37,100	100.0
1976	6,923	15.9	20,263	46.5	892	2.0	21,155	48.5	2,[illegible]6 c/	6.2	12,816	29.4	43,610	100.0

a/ Mali, Upper Volta, Mauritania, and Niger,

b/ Totals may differ slightly from sum of subtotals due to rounding.

c/ Includes an estimated 92 metric tons of meat and offals from 369 live animals imported from France.

Source:

Tables 9, 14, 18.

Per capita beef consumption fell abruptly from 1970 to 1971, reflecting a fall in imports, then partially recovered in 1972 and 1973 as imports picked up again. Between 1973 and 1975 annual per capita consumption fell from 7.4 kg. to 5.6 kg.; in 1976, due to the frozen meat imports, it rose back up to 6.3 kg. Per capita consumption in 1976 was still roughly 20% below that of 1970; this declining per capita beef consumption for the country as a whole is consistent with Montgomery's finding that per capita beef consumption in Abidjan has fallen in recent years (17). This decline in beef consumption appears to have been largely compensated for by an increase in per capita fish consumption; between 1970 and 1975 (the last year for which figures are available) estimated per capita fish consumption (in fresh fish equivalent) rose from 18.0 kg. to 25.3 kg. (13 p. 3). This substitution was due to a change in relative prices between beef and fish; price statistics collected by the Ministère de l'Economie et des Finances indicate that between 1970 and 1975, while fresh fish prices rose 25% in Abidjan, beef prices rose 80%. Thus, while in 1970 the ratio between the recorded retail prices of beef (with bones) and fresh fish sold on the traditional market was 1.3, by 1975 it had risen to 1.9 (8, 9). 17/

GOVERNMENT LIVESTOCK DEVELOPMENT PROJECTS AND THE FUTURE ROLE OF CATTLE IMPORTS

Faced with the prospect of insufficient meat supplies from its traditional suppliers and increasing dependence on an uncertain world market, the Ivoirian government has taken a number of steps aimed at boosting domestic animal production and thus limiting the growth of imports. The current stated government policy is to "increase by all means possible Ivoirian animal production, by utilizing the country's enormous potential for the production of forage and agricultural by-products, in order to fill the deficit in meat which continues to grow due to the increase in the population and its needs" (7). Increasing domestic beef production is limited by two factors, however: the small size of the national cattle herd, which means that even large percentage increases in national production have a small impact on total beef supplies; and a lack of coordination between policies aimed at increasing national beef production (under the control of the Ministry of Animal Production) and the anti-inflation policies of the Ministry of Commerce aimed at keeping down the price of meat. The latter policies (price controls and the importation of cheap frozen meat) have the effect of reducing the profitability of domestic beef production and hence discouraging it. 18/

Faced with the small size of the national cattle herd and the impossibility of producing a large proportion of national beef consumption in the near future, the stated policy of the government is to concentrate on the production of animals with short reproductive cycles (poultry, swine, sheep and goats), since meat production from these sources can be increased more rapidly than from cattle. "It is certain that this option will imply the modification of firmly-established eating habits among our population, and beef will become in time a luxury item."19/ Despite the stated goals of the government, however, the present price and import policy has continued to favor beef consumption and beef remains the cheapest meat available on the Ivorian market (see Chapt. VI).

17/ The prices collected by the Ministère de l'Economie et des Finances probably understate beef prices; however, the general tendency of beef prices to increase faster than fish prices over the period 1970-75 is rather clear.

18/ Officials of both AGRIPAC and DISTRIPAC (the two government-owned companies having the monopoly on frozen meat importations) told me that their mission was to supply urban consumers with meat at the lowest possible price. The practical result of this policy is that these companies sometimes refuse to buy animals from government-run projects (e.g., small-holder fattening projects run by the Bandama Valley Development Authority (AVB) because they can buy frozen Argentinian meat at a lower price.

19/ Statement by Philippe Yacé, Secretary-General of the PDCI (Parti Democratique de Côte-d'Ivoire, the country's single political party) at the Sixth Party Congress (October, 1975), quoted in 14, p. 3.

Among the current and proposed government projects aimed at increasing domestic beef production are the following: 20/

--Extension programs ("encadrement") for sedentary livestock producers in the north and central parts of the country, carried out by SODEPRA. The main goal of these programs is to insure better veterinary care of the animals and to improve management techniques. One aspect of these programs has been to create village cooperative feedlots to fatten animals from local herds during the dry season. As of July 1977, 18 such feedlots had been created (with a total of 750 head); plans call for fattening 2,500 head in 1978. Over half the sedentary herds in Northern Ivory Coast are covered by the SODEPRA extension program, which is continuing to expand. In the central region of the country, the extension program began in late 1976 and has not yet involved a large number of herds.

--The creation of medium-sized private farms ("moyennes entreprises"), each having between 700 and 800 head (of which 250 are to be cows). These farms, which have yet to be created, are to be owned either by private individuals or cooperatively by a village; their level of management is envisaged as being intermediate between that of the village herds covered by the SODEPRA "encadrement" programs and the large-scale "industrial" farms described below.

--"Industrial" scale cattle ranching schemes, based on imported breeds. This project envisages the creation of several large-scale private or joint state-private enterprises for beef and milk production. Due to the shortage of breeding stock in Ivory Coast, this program is to be based on importation of heifers of both West African and exotic breeds. For meat production, plans call for importing 4,500 "foreign" heifers plus 3,000 West African Heifers in 1977-78; by 1982, these figures are projected as 6,000 head and 4,000 head respectively. In addition, it is hoped to import 2,400-2,500 heifers per year for milk production. It appears that these projections are very ambitious.

--Large-scale fattening projects. Plans call for the creation of large-scale feedlots to fatten imported cattle from the Sahel using agro-industrial by-products (molasses, cottonseed, etc.). One such feedlot has been in operation near the sugar refinery at Ferdéssédougou since late 1976, and during its initial phase is fattening approximately 750 animals per year. The fattening period is roughly six months, based on a molasses, cottonseed, and cut-forage ration; and the mean daily liveweight gain per animal is approximately 600 grams. 21/ Plans call for expanding the operation to 8,000 head per year by 1979, with the possibility of further expansion to 16,000 head in 1980. A second feedlot, with a capacity of 20,000 head per year, is planned for around 1980; and further large-scale feedlots are "hoped for" if private capital can be found to finance them.

--Sedentarization of Peulh herds in Northern Ivory Coast. In order to increase the number of breeding stock in Ivory Coast (and hence domestic production), the Ivoirian government has created a 14,000 ha. "pastoral zone" near Boundiali which is to be reserved for Peulh herders. This zone (called "la Palé") is to be provided with wells, roads, veterinary facilities (dipping tanks, vaccination chutes, etc.), and other improvements in the hope that these facilities will entice transhumant Peulh herders from Mali and Upper Volta to settle permanently in the region with their animals. Current plans call for 158 herds totalling approximately 30,000 head of zebus to be settled in the region by 1991, when the project is to be fully operational (5).

20/ Most of the following descriptions and production projections are drawn from documents produced by the Planning Ministry (11, 12).

21/ Information on liveweight gains from Dr. Klaus Hübl, director of the project (personal communication). The Planning Ministry's production projections for this feedlot are based on an assumed daily gain of 750 grams (12, Vol. III, Part 1, p. 135).

--Cattle raising in palm plantations. Since 1974, the state-owned company for palm oil production (SODEPALM) has been stocking trypano-tolerant Boualé and N'dama cattle in its palm plantations. The aim is threefold: one herd serves as a center for selection of improved Boualé breeding stock to be distributed by SODEPRA to its other projects (small-holders, medium-sized farms, etc.); the sale of cattle adds to SODEPALM's revenues; and the cattle, by keeping down grasses and other plant growth, considerably reduce labor costs in the palm plantations. As of March 1977, there were 5,030 cattle in the palm plantations. Plans call for expanding the total to 15,000 by 1982-83 and 30,000 (with the creation of new palm plantations) by 1984 (21; 5, Vol. III, Part 1, p. 139).

--The expansion of three state-owned ranches, located at Sipilou (near Man), Abokouamikro (near Yamoussoukro), and the Marahoué (near Mankono). These ranches are conceived primarily as centers for selection and diffusion of improved N'dama breeding stock; their main goal is not meat production. Nonetheless, meat is produced as a "by-product" of their operations and it will increase as the ranches expand. Currently, the two ranches of Sipilou and Abokouamikro have nearly reached their capacity of 4,000 head each; the Marahoué ranch, which is projected to have 30,000 head by 1986, began to be stocked in July 1975 and currently has about 1,000 head (4).

--Animal traction projects. Although conceived primarily as agricultural rather than livestock programs, the rapid expansion of animal traction in Ivory Coast has a definite impact on meat production. Animal traction is

used primarily in cotton production (and to a lesser extent, in rice cultivation) and has expanded very rapidly in Ivory Coast. In 1971-72 CIDT (Compagnie Ivoirienne pour le Développement des Textiles), the para-statal (monopoly) cotton company, reported 126 pair of oxen in use by cotton farmers in Ivory Coast. By 1976-77 the total had grown to 5,790 pair, and it was projected at 11,315 pair by 1980 (3). Animal traction may be considered as a type of "long term" fattening (lasting several years), as the animal, by working, develops its muscalature and may add roughly 50 kg. to its carcass weight. 22/ Assuming that the 5,043 oxen put into service during CIDT's 1976-77 campaign are sold for meat after having worked four years, this implies a supplemental production of 253 tons of beef by 1980.

It must be stressed that the projections made by the Planning Ministry for domestic beef production through 1990 (based on the programs described above) seem extremely optimistic. In the words of the Planning Ministry itself, "it must be understood that the production goals established in the 1976-80 Plan are voluntarily very ambitious and can be achieved only to the extent that an entire set of necessary pre-conditions are met" (11). One may seriously question whether all these pre-conditions can be met (e.g., whether a sufficient amount of female breeding stock can be imported from neighboring countries, whether the feedlots and ranches can be expanded as rapidly as projected, etc.). In short, one should take the Planning Ministry's projections of domestic production as the maximum possible in the coming years. These projections are shown in Table 25.

Table 25 indicates total beef imports rising through 1980 and then declining gradually thereafter as the share of national consumption met by domestic production increases steadily. Total consumption grows constantly through 1990 but per capita consumption is fairly steady after 1980, a hypothesis based on the assumption that the government will follow price and other policies (e.g., educational campaigns) which will encourage consumption of sheep/goat meat, pork, poultry and fish instead of beef (see p. 43). The role which the

22/ Twenty-three animals sold by CIDT between 1974 and 1977 to butchers at Bouaké, after having been used for animal traction for several years, had an average carcass weight of 172 kg. (3, p. 2). Assuming an initial live-weight of 250 kg. and a 50% dressing percentage, this implies a mean gain of 47 kg. per carcass. (The 250 kg. liveweight figure was supplied by Dr. Charry, the official in charge of animal traction projects for CIDT).

Table 25 Projected Domestic Beef Production and Imports (Meat and Edible Offals) by Project: 1975-90 (in metric tons)

	1975	1980	1985	1990
Smallholder (taurin) production covered by SODEPRA extension programs:	2,030	4,275	8,000	16,600
Medium-sized farms ("moyennes entreprises"):	—	495	1,400	5,000
State ranches:	140	380	735	1,500
Cattle raising in SODEPALM plantations:	—	250	525	750
Zebu production (including Northern Ivory Coast pastoral zone):	2,000	3,150	5,400	9,800
Smallholder (taurin) production not covered by SODEPRA extension programs:	2.770	2,100	2,465	2,850
"Industrial" small enterprises:	—	270	3,000	15,200
Fattening of imported zebus:	—	2,700	6,075	6,750
TOTAL:	6,940	13,620	27,600	58,450
Projected consumption:				
Per person (kg./year):	4.7	6.3	6.0	7.0
Total:	37,350	50,000	60,000	83,000
Required imports:	30,410	36,380	32,400	24,550
National production as a % of national consumption:	18	27	46	70

Source: Ministère du Plan, "Objectifs du Plan 1976-1980, Secteur Elevage et Pêche, Tableaux" (DDP/PP-1), Abidjan, March 1977 (Mimeographed), Tables 1, 3, and 10.

traditional cattle marketing system will play in this changing supply situation will depend on several factors:

1. The "split" of meat and cattle imports between the Sahelian countries and the non-West African meat suppliers. The larger the imports of non-West African meat, the smaller will be the volume of cattle sold by the traditional system in Ivory Coast. The volume of frozen meat imports in coming years will be directly related to the world price of beef, which, unfortunately, is an unknown factor at this point.

2. The degree to which the production goals of the Plan can be met. To the degree that the goals cannot be met, imports will have to rise if projected levels of consumption are to be met.

3. Whether per capita beef consumption can be held to the projected levels. Although per capita consumption has fallen since 1970 (see Table 24), it is possible that the projected increases in per capita income and rates of urbanization may lead to increased per capita beef consumption in the future. Despite its statements to the contrary, the government's current policy has been to encourage beef consumption vis-a-vis pork and sheep/goat meat by importing large quantities of cheap frozen beef. One should not underestimate the political difficulties the government would face in restricting beef imports in order to raise the relative price of beef in relation to other meats.

4. The degree to which livestock producers involved in government extension programs will continue to market their animals through traditional channels. SODEPRA has created a marketing service to handle sales not only from its large- and medium-scale operations and feedlots, but also from village herds covered by its extension programs. To the extent that villagers and sedentary Peulh covered by SODEPRA programs sell through SODEPRA, the traditional circuit ' ol will diminish.23/

In sum, the importance of the traditional cattle marketing system in Ivory Coast will most likely decline relative to alternative sources of supply; however, even accepting the very optimistic production goals of the 1976-80 Plan, the absolute volume of animals handled by this system (i.e., a large percentage of total imports, almost all the animals sold from herds not covered by SODEPRA programs and some percentage of those animals from herds covered by these programs) will remain fairly constant through 1990. To the degree that the Plan's production goals are not met, the traditional system will probably serve as the residual supplier of animals on the market.

23/ Between August 1976 and March 1977, 50% of the recorded sales from sedentary herds covered by SODEPRA programs in Northern Ivory Coast were to traditional marketing agents (butchers, 39%; cattle merchants, 11%), while 16% of the sales were to SODEPRA or to village fattening projects (the remainder were to other peasants and miscellaneous buyers) (20, p. 3). It is likely that the percentage sold to SODEPRA will increase as its program becomes better established.

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4. Mr. Deterier, Assistant Director of the Marahoué ranch, personal communication.

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CHAPTER II: THE STRUCTURE OF CATTLE AND MEAT MARKETS IN IVORY COAST

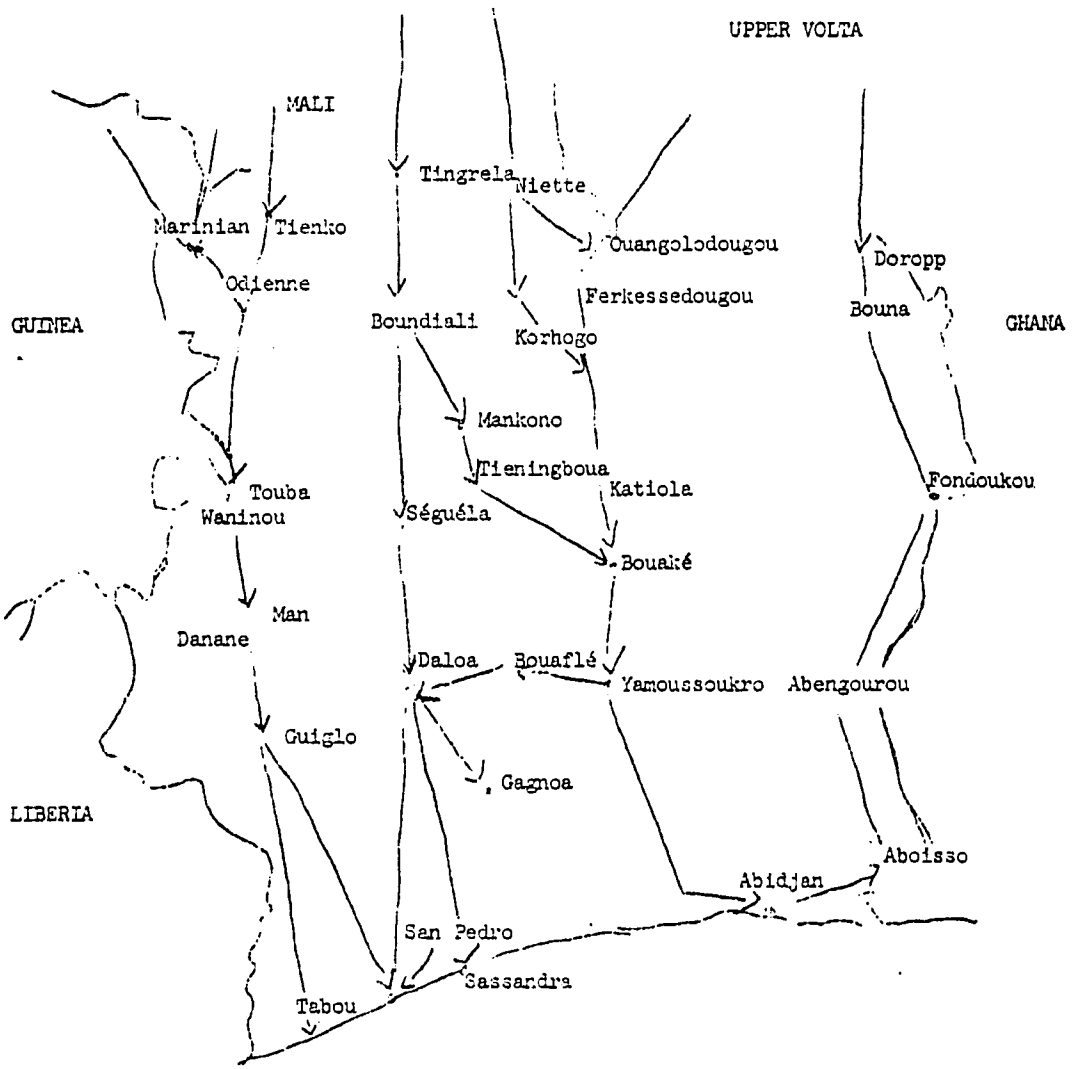
TRADE FLOWS OF CATTLE

There are four major north-south cattle trade "corridors" in Ivory Coast: one in the west, two in the central part of the country and one in the east (see Map 1). In the west, the two major border-crossing points are Tienko and Maninian (both near Odienne); Tienko receives animals entering from Mali while Maninian receives both Malian and Guinean animals (the latter are mostly N'damas). These animals pass south, mainly on hoof, through Odienne and Touba to Man. Additional animals enter this corridor from Guinea at the town of Waninou (near Touba). At Man, the animals are either redirected to Danané and from there exported to Liberia, are slaughtered in Man itself, or are shipped to markets farther south (Guiglo, Tabou, and San Pedro).

According to Dr. Sinali, Regional Director of the Veterinary Service in Northern Ivory Coast, the official statistics on the volume of animals passing through this western corridor are incomplete, not taking account of all the animals which enter the country around Odienné nor any of the imports from Guinea. The only available official statistics on the number of animals handled annually by this corridor is the figure for imports passing through Tienko, which in 1976 totalled 4,195 head (5, p. 60); however, Dr. Sinali considers even this figure an underestimation. One can get a rough idea of the volume of animals entering this western corridor at points other than Tienko by looking at the number of animals from other border regions passing through Man. Man is the major redistribution market of this corridor, and a large percentage of the animals passing through this corridor (including almost all the animals eventually exported to Liberia) pass through Man. Between February 1976 and February 1977, 858 animals from Maninian were recorded as either entering the market at Man or transiting through Man for another destination. 1/ A total of 2,066 head were noted from the region of Touba (Touba, Waninou, and Booko) and were probably Guinean animals. It should be added that Touba itself is an important market for cattle, especially N'dama males to be used in animal traction. For example, from May 1975 through January 1976, C.I.D.T. purchased 1,947 N'dama at Touba for its animal traction programs (1); it is likely that the large majority of these animals originally came from Guinea. Thus a conservative estimate of the number of animals passing through this corridor in 1976 can be made as follows:

Imports from Mali entering Ivory Coast at Tienko:	5,000
Imports from Mali and Guinea entering Ivory Coast at Maninian:	1,200
Imports from Guinea entering Ivory Coast at Waninou and Touba:	4,000
Total:	10,200

1/ These figures (from laissez-passer sanitaire statistics available at the Regional Office of the Veterinary Service in Man) probably understate the volume of animals passing through Man because it is likely that not all herds transiting through Man for other destinations are recorded by the Veterinary Service. Figures used are for February 1976 to February 1977, rather than the calendar year 1976, because figures were unavailable for January 1976.



Map 1 Major Trade Routes for Cattle in Ivory Coast

As with total imports for this corridor, no official statistics exist on the number of animals which pass along this corridor and are eventually exported to Liberia. A rough estimate of the importance of this trade can be made by looking at the number of animals officially recorded as leaving or transiting through Man for Danane, the major border-crossing point. Almost all animals exported to Liberia pass through Man and cross the border at Danané, hence transit and laissez-passer statistics from Man should give a fairly good idea of the numbers involved. For 1976, 3,741 cattle were recorded as leaving or transiting through Man for Danane. Since only 838 head were slaughtered at Danané during the year, exports to Liberia can be estimated at a minimum of 3,000 per year (6).

A second cattle corridor is found in the east of Ivory Coast. Voltaic animals enter the country, mainly on hoof, at Doropo and pass from there to Bouna and to the major cities of the east (Bondoukou, Abengourou, Agnibelikro). Formerly, this was an important trade route for animals going to Ghana; they would exit Ivory Coast at Bondoukou and Agnibelikro. As the economic situation in Ghana has worsened in recent years, the volume of animals passing along this corridor has diminished considerably. In 1966, SEDES estimated that 7,000 imported animals moved along this corridor annually: by 1976, the Veterinary Service statistics indicate that only 1,970 cattle entered the country at Doropo (7;11. Vol. I, p.281).

The two most important north-south cattle corridors, in terms of the number of animals handled, are in the center of the country. One circuit runs from the region between Sikasso and Bougouni in Mali to Tingrela, which is the most important single border-crossing point in Ivory Coast, with 32,382 head recorded as having passed through it in 1976 (5, p. 60). Tingrela is not only an important border-crossing point, it is also the largest market in Northern Ivory Coast for both imported and domestically-produced cattle. Often cattle traders based in Ivory Coast will come to Tingrela to buy from their Malian counterparts and then ship the animals to the major consumption centers in the south. From Tingrela, the animals generally move south on hoof to Boundiali; from Boundiali some of the herds continue directly south to Séguela. At Séguela some of these animals are slaughtered, a few head southwest to Man, but the bulk continue on to Daloa, which is a major consumption and redistribution center. Animals not slaughtered at Daloa are sent on to other markets throughout the southwest (Guiglo, Gagnoa, San Pedro, and Sassandra). Those animals which do not continue directly south to Séguela from Boundiali travel southeast to Mankono, Tieningboue and Bouaké. Bouaké is not only the second most important consumption center for meat in Ivory Coast, it is also the country's most important redistribution market. For example, in 1976, 15,149 cattle were recorded as leaving the Bouaké market for other cities in the south and central regions of the country (8). Thus, some of the animals arriving in Bouaké are slaughtered for local consumption (total recorded cattle slaughter in 1976 was 10,841 head (8)), and the rest are sent on to other markets in the center and south (Yamoussoukro, Divo, Toumodi, Dimbokro, Daoukro, Oume, and Bouaflé are the most important secondary markets served by Bouaké), as well as to Abidjan. Shipments of cattle from Bouaké to Abidjan are very seasonal, however, taking place largely from April through July. This period is the end of the dry season and the beginning of the rainy season in Upper Volta, when there are few animals available in the cattle markets of Ouagadougou and Bobo-Dioulasso, which normally supply a large number of the cattle sold in Abidjan. During this same period, Bouaké is receiving ample supplies of slaughter animals from Northern Ivory Coast and Southern Mali (the rains start earlier in these regions than in the areas around Bobo and Ouaga, so the animals have been gaining weight from around May). Cattle traders in Bouaké and Abidjan thus take advantage of the supply situation in Bouaké to buy and ship well-fed animals from Bouaké to Abidjan.

Shipments of cattle from Bouaké to Abidjan are made largely by truck, although some animals are also sent by train. Some animals are sent to the secondary markets (e.g., Yamoussoukro) on hoof, but hoof transport south of Yamoussoukro is rare and it is forbidden to trek animals to Abidjan.

In addition to the corridor that runs through Tingrela, a second central corridor passes through the border town of Niellé. Animals from Sikasso, San, and Mopti in Mali enter Ivory Coast at Niellé, then travel southwest to Ouangolodougou. At Ouangolodougou animals also enter Ivory Coast from Upper Volta, both on Hoof and by rail. The Malian animals which arrive at Ouangolodougou generally continue south on hoof to Ferkéssédougou, where those destined for Abidjan and some of those destined for Bouaké are loaded on the train for the trip south. 2/ The rest continue south on hoof, passing through Tafiré and Katiola before arriving at Bouaké. The two central livestock corridors account for the bulk of the animals imported into Ivory Coast every year. In 1976 roughly 100,000 head passed through these corridors.

SEASONALITY OF CATTLE IMPORTS

Data on monthly imports of cattle are available only since 1974, so it is somewhat difficult to analyse the seasonality of imports, especially since 1975 was such a highly abnormal year due to rapidly falling imports throughout the year. Nonetheless, looking at Figure 2, certain patterns can be seen, despite the general downward trend in imports. In 1974 and 1976 there is a marked seasonal peak in imports in December, which corresponds to a period of strong demand for beef because of the various religious and other festivals during this period, such as Christmas, New Year's, and all the harvest festivals in the forest zone (this is the period when people begin to be paid for their coffee and cocoa harvest). This is followed by a fall in imports in January, then slightly rising total imports until about April or May. 3/ Imports from Upper Volta start to fall in about April, rise slightly in June and then fall

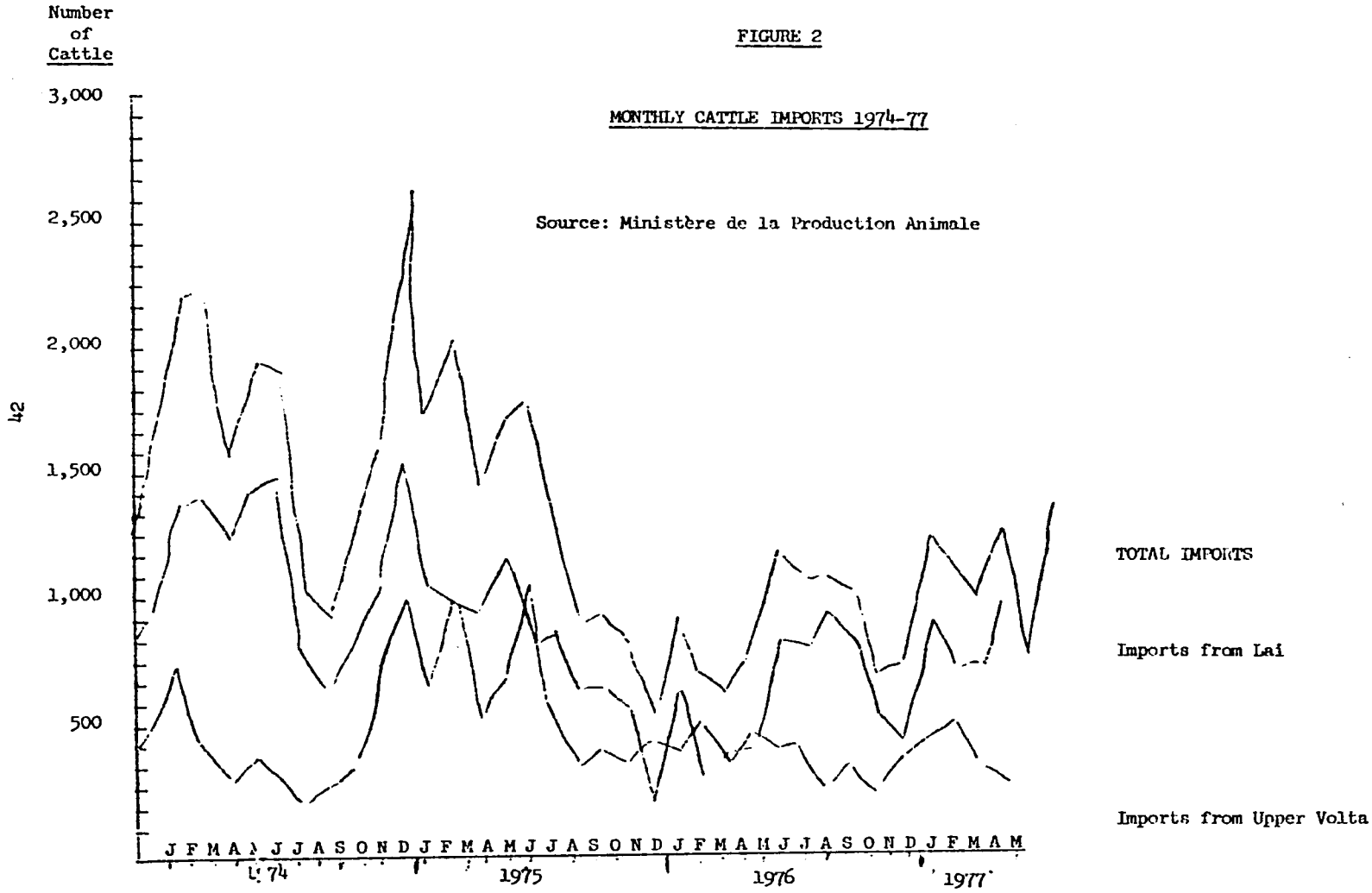
2/ The rail rates per kilometer are higher from Ouangolodougou than from other cities in Northern Ivory Coast and Southern Upper Volta; this is because the RAN considers that merchandise and animals loaded at Ouangolodougou are almost exclusively Malian. Being partly owned by Upper Volta, the RAN sets its rates so as to favor Voltaic products vis à vis Malian ones, hence the higher freight rates from Ouangolodougou. The Malian cattle merchants, however, avoid these rates by simply walking their animals south the 44 km. to Ferkessedougou, where the rates per kilometer are lower. Shipment of cattle by rail from Ferkessedougou to Bouake takes place mainly in the dry season when the animals arrive in Ferké already weakened from a lack of food and there is little grazing or water between Ferké and Bouaké. During the rainy season, most merchants trek their cattle between Ferké and Bouake.

3/ Part of the apparent fall in import from December to January is due to the way in which the Veterinary Service reports its statistics. The monthly reporting period is from the 21st of one month to the 20th of the following month (e.g., the April report covers the period March 21-April 20); this is true except for the months of December and January. December's report covers the period Nov. 20-Dec. 31, while January's report only covers the period Jan. 1-20. Hence imports for December are overstated and those for January are understated. Even taking account of this factor, however, there is still a seasonal peak in imports in December.

FIGURE 2

MONTHLY CATTLE IMPORTS 1974-77

Source: Ministère de la Production Animale



off again in July or August. This is the beginning of the rainy season and cattle owners hold back their animals, waiting for them to fatten up on the new pastures. 4/ Demand in the large cities also drops off during this period, as much of the expatriate population starts to leave for vacation and Ivoirian students and teachers often return to their villages for their vacations.

It is interesting to note that imports from Mali are fairly steady during the months of March-June, while Voltaic imports are falling; this "contracyclical" pattern lessons somewhat the fall in total imports during the period March-June. After having fallen to a low point around August, total imports start to pick up again during the last quarter, building towards the seasonal peak in December.

Figure 2 also shows the dramatic fall in cattle imports during 1975. From a peak of 26,201 cattle imported in December 1974, imports fell steadily to a low point of 4,362 head in October 1975. Since that date monthly imports have been increasing gradually, although they are not yet near the levels of 1974 (see Table 26).

STRUCTURE OF CATTLE MARKETS IN IVORY COAST

In general, the major cattle markets of Ivory Coast may be classified into three groups: "supply markets," in which both imported and domestically-produced animals are sold primarily for reshipment to consumption centers further south; "consumption-redistribution" markets, where a large number of the animals are slaughtered for local consumption, but which also serve as major redistribution points for sales of cattle to the surrounding population centers; and "consumption markets," where the large majority of animals are slaughtered for local consumption. The most important supply markets are Tingrela, Boundiali, and Odienné in the north, and Warinou and Touba in the west (the latter handle mainly Guinean animals). The major consumption-redistribution markets in the country are Korhogo, Man, Daloa, Bouaké, and Abengourou; Man serves not only as a redistribution point for animals within Ivory Coast but also for animals exported towards Liberia. The major consumption markets are in the south and include Gagnoa, San Pedro, Sassandra, Aboisso and Abidjan. These definitions are not exclusive. For example, Korhogo exhibits some characteristics of a supply market, exporting locally-produced animals towards the south, and there is some redistribution of animals from Abidjan to surrounding markets.

Since Bouaké is both a major consumption market and the largest redistribution market in the country, it exhibits characteristics found both in the consumption markets, such as Abidjan, and the supply markets farther north. For this reason, Bouaké was chosen as the "base" for this study, and hence I will use the example of Bouaké to describe the various agents involved in cattle and meat marketing in Ivory Coast. In most cases this description can be generalized to most of West Africa; where these agents or their roles differ from those of their counterparts in Abidjan, the difference will be mentioned.

4/ Many cattle merchants in Abidjan say that this drop is also due to the fact that during this period, most people in Upper Volta, including many of the smaller cattle merchants, are busy preparing their fields and thus have no time to trade cattle.

Table 26 Monthly Cattle Imports 1974-77 (number of cattle)

Year/Country	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1974													
Upper Volta	2,077	4,456	6,048	2,904	1,528	2,121	1,936	811	1,166	1,769	5,253	9,015	39,084
Mali	6,995	8,350	12,885	12,974	11,391	13,337	13,382	6,595	5,573	7,424	9,675	14,561	123,148
Mauritania	2,628	4,024	2,233	5,193	1,790	3,524	2,936	1,821	1,499	2,112	1,012	2,625	31,397
Niger	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL	11,700	16,836	21,166	21,071	14,709	18,982	18,254	9,227	8,238	11,305	15,940	26,201	193,629
1975													
Upper Volta	5,271	9,321	4,272	5,894	9,865	4,731	2,521	2,972	2,741	3,348	3,172	4,333	58,441
Mali	9,555	9,314	8,553	10,736	7,279	7,610	5,550	5,492	4,878	870	5,342	1,866	77,065
Mauritania	1,871	1,038	753	280	370	160	160	44	65	54	98	176	5,669
Niger	—	94	11	—	—	—	—	—	200	90	—	—	395
TOTAL	16,697	19,767	13,589	16,910	17,514	12,501	8,231	8,508	7,884	4,362	8,612	6,395	140,970
1976													
Upper Volta	2,404	3,946	3,336	3,090	1,750	2,536	1,447	2,937	3,532	4,018	2,843	3,345	35,264
Mali	2,900	3,234	7,841	7,283	8,735	7,332	4,488	3,653	8,414	6,387	6,529	9,055	75,851
Mauritania	—	105	97	104	—	91	56	—	109	—	137	131	830
Niger	—	—	—	—	—	—	—	—	—	—	—	—	—
France	—	—	—	—	—	—	369	—	—	—	—	—	369
TOTAL	5,304	7,285	11,274	10,477	10,485	9,959	6,360	6,590	12,055	10,405	9,509	12,531	112,314
1977													
TOTAL	7,075	13,138	n.a.	7,285	7,885	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Notes: — None
n.a. Not available

Source: Ministère de la Production Animale.

AGENTS INVOLVED IN CATTLE AND MEAT MARKETING AND THEIR ECONOMIC ROLES

The agents involved in cattle and meat marketing in Bouaké and Abidjan include the following: cattle merchants, "courtiers," "petits-intermediaires-arbitrageurs," wholesale butchers, retail butchers, butchers' apprentices, and herders. There are also many "hangers-on" at the cattle markets (vendors, griots, etc.) who earn part of their living providing services to the market participants. The functions of these agents are the following:

Cattle Merchants

Cattle merchants are men who buy animals either in the north for resale farther south or in one of the redistribution markets for shipment to one of the surrounding markets. The bulk of the animals arriving both in Abidjan and Bouaké belong to cattle merchants based in the exporting regions (Mali, Upper Volta, and Northern Ivory Coast); these men or their representatives are usually present at the sale of their animals in the final markets, but generally do not accompany the animals south themselves. Rather they hire herders to transport the animals south and then travel to the destination themselves a few days before the scheduled arrival of the herd in order to check out prices and make arrangements for the sale. Those merchants who export regularly by train from Ouaga and Bobo to Abidjan usually do not go south for each sale of their animals, but leave the sale to their "convoyeurs" who accompanied the herd south and to their courtiers in Abidjan.

In addition to individual cattle merchants resident in the exporting regions, there are several Malian import-export companies which export animals to Bouaké and Abidjan; often this is done on a profit-sharing arrangement with the company's representative who arranges for the transport and sale of the animals. Animals are exported by these companies not only for the profits involved, but also in order to gain the right to import merchandise into Mali. Under Malian foreign trade regulations, by exporting cattle and repatriating the money thus earned, the companies earn the right to import goods worth 75% of the value of the cattle exported (9).

There are also a small number of cattle merchants resident in Bouaké and Abidjan who import from the north or buy animals for resale in other markets. In Abidjan, all these merchants work also as intermediaries (see below), but in Bouaké there are six men whose primary activity is that of cattle merchant (including one who has 16 buying agents in Mali). Two of these merchants import from Mali, while the four others buy in Bouaké for resale in other markets. In addition, there are also four courtiers who regularly import cattle to Bouaké or buy in Bouaké for sale elsewhere.

Courtiers

The "courtiers" or principal intermediaries (known as "landlords" in the Anglophone countries) serve as cattle brokers, arranging for the sale of a cattle merchant's animals, but not actually buying the animals themselves. Typically, a cattle merchant who arrives in Bouaké or Abidjan contacts a courtier, who is often originally from the same region in the north as the merchant. The merchant stays at the courtier's house and the courtier contacts prospective buyers and negotiates terms of sales for the animals (subject to approval by the merchant). If the sale is on credit, the courtier negotiates the terms (period of credit; interest, if any; etc.) and often acts as a guarantor of the buyer's credit. Thus, if the buyer fails to pay the credit at the agreed time, the courtier threatens, cajoles, and harasses the buyer and may try to convince the other intermediaries to refuse to sell to him until he pays. If his efforts fail, the courtier, in theory, is obligated to

pay the seller for his animals. (In reality, there are times when the courtier refuses to reimburse the total amount, so that the cattle merchant ends up absorbing some or all of the loss.) In Bouaké (but not often in Abidjan), the courtiers also usually guarantee to the buyer that the animal is healthy (i.e., that it won't die before being slaughtered) and that it is not stolen. Thus, the system of courtiers is built upon the specialized knowledge which these agents possess of local market conditions (prices, solvency of local butchers, etc.), and is the basis of the entire credit system on which the cattle marketing system is based. This is not to say that the system is flawless; there are occasional abuses of the system, which is based entirely on personal trust rather than written contracts, and often debts go unpaid or are not paid on time, especially in Abidjan (see below).

For his services, the intermediary in Bouaké and Abidjan receives a commission of 200 F CFA for each animal sold (paid by the buyer); if the buyer feels he got a particularly good buy he may pay more to the intermediary in the hopes of getting more such buys in the future. In addition, there are some courtiers who regularly supply a certain butcher or butchers with animals on credit. In such cases, the courtier usually takes an additional margin of roughly 2,000 F CFA per animal sold. The seller, upon leaving Bouaké or Abidjan, often gives a gift to his courtier of between 2,000 to 5,000 F CFA if he feels he has received good prices for his animals. Normally he also reimburses the courtier for the cost of feeding him during his stay.

In their studies of the cattle marketing system in Nigeria and Ghana, Cohen (2, 3) and Hill (4) both state that courtiers in these countries act solely as brokers, arranging sales and acting as witnesses to the transactions, but never buying and selling animals themselves. My observations in various markets in Ivory Coast have shown that while intermediaries may be very reluctant to admit that they buy and sell cattle themselves, they often do act as cattle merchants as well as intermediaries. 5/ In these instances the courtiers actually buy the animals themselves and resell them at the same market or elsewhere. Occasionally cattle merchants, especially those who sell in Abidjan, prefer to sell their animals as a lot to their courtier (which allows the merchant to return home quicker and thus have a more rapid turnover of capital), who later sells the animals individually to butchers. In Bouaké, there are thirteen courtiers, all but one of whom are Malian and ten of whom are Peulh (the other three are Dioula). Together they handled a volume of roughly 26,000 cattle in 1976. In Abidjan there are sixteen courtiers, of whom nine are Malians, six are Voltaics, and one is a Mauritanian. The larger number of Voltaic intermediaries in Abidjan is due to the fact that Abidjan is largely supplied by Voltaic animals shipped south by rail.

In addition to the courtiers, certain large cattle merchants and butchers in Bouaké and Abidjan may house merchants from the north who have come to sell animals. This is usually done in hopes of striking a deal to buy the animals as a lot. There are also a few butchers in Bouaké and Abidjan who combine their work as butchers with the profession of courtier.

Petits-Intermediaires-Arbitrageurs

In addition to the courtiers, there are in most markets a number of smaller intermediaries whose function is to help the principal intermediaries sell the animals of their clients. The small intermediaries are often related to the

5/ The reason courtiers are reluctant to admit buying animals themselves is that it implies they may not always try to sell their clients' animals at the highest possible price, especially if they are themselves interested in buying those animals. In fact, occasionally there are abuses of confidence by courtiers. I once observed a courtier telling one of his clients (a cattle merchant from Mali) that prices on the Bouaké market were lower than they actually were; he convinced the merchant to sell him the animals at a relatively low price and then resold them the next day (after the merchant had left Bouaké) for a healthy profit.

courtiers. Typically, when a herd arrives, the small intermediaries, who often work with little or no capital, "buy" animals on credit (typically in the morning or early afternoon) through the courtier in charge of selling the herd and then try to resell the animals to butchers in the evening, making a profit of from 1,000 to 5,000 F CFA per animal. If a "petit-intermediaire" does not find a buyer for his animal, he "gives it back" to the courtier and is relieved of his debt. Thus, the credit given to the small intermediary generally lasts only a few hours. Some of the more established small intermediaries extend credit themselves to buyers (and hence guarantee the buyer's credit to the principal intermediary); this acts to diffuse risk in the system, as the principal intermediary no longer bears all the risk in case of default by the buyer. Other less solvent petit-intermediaires can extend credit only with the agreement of the principal intermediary; in such cases it is the latter who serves as the guarantor of the credit.

Depending on how much capital they have, the small intermediaries may sometimes buy animals for cash themselves, which they either ship to another market for sale (often several small intermediaries will form a common herd and jointly pay the expenses of shipping it to another market) or simply hold for sale at the same market at a later date when fewer animals are on the market and prices are higher. 6/ The cash purchase and resale of animals by small intermediaries is much more common in Bouaké than in Abidjan. The cost of transporting animals by hoof from Bouaké to surrounding markets is much less than the truck transport required to ship animals from Abidjan; and there is no possibility of stocking animals for a long time around Abidjan due to a lack of pasture.

At Bouaké there are roughly 25-30 small intermediaries. The main economic advantage of having this many selling agents in the market is that to the extent that the small intermediaries extend and guarantee credit themselves, risk is diffused in the system; and the large number of selling agents may speed up the sale of the herd (thus permitting the cattle merchant to have a more rapid turnover of capital), as the principal intermediary doesn't have to negotiate the terms of each sale himself. The main disadvantage, according to butchers, is that courtiers prefer to sell to the small intermediaries (to whom they are often related) rather dealing directly with the butchers; this, according to the butchers, excessively boosts the cost of animals, as the small intermediary adds his profit margin before reselling to the butcher.

Wholesale Butchers

According to official Ivoirian regulations, butchers in the major cities are classified into two groups: wholesale butchers ("chevilliards") who buy and slaughter cattle and sell the meat wholesale, and retailers ("detaillants") who do not slaughter, but buy meat from the wholesalers to resell themselves. A third category of butcher, that of "slaughter-retailer" is defined for the smaller markets. Retailers are further classified as first-class retailers ("bouchers detaillants de 1ere classe") and second-class retailers ("bouchers detaillants de 2eme classe"). The former include supermarkets and European-style butcher shops, while the latter include the butchers selling on the traditional market. According to the regulations, wholesalers do not have the right to sell retail, and retailers (except for certain first-class butcher shops) do not have the right to slaughter. In reality, all of the wholesale butchers in Bouaké also sell meat retail. Most wholesale butchers in Bouaké (there are approximately forty currently active) slaughter one animal per day; a few occasionally slaughter two. In addition, there is one wholesale butcher who sells exclusively frozen meat from AGRIPAC, although he is still licensed to slaughter. He holds the contracts to supply most of the institutions in Bouaké (the army, the hospital, the schools, etc.). Until mid-1975 he was the largest wholesale butcher in Bouaké, reportedly slaughtering up to 20 head per day (out of a total slaughter

6/ In Bouaké, it is most common for small intermediaries to buy and hold young animals (roughly two years old) for sale later; the capital investment required is low and usually a good profit can be realized when the animals are sold, generally to hotels or supermarkets, as veal.

of around 40). He switched to selling frozen meat after having amassed a large debt with one of the local courtiers, which led many of the courtiers to refuse to sell to him.

By contrast, in Abidjan the market is notably larger, but also much more concentrated. Although there are roughly fifty active "chevillards" who slaughter in Abidjan, there are around ten who slaughter five or more animals per day (total slaughter is approximately 110 animals per day). Most of these larger butchers only sell wholesale. Those butchers who slaughter only one or two animals per day (many of these are apprentice butchers just beginning to slaughter on their own) often combine wholesale and retail operations.

In both Bouaké and Abidjan, where the abattoirs are municipally-owned, the licensing of wholesale butchers is handled by the municipal governments and the number of licenses issued is strictly limited (presumably for health reasons). While in Bouaké the list of wholesale butchers is updated yearly, in Abidjan it has not been updated since 1970. In neither city, however, is an effort made to establish who among the licensed wholesale butchers are actually practicing the profession. The result is that many licensed butchers who have retired or gone into other professions (e.g., selling cattle) continue to pay for their butcher's licenses every year and then rent them out to younger butchers who are unable to obtain their own licenses because all the authorized "places" have been taken. (Once a butcher has a license, he has the option of renewing it every year; only if he decides not to do so or has his license suspended for violation of certain regulations does a place on the official license roster become available for someone else.) A licensed wholesale butcher who leaves the profession has a strong monetary incentive to continue to pay for his license every year and then rent it out. In Bouaké during 1976 and early 1977, the normal "rental rate" for a license costing between 105,000 and 110,000 F CFA/year was 1,500 F CFA per day, or roughly 540,000 F CFA per year. The net result is that the majority of the wholesale butchers on the official roster in Abidjan and many of those on the list in Bouaké are either retired, in other professions, or dead. (In the case of death, a butcher's family sometimes continues to pay his license fee every year and rent out the license.) By limiting the number of licenses issued, the municipal governments have created, perhaps inadvertently, a situation in which it is very costly for younger butchers to enter the profession, and the increased costs are reflected in the price of meat. It should be noted, however, that even if the number of licenses issued were increased, there would probably still be some rental market for licenses, as not all the people who want to be butchers can meet the legal requirement of blocking 300,000 F CFA in a bank account as a financial guarantee (presumably against unpaid debts). These individuals have no alternative but to rent a license or not slaughter.

Retail Butchers

In addition to wholesale butchers who also sell retail, a number of individuals buy meat from wholesalers and then resell it. There are three types of retailers: first-class retailers (European-style butcher shops and supermarkets); second-class retailers (retailers who have stalls in the market); and meat vendors who walk around the markets and neighborhoods selling meat.

The first-class retailers do not slaughter animals themselves, but usually have a verbal contract with one of the larger wholesale butchers who supplies them with locally-slaughtered rear quarters plus filets, kidneys, etc., which the latter purchases from other wholesalers. The supermarkets and butcher shops also may extend credit to the wholesaler to permit him to purchase choice animals, the rear quarters of which are sold to the retailers. This fresh meat complements the imported chilled meat sold by these establishments, which is ordered through DISTRIPAC or AGRIPAC. There are three first-class retailers in Bouaké which sell beef, and 26 in Abidjan. The clientele of the butcher shops is primarily European, while the supermarkets cater both to Europeans and upper-income Africans. As would be expected, these establishments are concentrated in the higher income areas of Abidjan; 18 of the 26 first-class retailers are located on the Plateau, Cocody, and the Riviera.

400 imported rear quarters x 55 kg./quarter	- 22.00 m.t.
150 locally-slaughtered rear quarters x 55 kg./quarter	- 8.25 m.t.
Equals 1573 m.t. per year	30.25 m.t./week

In addition, Pauvert estimates roughly 300 tons of lamb and mutton (largely imported) is sold by these establishments annually. By contrast, the first-class market in Bouaké is much more limited. Based on discussions with the retailers involved, I estimate their annual volume at 82 tons of beef and 17 tons of mutton. Most of the beef is locally-slaughtered, while roughly half the mutton is imported from Argentina.

The second-class retailers purchase fresh meat from the wholesalers or frozen meat from AGRIPAC or DISTRIPAC to resell in the main markets or in the smaller neighborhood markets. Often they are related to the wholesale butchers. These retailers sell meat either by kilogram or in small piles ("tas"). In Abidjan a large number of wholesale butchers who formerly slaughtered animals have, since late 1975, become retailers selling only frozen meat. Many of these butchers had amassed large debts with courtiers in Abidjan and thus had trouble finding people willing to sell them animals.

Meat vendors have no market stalls; they travel about the market and the neighborhoods with palettes of meat in small piles which are sold for between 25 and 100 F CFA. These vendors are often the agents of a retailer or wholesale-retail butcher and receive a commission on the meat they sell.

Butchers' Apprentices

Each wholesale butcher is assisted by one or more apprentice butchers who do the actual slaughtering and dressing of the animals. The apprentices are organized into teams (at Bouaké, the teams range from 2 to 8 individuals, the average being about 4), with one team often working for several butchers. Each team has a "chef"; and most of the apprentices aspire to become butchers themselves. The apprentice system plays an important role in training future butchers in the skills of the trade (how to estimate the carcass weight of an animal, basic accounting, etc.). All of the 29 wholesale butchers in Bouaké with whom we conducted in-depth interviews had spent at least two years as apprentices before beginning to buy and slaughter animals themselves. 7/ In Abidjan, each team of apprentices receives 500 F CFA per animal slaughtered; in Bouaké, most apprentices do not receive a cash wage. Rather, each team buys and resells the fifth quarter from every animal it slaughters (except for the hide, stomach, and internal fat, which are sold by the wholesale butcher). Their "wage" is thus any profit they make over the purchase price of the fifth quarter. The fixed purchase price must be paid to the butcher for every animal slaughtered, even if some of the internal organs are seized because of disease. Thus the apprentices and not the wholesale butcher take most of the risk if an animal is sick; the butcher loses only if the entire carcass is seized.

Herders

In both Bouaké and Abidjan there are a number of herders who earn their living loading and unloading cattle into trucks and train cars, watching herds which arrive at the market for sale, and accompanying herds sent to other markets by local merchants. In Bouaké there are 14 such herders, who have formed a cooperative association; each member pays into a common fund from which any member can draw if he is injured during work.

The professions described above are not mutually exclusive. It is not uncommon for a butcher, for example, to buy several animals, resell some and slaughter

7/ It should be noted that when modern capital-intensive abattoirs such as the ones in Bamako or Ouagadougou are constructed, the traditional apprenticeship system is destroyed, as the apprentices are replaced by a limited number of abattoir employees and a lot of capital equipment. Herman estimates that when the new abattoir in Ouaga opened in 1976, roughly 300 apprentices lost their jobs. It is not clear in this situation how new butchers will be trained to replace those who retire or die.

the rest himself, thus acting as both a butcher and a cattle merchant. Several butchers are also intermediaries; and sometimes older butchers, after having acquired sufficient capital, cease butchering, rent their license, and become cattle merchants.

EMPLOYMENT GENERATED BY CATTLE AND BEEF MARKETING

A rough estimate of the employment generated by cattle and beef marketing can be drawn from data collected in Bouaké. The estimate for Bouaké is shown in Table 27; it includes only those people who earn most of their living from selling cattle or uncooked beef. It thus excludes a considerable number of people involved in selling prepared meat, as well as others who earn only part of their income from the meat trade (e.g., taxi drivers and laborers who earn money transporting meat to various markets). The estimate also excludes all those individuals (e.g., herders and merchants) who are not residents of Bouaké. Despite these limitations, Table 27 shows that roughly 280 people were directly involved in cattle and beef marketing in Bouaké in 1976-77. These people handled the sales of roughly 26,000 animals (and the slaughter of 10,841). The ratio is roughly one job generated for every 93 animals sold. It can thus be seen that the marketing system is very labor-intensive. I would hope that when proposals are made for "reorganizing" the cattle and meat trades some attention be given to the employment effects such actions would have.

DIFFERENCES IN THE MARKET STRUCTURE BETWEEN BOUAKE AND ABIDJAN

Differences between the structure of the cattle markets in Abidjan and in Bouaké stem from two basic causes: the fact that Abidjan is a much larger and "richer" market than Bouaké, and differences in the physical layout of the two cattle markets. The fact that the Abidjan market for meat is much larger than Bouaké's has led to more specialization among butchers in Abidjan than in Bouaké. Fewer of the "chevillards" in Abidjan sell retail and there are more butchers who buy in large lots and slaughter several animals per day. Since there is a large "quality" market in Abidjan, premiums paid for "choice" animals are greater than in Bouaké.

The most marked contrasts in the structure and performance of the two markets, however, are due to differences in the physical layouts of the cattle markets. The Bouaké cattle market is located at the north edge of the city in a region which is not yet very built up; adequate grazing and water are available nearby for most of the year. It is also possible to trek animals from the producing areas to Bouaké, which means that arrivals of cattle in Bouaké, unlike Abidjan, are not dependent on the availability of trucks and rail cars (in 1976, 73% of the cattle arriving in Bouaké came by hoof, 17% by train, and 10% by truck (3). The availability of pasture allows both butchers and merchants to hold animals as a buffer against price fluctuations.

In contrast, the cattle market in Abidjan is located in the industrial zone of Port Bouet. Cattle arrive solely by rail or truck, and since there are often shortages of rail cars in the exporting areas, arrivals are irregular. 9/ There is also little grazing space around the cattle market, and in the dry season there is little pure water. It is thus nearly impossible to hold animals for more than a week without them losing a good deal of weight. The situation is especially bad in the dry season. Animals arriving from the Sahel are not habituated to the green grass they find in Abidjan (after having had very sparse, dry grazing in the north); as a result, they usually come down with diarrhea. In addition, the only water available for them at this time is from the slightly

9/ According to the RAN, due to a lack of warehouse space in Upper Volta, train cars are often used there as storage facilities for goods shipped north from Ivory Coast. This leads to a slow turnover of cars and makes it difficult for cattle exporters to get them when needed; often they have to wait a week or more for a car. If the RAN would raise its daily rental fee for cars on sidings, perhaps a more rapid rotation of wagons could be achieved.

saline lagoon; hence in addition to their weight losses from diahrea, the animals also lose weight from dehydration.

Table 27 Estimate of the Employment Generated by Cattle and Beef Marketing in Bouaké 1976-77

Cattle Market	
Cattle merchants	6
Courtiers	13
Wholesale butchers (including inactive butchers who rent out their licenses)	45
Petits intermediaires	30
Herders	14
Vendors of food, drink, cloth, medicines, etc.	6
Griot	1
Subtotal	115
Abattoir	
Apprentice butchers	60
Veterinary assistants and municipal abattoir employees (includes tax collector and truck driver)	8
Employees of company which buys hides	4
Subtotal	72
Retailers	
First-class retailers: 4 employees per establishment	12
Second-class retailers: approximately 2 retailers for every one practicing wholesale butcher	30
Subtotal	92
GRAND TOTAL	279

Source: SLP study, Bouaké.

The result of this inability to hold animals in Abidjan is twofold: cattle supplies and prices fluctuate more widely in Abidjan than in Bouaké; and the butchers in Abidjan have more market power vis à vis the cattle merchants than in Bouaké. A cattle merchant in Bouaké who doesn't get the price he wants for his animals can simply hold them off the market for a while or ship them to one of the other major markets farther north. In Abidjan, a merchant does not have these options. He cannot hold his animals off the market without them losing weight, and there are no other markets farther south to which he can send his animals. He thus has less leeway in bargaining with the butchers than doeshis Bouakéan counterpart. The market power of the butchers in Abidjan is further enhanced by the availability of large amounts of frozen meat there. Butchers are not obligated to buy from the cattle merchants and do so only when they believe it is advantageous. As a result of the strong position of the butchers and the highly fluctuating prices in Abidjan, there is much more defaulting on debts by butchers in Abidjan than in Bouaké. The fluctuating prices lead some butchers to lose money on days of high prices; but even if they refuse to repay their creditors, they can buy frozen meat from AGRIPAC and DISTRIPAC and continue practicing their profession. Cattle merchants and courtiers have to accept certain losses because they have no alternative buyers.

Most of these credit problems and wide price fluctuations are due to the inability to stock animals at the Abidjan market. Until a solution is found to this problem (either relocating the abattoir to an area where there is adequate grazing or providing cut forage to the animals at the present location) these problems will probably continue. To the extent that debts go unpaid to cattle merchants, Abidjan becomes a less profitable market for Sahelian exporters.

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CHAPTER III: TRANSPORT COSTS FOR CATTLE AND MEAT

Cattle marketing in West Africa is characterized by the long distance between the livestock production zones in the Sahel and the major meat consuming regions along the coast. Thus transport costs for cattle and meat become an important component of the final sale price of meat in the coastal areas. This chapter will analyze these costs for some of the major trade routes within Ivory Coast and between Ivory Coast, Mali, and Upper Volta.

TRANSPORT COSTS FOR CATTLE

Cattle are transported to the major markets in Ivory Coast by hoof, rail and truck, or by some combination of these methods. Some merchants change transport methods according to the season, trekking animals in the rainy season when there is plenty of grazing en route, and switching to truck or rail transport during the dry season.

Transport costs for cattle include the cash outlays required for shipping the animals (wages of herders, truck and rail fees, etc.), mortality and weight losses of the animals during transport, and the cost of the capital tied up in the cattle while they are being transported to market. In order to determine these costs of transporting cattle, interviews were carried out with cattle merchants and "chefs de convois" arriving in Bouaké and Abidjan, as well as with truck drivers and officials of the RAN. The information thus received was complemented by that from Larry Herman's work in Upper Volta and that of Robert Van de Putte, an FAO agricultural economist working with O.M.BE.VI. in Mali.

Tables 28 and 29 present transport costs for animals shipped from Northern Ivory Coast and from Mali to Bouaké by various methods. (no figures are presented for the shipment of Voltaic animals to Bouaké, as the number of Voltaic animals entering the Bouaké market is fairly limited.) Table 28 compares the cost of transporting animals from Northern Ivory Coast (Tingrela) to Bouaké by hoof and by truck, while Table 29 contrasts the costs of hoof and mixed hoof-train transport of animals between Sikasso (Mali) and Bouaké.

As can be seen from Table 28, both the total cost (excluding weight loss) and the cash outlay required for transporting cattle by hoof from Northern Ivory Coast to Bouaké are quite limited. A merchant can transport a herd of fifty animals for a cash outlay of roughly 90,000 F CFA (total cost minus losses due to mortality and forced sales). By contrast, truck transport involves roughly two and a half times the cash outlay and total cost (excluding weight losses). The difference in cost stems mainly from the expenses of renting a truck, paying the illegal charges demanded by police, customs officials, etc. along the highway, and the higher mortality rate for truck transport. It should be noted that the mortality rate *per se* for cattle transported by hoof from the producing regions in the north to Bouaké is extremely low; most of the "losses" of animals are animals which escape the herd and get lost in the bush. 1/

1/ We interviewed 29 cattle merchants and "chefs de convois" in Bouaké who transported their animals to Bouaké by hoof from Mali, Northern Ivory Coast, and Upper Volta. Out of a total of 1,533 animals which left the north, 17 were lost en route, including three which died and 14 which escaped.

Table 28 Comparison of the Cost of Hoof and Truck Transport: Tingrela to Bouaké (in F CFA) -- Herd of 50 Animals

EXPENSE	HOOF TRANSPORT Total	HOOF TRANSPORT Per Animal	TRUCK TRANSPORT Total	TRUCK TRANSPORT Per Animal
Salary of herders	3 @ 10,000 = 30,000	600	2 @ 5,000 = 10,000	200
Food for herders	18,000	360	—	—
Return transport for herders (2,500 F/person)	7,500	150	5,000	100
Round-trip transport for owner	5,000	100	5,000	100
Food for owner in Bouaké 200 F/day X 7 days	1,400	28	1,400	28
Laissez-passer sanitaire a/	3,000	60	3,000	60
Vaccination b/	2,250	45	2,250	45
Amortization of cattle merchant's license c/	12,100	242	12,100	242
Indemnity for damaged fields d/	600	12	—	
Loss of animals e/	1% of 50 animals @ 40,000 F/animal = 20,000	400	2% of 50 animals @ 40,000 F/animal = 40,000	800
Forced sales f/ 0.7% of 50 animals @ 20,000 F loss/animal	7,000	140	7,000	140
Cost of truck 2 trucks @ 87,500 F	—	—	175,000	3,500
Illegal charges	—	—	10,000	200
Cattle market tax: Bouaké	10,000	200	10,000	200
Total Cost (excluding weight losses)	116,850	2,337	280,750	5,615
Cost per animal safely arrived in Bouaké g/		2,361		5,730
Days in transit	25		1	

Notes: a/ In theory, laissez-passer sanitaires (health certificates) are free in Ivory Coast. In reality, the Veterinary Service office which issues them usually charges 1,500 F CFA, and other veterinary offices en route charge 500 F to sign and stamp them.

Table 28 Notes (continued)

b/ Vaccinations of trade animals in Ivory Coast are free; however, sometimes the Veterinary Service is out of the required vaccines so that the merchant is obligated to buy the vaccine himself, which the Veterinary Service then administers. Our survey in Bouaké showed that roughly 30% of the merchants arriving in Bouaké had to buy the vaccine at the cost of 150 F CFA per animal. Hence the average cost for a herd of 50 animals is .30 X 150 X 50 = 2,250 F CFA.

c/ The license for a cattle merchant selling more than 100 head per year is 96,800 F CFA. Amortization is calculated assuming an annual volume of 400 animals. To the extent that truck transport permits a more rapid capital turnover and higher annual volume, the cost of the license per animal sold would be less.

d/ Based on our interviews in Bouaké, I estimate that 6% of the herds cause crop damage for which they must pay an indemnity. The average amount of the indemnity in 10,000 F CFA, hence the average cost per herd is .06 X 10,000 F = 600 F.

e/ Data on losses of animals transported by hoof are drawn from interviews with 29 "chefs de convois" who trekked animals to Bouaké between November 1976 and July 1977. Losses include both mortalities and animals which escape. According to cattle merchants interviewed, losses in truck transport are roughly twice those in hoof transport. An average purchase price of 40,000 F CFA is assumed.

f/ Forced sales are sales of animals en route which are too weak, injured, or ill to continue the trip or sales at the final destination of animals injured during transit. Generally these sales involve a loss of roughly half the purchase price of the animal. The rate of 0.7% for forced sales was established from the interviews described in note e/ with chefs de convois. If the likelihood of an animal being thus sold is 0.7%, the likelihood of one such sale in a herd of 50 is 50 X 0.7% = 35%, and the average monetary loss is 35% X 20,000 F CFA (half the assumed purchase price) = 7,000 F CFA.

g/ Cost per animal taking account of the mortality rate en route. For example, with a mortality rate of 2% in truck transport, an average of 49 animals (and not 50) will arrive safely in Bouaké, hence a cost per animal of 280,750 ÷ 49 = 5,730.

Source ELP field study, Bouaké.

Table 29 Comparison of the Cost of Hoof and Mixed Transport: Sikasso to Bouaké (in F CFA) --Herd of 50 Animals

EXPENSE	HOOF TRANSPORT		HOOF TO FERKESSÉDOUGOU; TRAIN FROM FERKÉ TO BOUAKÉ	
	Total	Per Animal	Total	Per Animal
Salary of herders a/	3 @ 12,500 = 37,500	750	2 @ 12,500 / 1 @ 10,000 = 35,000	700
Food for herders	24,000	480	18,000	360
Return transport for herders b/	9,000	180	4,500	90
Round-trip transport for owner	6,000	120	6,000	120
Food of owner in Bouaké 200 F/day X 7 days	1,400	28	1,400	28
Laisser-passer sanitaire c/	3,500	70	3,000	60
Indemnity for damaged fields d/	600	12	300	6
Loss of animals 1% of 50 animals X 40,000 F/animal	20,000	400	20,000	400
Forced sales e/	0.7% of 50 animals X 20,000 F loss per animal = 7,000	140	1.7% of 50 animals X 20,000 F loss per animal = 17,000	340
Salt for animals	500	10	500	10
Cattle market tax: Bouaké	10,000	200	10,000	200
Malian license, export tax, and vaccination	220,000	4,400	220,000	4,400
Rail transport				
Rental of car	—	—	2 (H12) cars @ 39,713 F = 79,426	1,589
Straw	—	—	1,000	20
Loading/unloading	—	—	2,500	50
Other f/	—	—	2,000	40
Total Cost (excluding weight losses)	339,500	6,790	420,626	8,413
Cost per animal safely arrived in Bouaké g/		6,859		8,497
Days in transit	30		20	

Notes· See following page.

Table 29 Notes

a/ For mixed transport, three herders accompany the animals to Ferkéssédougou, but only two continue on by train to Bouaké.

b/ Return fare to Ferkéssédougou is provided free by the RAN to the herders who accompanied the animals by train. Hence the only expense for them is transport between Ferké and Sikasso, costing 1,500 F CFA each. Return transport from Bouaké to Sikasso costs 3,000 F per person.

c/ See note a/, Table 28.

d/ See note d/, Table 28. Incidence of crop damage with mixed transport is assumed to be 50% of that by hoof transport.

e/ See note f/, Table 28. The rate of 1.7% for mixed transport was established on the basis of interviews with "chefs de convois" arriving in Bouaké.

f/ Includes "tips" to various RAN employees.

g/ See note g/, Table 28.

Source ELP field study, Bouaké.

The low cash outlay and low total cost of hoof transport (roughly 1,800 F CFA per head) explains why the vast majority of animals transported between Northern Ivory Coast and Bouaké come by foot. The main advantages of truck transport are that it allows a merchant to react quickly to shortages of cattle in the consumption markets (if he can quickly find a truck in which to transport his cattle) and that it allows a more rapid capital turnover. For example, instead of having his animals spend 25 days travelling by hoof between Bouaké and Tingrela, a merchant can ship them by truck to Bouaké in a single day. Even if it takes him three days to find a truck (and assuming it takes a week to sell a herd of 50 animals in Bouaké), his rate of capital turnover is almost three times that of someone who transports cattle by hoof (11 days vs. 32 days).

Weight losses appear to vary both by season and by means of transport, but data on such losses are rather skimpy. These data are discussed later in this chapter. It should be noted that if the sale price of cattle in Bouaké is 180 F CFA/kg. liveweight, it is cheaper to transport by truck only when the liveweight losses of animals transported by hoof are at least 19 kg. more than those of animals transported by truck.

Table 29 contrasts transport costs for cattle from Sikasso to Bouaké by two different methods (hoof and hoof plus train). As can be seen, the relative costs of the two methods are closer than the alternatives presented in Table 28. This is due to the large fixed cost which Malian export licenses and taxes represent in both alternatives presented in Table 29. The taxes account for roughly two-thirds of the cost of exporting by hoof and over half the cost of mixed transport. It is thus clear that Malian exporters have a strong monetary incentive to try to export illegally. One of the advantages of hoof transport from the exporter's point of view is that it is easier to evade Malian customs officials by walking animals across the border than by exporting by truck.

While the time in transit is generally less with mixed transport than with trekking (20 days vs. 30), this varies considerably, depending on the availability of train cars. When most of the cars are in heavy use for transporting the tree-crop harvests during December, merchants may wait up to a month in Ferké for cars. 2/

Since the difference in cost between hoof and mixed transport between Sikasso and Bouaké is not too great, there is some shifting between these methods depending on the season. During the dry season, when weight losses during trekking are large, many merchants shift to mixed transport. When weight losses during hoof transport exceed those of mixed transport by more than 9 kg./animal it becomes cheaper to use mixed transport than to trek animals all the way to Bouaké. 3/ In addition, in the dry season the animals are often already weakened from a lack of grazing by the time they reach Ferké and it may be impractical to continue on hoof, as the risk of mortality would be excessive. In contrast, during the rainy season, when animals trekked from Sikasso to Bouaké may actually gain weight due to the good grazing en route, mixed transport of animals virtually ceases between these two cities.

Tables 30-32 present transport costs for cattle arriving in Abidjan from Northern Ivory Coast, Mali, and Upper Volta, Table 30 compares the cost of transporting cattle between Tingrela and Abidjan by truck and by mixed transport (trekking to Bouaké and continuing by truck from Bouaké to Abidjan). As can be seen, truck transport costs are roughly 1.6 times those of mixed transport (excluding weight losses). As was the case in the shipment of cattle to Bouaké, the main advantages of truck transport are the ability to react quickly to shortages of cattle in the final market, a rapid capital rotation, and possibly smaller weight losses during the dry season. Nonetheless, the cost differences are such that few of the cattle from Northern Ivory Coast which arrive in Abidjan are trucked the entire distance; most travel at least part of the way on hoof. Table 31, which compares costs of truck and mixed transport of cattle from Mali to Abidjan, again shows the relatively high cost of shipping cattle by truck; it is over twice as expensive to ship cattle by truck as by mixed transport (again, ignoring weight losses). The major cost is the rental fee of the truck, which currently averages around 14,000 F CFA per animal (5, p. 6). Also to be noted is the relatively high level of illegal charges levied against trucks travelling south with cattle from Mali. Apparently police and customs officials consider such trucks "fair game" for extorting money. In both transport alternatives, the Malian export taxes and the truck or train car rental fees are the major expenses; together they account for 80% of the expenses of truck transport and 67% of those of mixed transport.

2/ In December 1976 we interviewed three merchants in Bouaké who had waited between 18 and 30 days for cars in Ferké. They did not want to walk their animals to Bouaké due to reports of a lack of water between Ferké and Bouaké.

3/ This assumes a price for cattle in Bouaké of 180 F/kg. liveweight.

Table 30 Comparison of the Cost of Truck and Mixed Transport: Tingrela to Abidjan (in F CFA) -- Herd of 50 Animals

EXPENSE	TRUCK TRANSPORT		HOOF TO BOUAKÉ, TRUCK FROM BOUAKÉ TO ABIDJAN	
	Total	Per Animal	Total	Per Animal
Salary of herders a/	2 @ 5,000 = 10,000	200	1 @ 10,000 / 2 @ 12,500 = 35,000	700
Food for herders	—	—	20,000	400
Return transport for herders	2 @ 3,500 = 7,000	140	2 @ 3,500 / 1 @ 2,500 = 9,500	190
Round-trip transport for owner	7,000	140	7,000	140
Food for owner in Abidjan 200 F/day X 7 days	1,400	28	1,400	28
Laissez-passer sanitaire b/	3,500	70	3,500	70
Vaccination c/	2,250	45	2,250	45
Indemnity for damaged fields d/	—	—	600	12
Loss of animals	2% of 50 animals X 40,000 F/animal = 40,000	800	1.5% of 50 animals X 40,000 F/animal = 30,000	600
Forced sales	1.5% of 50 animals X 20,000 F loss/animal = 15,000	300	1.5% of 50 animals X 20,000 F loss/animal = 15,000	300
Cattle market tax: Abidjan	25,000	500	25,000	500
Amortization of cattle merchant's license e/	12,100	242	12,100	242
Truck transport Rental of truck	2 trucks @ 150,000 F = 300,000	6,000	2 trucks @ 50,000 F = 100,000	2,000
Other charges (straw, loading/unloading)	12,250	245	12,250	245
Illegal charges	20,000	400	2,500	50
Total cost (excluding weight losses)	455,500	9,110	276,100	5,522
Cost per animal safely arrived in Abidjan f/		9,296		5,606
Days in transit	1		26	

Notes: see p. 62

Source: ELP field studies in Bouaké and Abidjan.

Table 31 Comparison of the Cost of Truck and Mixed Transport: Koutiala (Mali) to Abidjan (in F CFA) -- Herd of 50 Animals

EXPENSES	TRUCK TRANSPORT		HOOF TO FERKESSÉDOUGOU; TRAIN FROM FERKÉ TO ABIDJAN	
	Total	Per Animal	Total	Per Animal
Salary of herders a/	2 @ 5,000 = 10,000	200	1 @ 12,500 / 2 @ 15,000 = 42,500	850
Food for herders	1,000	20	25,000	500
Return transport for herders b/	2 @ 6,500 = 13,000	260	3 @ 1,500 = 4,500	90
Round-trip transport for owner	13,000	260	13,000	260
Food for owner in Abidjan 200 F/day X 7 days	1,400	28	1,400	28
Laissez-passer sanitaire c/	3,500	70	3,000	60
Indemnity for damaged fields d/	——	——	300	6
Loss of animals	2% of 50 animals X 40,000 F/animal = 40,000	800	1.5% of 50 animals X 40,000 F/animal = 30,000	600
Forced sales	1.7% of 50 animals X 20,000 F loss/ animal = 17,000	340	1.7% of 50 animals X 20,000 F loss/ animal = 17,000	340
Salt for animals	——	——	500	10
Market tax: Abidjan	25,000	500	25,000	500
Malian license, export tax, and vaccination	220,000	4,400	220,000	4,400
Transport fee e/ Rental of truck/train car	2 trucks @ 350,000 F = 700,000	14,000	2 cars (H12) @ 62,633 = 125,266	2,505
Straw	——	——	1,000	20
Loading/unloading	2,500	50	2,500	50
Other f/	——	——	2,500	50
Illegal charges	75,000	1,500	——	——
Total cost (excluding weight losses)	1,121,400	22,428	513,466	10,269
Cost per animal safely arrived in Abidjan g/		22,886		10,385
Days in transit	3		26	

Notes: see p. 62

Sources: ELP field studies in Bouaké and Abidjan, and O.M. BE.VI., "La Commercialisation des Animaux d'Embouche de l'ECIBEV," Document No. 39, Economie (Bamako, April 1977).

Table 32 Costs of Transporting Cattle from Ouagadougou to Abidjan by Rail (in F CFA) -- Herd of 50 Animals

Expense	Total Cost	Cost per Animal
Marking the animals to denote ownership (in Ouaga)	500	10
Courtier's commission in Ouaga	12,500	250
Payment to herders for watching animals before shipment	7,500	150
Export license (9,100 F for 75 animals)	6,067	121
Veterinary inspection of animals	7,500	150
Certificate of origin: 100 F per herd	100	2
Transport fees		
Rental of train cars: 2 H12 cars @ 104,741 F CFA [a]	209,482	4,190
Straw for cars: 4,000 F/car	8,000	160
Loading of cars: 1,500 F/car	3,000	60
Unloading of cars: 500 F/car	1,000	20
Other fees [b]: 10,750 F/car	21,500	430
Wage of herders: 5,000 F per car	10,000	200
Food for herders: 2,000 F each	4,000	80
Voltaic export tax: 6,520 F/animal	326,000	6,520
Mortality: 1.4% of 50 animals at an average loss of 30,000 F/animal [c]	31,000	420
Market tax: Abidjan	25,000	500
Total cost (excluding weight losses)	663,149	13,263
Cost per animal safely arrived in Abidjan [d]		13,451
Days in transit	2-3	

Notes: see p. 62

Sources: DLP field study, Abidjan; Larry Herman, personal communication; J. Staatz and L. Lawani, "Note Sur les Couts de Transports de Bovins Entre Ouaga et Abidjan," Centre Ivoirien de Recherche Economique et Social, Document de Travail No 4 (Abidjan, March '77).

Table 30: Notes

a/ For mixed transport, three herders accompany the animals to Bouaké but only two continue on by truck to Abidjan.

b/ See note a/, Table 28.

c/ See note b/, Table 28.

d/ See note d/, Table 28.

e/ See note c/, Table 28.

f/ See note g/, Table 28.

Table 31: Notes

a/ For mixed transport, three herders accompany the animals to Ferkéssédougou, but only two continue on from Ferké to Abidjan.

b/ See note b/, Table 29.

c/ See note a/, Table 28.

d/ See note d/, Table 29.

e/ Prior to April 1977, truck transport cost roughly 6,000 F CFA/animal

f/ See note f/, Table 29.

g/ See note g/, Table 28.

Table 32 Notes

a/ Prior to March 1, 1977, the rental rate per car (H12) was 95,327 F CFA or 3,815 F CFA per animal; total transport costs per animal were thus 12,888 F CFA.

b/ Includes "tips" to various PAN and customs employees.

c/ The mortality rate of 1.4% was established by monitoring all rail arrivals of cattle in Abidjan from November 1976 to May 1977 as part of the ELP field study in Abidjan. According to Herman, most cattle which die en route are sold at between a half and a third of the amount which the owner has invested in them; the average loss is estimated here at 30,000 F CFA.

d/ See note g/, Table 28.

Table 32 presents costs for transporting cattle by train between Ouagadougou and Abidjan. For most of the year, Ouaga is the most important source of cattle for Abidjan; all the cattle shipped between Ouaga and Abidjan come by rail. As can be seen, the average transport cost per head is 13,263 F CFA, of which 10,710 F CFA (81%) is accounted for by the rental of the train cars and the Voltaic export tax. It should be noted that most of the difference in cost between transporting Malian cattle to Abidjan by mixed transport and that of shipping Voltaic cattle by train stems from the higher Voltaic export tax on cattle.

In all of the examples shown in Tables 28-32, it is clear that the major cash outlays required are rental fees of trucks and train cars and, in the case of imported cattle, export taxes in the producing countries. The cash outlays required for hoof transport are low and the losses of cattle en route appear to be less than with other forms of transport. The main disadvantages of trekking are the slow capital rotation and dry-season weight losses. In all the examples given, truck transport requires the largest cash outlay, and this largely explains why few exporters ship by truck. The potential use of trucks for transporting cattle is further limited by the amount of merchandise waiting in Southern Ivory Coast to be transported north. Truckers consider cattle a "back-haul" cargo; most of their profits are made hauling goods north, and cattle are hauled south simply to cover return expenses. Even among return freights, it is less profitable to haul cattle than other goods, such as cotton, given the present rate structure. Thus trucks do not go north expressly looking for cattle, but only transport them south when they cannot find other back-haul cargoes (2).

WEIGHT LOSSES DURING TRANSPORT

Weight losses during transport are of two types losses of water and intestinal content, and losses of musculature (meat) and fifth quarter metabolized by the animal during the journey. Since cattle in Abidjan and Bouaké are normally purchased on the basis of butchers' estimates of their carcass weight rather than for a fixed price per kilogram liveweight, only the loss of musculature represents an economic loss for the cattle merchant. This is because butchers take account of losses of intestinal content when estimating the dressing percentage of an animal. Thus, while animals transported by truck between Bouaké and Abidjan may lose up to 25 kg. liveweight, this is almost all intestinal content (which is quickly regained by the animal) and thus does not represent an economic loss (6). On the longer journeys by truck and train, during which the animals are neither fed nor watered, and during long treks when grazing is sparse, losses of carcass weight become important.

Unfortunately, there are few data on these losses. Although several attempts were made during the course of my study to arrange weighings of herds on their departure from the north and on their arrival in Bouaké or Abidjan, most of these attempts were frustrated by a lack of functioning cattle scales in the north. (For example, during most of the time Larry Herman was in Ouaga, the cattle scales there were blocked.) Some weighings were possible, however. In cooperation with O.M.BE.VI., animals from three herds were weighed at the time of their departure on hoof from Sikasso and on their arrival in Bouaké. This was done during the rainy season (May-June, 1977); unfortunately, the cattle scale in Sikasso was not functioning during the dry season. In addition, O.M.BE.VI. weighed animals shipped by truck between Sogou and Abidjan. A third source of data on weight losses is a study of weight losses during train transport carried out in Nigeria in the early sixties (4).

The weighings of animals trekked between Sikasso and Bouaké indicate that animals may gain weight while being walked to market during the rainy season, but this depends on how quickly the animals are walked. The first group of animals weighed both in Sikasso and Bouaké (N = 25) gained an average of 16.5 kg. liveweight per animal during the journey. These animals were in a herd which took 36 days to travel between the two cities, while normally herds average about 30 days. The second group of animals (N = 11) were part of a herd which covered the 476 kilometers between Sikasso and Bouaké in the norm of 30 days; these animals lost an average of 11.4 kg. each. The third group covered the distance in 29 days and lost an average of 3.7 kg., but the small size of the sample (N = 6) makes the result somewhat questionable. These results do show, however, that transport of cattle on hoof through the Guinea-savanna zone during the rainy season can be advantageous to a cattle merchant if he takes his time in transporting the animals. This explains in part why hoof transport is preferred to mixed transport during the rainy season and why herders generally take longer to bring herds south during the rainy season than in the dry season, when little grazing is available. Dry season weight losses visible appear to be great (perhaps 10-15%), but I know of no studies which have empirically established this.

An O.M.BE.VI. experiment conducted in January, 1977, provides an estimate of weight losses during truck transport (10). Seventeen animals were weighed on departure from Niono (near Segou) and on their arrival in Abidjan two and a half days later (the distance covered was 1,145 km.). Total weight loss per animal averaged 54 kg.; this included loss of intestinal content, water, meat, and fifth quarter. Seven animals were re-weighed after 48 hours. By this time they presumably had recuperated the losses of water and intestinal content; they still had an average net loss of 20 kg. liveweight. According to Dr. Pierre Aloui of the Ministry of Animal Production, who has conducted similar experiments in Madagascar, roughly 12 kg. of this net loss can be attributed to a loss of meat, while 8 kg. represents a metabolism of carbohydrates from the fifth quarter. The average liveweight of these animals was 338 kg.; assuming a 50% dressing percentage, this implies a 7% loss of carcass weight. Given a price of cattle in Abidjan of roughly 405 F/kg. carcass weight, the value of the weight loss of these animals can be calculated as 4,800 F CFA per head. One reason for the sizeable weight losses in truck transport is the long period the cattle spend in the truck without food or water. This period is prolonged by the numerous police and customs checks en route. Koné estimates that such "contrôles et pseudocontroles" take between 15 and 25 hours for a trip between Mopti and Abidjan (3, p. 20).

Larson and Ndanako's study in Nigeria showed net carcass weight losses of 7.7% for the 50-hour train trip between Kano and Lagos and 10.7% for the 66-hour Gusuau-Lagos trip. Since the Ouaga-Abidjan trip usually takes around 55-60 hours, net carcass weight loss can be estimated at roughly 9-9.5%. This implies a very heavy cost; given the price per kg. carcass weight of cattle in Abidjan during early 1977 (between 405-410 F CFA), a 9% carcass-weight loss for an animal with an initial carcass weight of 150 kg. implies a cost of roughly 5,500 F CFA (8, p. 12). It is thus clear that any actions which reduce weight losses in both truck and train transport (e.g., reducing transit time by giving priority at border points to trucks and trains transporting cattle, providing better ventilated rail cars, etc.) are likely to have a sizeable economic payoff.

TRANSPORT COSTS FOR MEAT

Most of the modern abattoirs which have been built in the Sahelian countries have as one of their major goals the export of meat to the coastal areas. This export trade has not developed to the degree that the Sahelian countries had hoped it would, and an analysis of transport costs for meat can help explain why.

Given the costs of transport and the price of meat in Abidjan in early 1977, it was not profitable to ship ordinary quality chilled meat from Bamako to Abidjan. This is clearly shown in Table 33, which shows the expenses and receipts which such a shipment by refrigerated truck would involve. 4/ As can be seen, there would be a negative profit margin in such shipments. If only higher-valued rear quarters (rather than entire carcasses) were shipped, a net profit of roughly 4,670 F CFA per animal could be realized; it should be noted, however, that these figures include no allowance for the risk of loss of the meat due to mechanical failure of the refrigeration equipment. If a risk premium equal to 5% of the exporter's costs is included in the calculation, the net margin per animal is reduced to 2,956 F CFA which, as will be shown later in this study, is less than the margin for shipping live animals from Bamako to Abidjan.

In contrast, the existence of a rail link between Ouagadougou and Abidjan and the lower cost of cattle in Ouaga as compared to Bamako make chilled meat shipments between Ouaga and Abidjan potentially quite profitable. This is shown in Table 34, which contrasts the costs of shipping meat and live animals between Ouaga and Abidjan. As can be seen, the theoretical net margin for shipping meat is considerably above that for shipping live animals. In reality, the costs of shipping meat between Ouaga and Abidjan are considerably higher than indicated in Table 34, due to the frequent breakdowns of the refrigerated rail cars (see pp. 24-26). Many exporters, for example, buy large amounts of ice in Ouaga which they load into the cars to help keep down the temperature if the compressors fail. Even so, losses of meat are frequent and, as mentioned in Chapter I, this explains the decline in rail exports of meat from Upper Volta in recent years.

Charges for air transport of meat from Ouagadougou to Abidjan are much higher than for rail shipment; freight charges alone are 80 F CFA per kg., and transport to and from the airports in Ouaga and Abidjan can be evaluated at roughly 10 F/kg. (1, 9). Thus, the total freight charge for a 160 kg. carcass is 14,400 F CFA (as compared with 6,507 F CFA for rail shipment and unloading); and the net margin (excluding risk) becomes 5,168 F CFA per carcass. Inclusion of a 5% risk premium reduces this to 2,354 F CFA, which is considerably less than the margin that can be earned shipping live animals.

These figures show that given the current price structure for cattle and meat in Abidjan and in the exporting regions, transport costs post a major barrier to the expansion of the chilled meat trade between Ivory Coast and its Sahelian trading partners.

4/ Van de Putte (9) has shown that it is cheaper to ship meat from Bamako to Abidjan by refrigerated truck than by air.

Table 33 Profitability of Shipping Meat Between Bamako and Abidjan by Refrigerated Truck (in F CFA)
(Prices and Costs as of Dec 76-Jan 77)

Expense	Shipment of Entire Carcass	Shipment of Rear Quarters Only a/
Purchase of an animal of 160 kg. carcass weight at Kati 300 F CFA/kg. carcass weight	48,000	48,000
Shipment from Kati to Bamako	300	300
Slaughter at Bamako		
Slaughter tax	1,343	1,343
Wrapping (7.5 F CFA/kg.) b/	1,200	675
Butcher's license (approx. 0.5 F CFA/kg.)	80	80
Sale of fifth quarter in Bamako c/	-3,840	-3,840
Sale of front quarters in Bamako 70 kg. @ 300 F CFA/kg.		-21,000
Losses due to seizures (2%)	960	960
Total slaughter cost minus value of meat and offals sold in Bamako	-257	-21,782
Export taxes and license d/	2,480	1,395
Transport fee: 60 F CFA/kg.	9,600	5,400
Veterinary inspection tax in Ivory Coast: 10 F CFA/kg.	1,600	900
Total expenses	61,723	34,213
weight loss e/	6.4 kg.	3.6 kg.
Weight of meat arrived in Abidjan	153.6 kg.	86.4 kg.
Sale price per kg. in Abidjan	400 F CFA	450 F CFA
Revenue	61,440	38,880
Profit/loss per animal	-283	4,667

Notes: a/ Rear quarters weighing a total of 90 kg.

b/ Applies only to meat exported from Bamako

c/ Estimated at 8% of purchase price of animal

d/ Export tax = 15 F CFA/kg.; amortization of exporter's license estimated at 0.5 F CFA/kg.

e/ Weight loss figures from experiments carried out in the cold room at the Bamako abattoir by O.M. BE.VI.

Sources: Meat prices from ELP field study, Abidjan; price of animals and export costs from Robert Van de Putte, "Organisation des Exportations," unpublished paper, O.M.BE.VI. (Bamako, 1977)

Table 34 Comparison of the Theoretical Profitability of Exporting Meat and Live Animals from Ouagadougou to Abidjan (in F CFA)

I. Export of Meat	
Purchase of animal of 160 kg. carcass weight at Ouaga· 250 F CFA/kg. carcass weight	40,000
Slaughter tax, license, and veterinary inspection in Ouaga	1,000
Sale of fifth quarter in Ouaga a/	-3,072
Loss through seizures (2%)	768
Health certificate	50
Voltaic export tax: 1.5% ad valorem	576
Transport RAN/CODAPAG: 37,541 F CFA/T	6,007
Unloading of wagon	500
Round-trip ticket for exporter: Ouaga-Abidjan b/ Cost per animal	1,800
Lodging and food for exporter in Abidjan Cost per animal	750
Total expenses	48,379
Weight loss per carcass c/	6.4 kg.
Weight of meat arrived in Abidjan	153.6 kg.
Sale price per kg. in Abidjan	400 F CFA
Revenue	61,440
Profit per animal	13,061
II. Export of Live Animals	
Purchase of animal of 160 kg. carcass weight at Ouaga	40,000
Total transport costs (from Table 32)	13,451
Total expenses	53,451
Carcass weight loss (9%) d/	14.4 kg.
Carcass weight of animal in Abidjan	145.6 kg.
Sale price of animal in Abidjan (F CFA/kg. carcass weight) e/	405
Revenue	58,968
Profit per animal	5,517

Notes: see following page.

Table 34 Notes

a/ Estimated at 8% of purchase price.

b/ Cost of exporter or his agent coming to Abidjan to arrange export with CODAPAG. Most exporters ship small quantities (5-10 carcasses); it is estimated that one trip is made for every 10 carcasses and it is assumed that he spends 3 days in Abidjan. Round-trip ticket = 18,000 F CFA; food and loging is estimated at 2,500 F CFA/day.

c/ See note e/, Table 33.

d/ See text for explanation.

e/ The price per kg. carcass weight of live animals can exceed the wholesale meat price due to the value of the fifth quarter.

Sources: prices of cattle and export costs from Larry Herman, private communication RAN data, and SEDES, Note Sur le Transport des Viandes par Chemin de Fer Entre la Haute Volta et la Cote d'Ivoire (Paris, October 1973); prices of cattle and meat from ELP field survey, Abidjan.

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8. J.Staatz and L. Lawani, "Note Sur les Couts de Transports de Bovins Entre Ouaga et Abidjan," Centre Ivoirien de Recherche Economique et Sociale, Document de Travail No 4 (Abidjan, March 1977).

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10. Robert Van de Putte, personal communication.

CHAPTER IV: CATTLE PRICES AND THE MARGINS OF CATTLE TRADERS

A large part of the ELP field study in Bouaké was devoted to developing price series for different types of cattle. In all major livestock markets in Ivory Coast, cattle are sold by sight rather than being weighed and sold by Kilogram. Until late 1976, none of the markets were equipped with cattle scales. In October 1976, scales (financed by the CEBV) were installed in Bouaké and Abidjan, and plans call for equipping 18 other markets with scales starting in 1978, under a CEAO program. The government hopes to eventually move towards sales of animals on a per kilogram basis, but for the present only government development agencies and research stations (SODEPRA, AVB, etc.) sell their animals on a per kilogram basis.

Collection of price data on cattle sold in Bouaké began in July 1976 and ran through June 1977; prices were also collected in Abidjan from November 1976 through June 1977. Due to the lack of a cattle scale at the Bouaké market when the study began, it was decided to express all prices in terms of F CFA per kilogram carcass weight. This was the method used by SEDES in its West African price studies (4, 5). The installation of cattle scales in Bouaké during the course of the study permitted us to establish dressing percentages, so that the prices reported here can be converted into terms of F CFA per kilogram liveweight if needed. Prices were collected in the following manner: The enumerators would attend the cattle markets in Bouaké and Abidjan in the evenings and ask butchers the prices of the animals they had purchased for slaughter the next day. At the same time they would note the sex and breed of the animal and its point of origin. The next morning, when the animal was slaughtered, they would estimate its age (according to its dentition and horns) and weigh its carcass. The enumerators were instructed to use a "rotating sample" covering all the active butchers in the market. In reality, the sample was somewhat more limited, because a few butchers (five out of 40 in Bouaké) refused to cooperate with the study. Three other butchers were dropped from the sample in Bouaké when cross-checks (talking with sellers and other butchers) revealed that they were reporting exaggerated prices.

Since most butchers in Bouaké buy and slaughter only one or two animals at a time, it is much easier to determine the price differentials paid for different types of animals in Bouaké than in Abidjan, where animals are often sold in large lots. When a butcher buys a number of animals as a lot he pays a uniform price per head (e.g., 60,000 F CFA). The weight of the animals in the lot may vary considerably, however, and the butcher takes this into account when he decides what price he will offer for the animals. The problem a researcher faces in trying to determine the price of cattle in Abidjan is that unless he has the weight of every animal in the lot, he is likely to get a biased view of prices. The smaller animals in the lot appear to have a very high price per kilogram carcass weight, while the heavy animals appear to be very inexpensive per unit of weight. In reality, there exist prices for each type of animal sold in Abidjan, but these prices are only reflected in the average price paid for the lot, not the apparent price for each individual animal. For this reason, most of the data on price differentials for different types of animals comes from the Bouaké study.

PRICES OF CATTLE IN BOUAKÉ

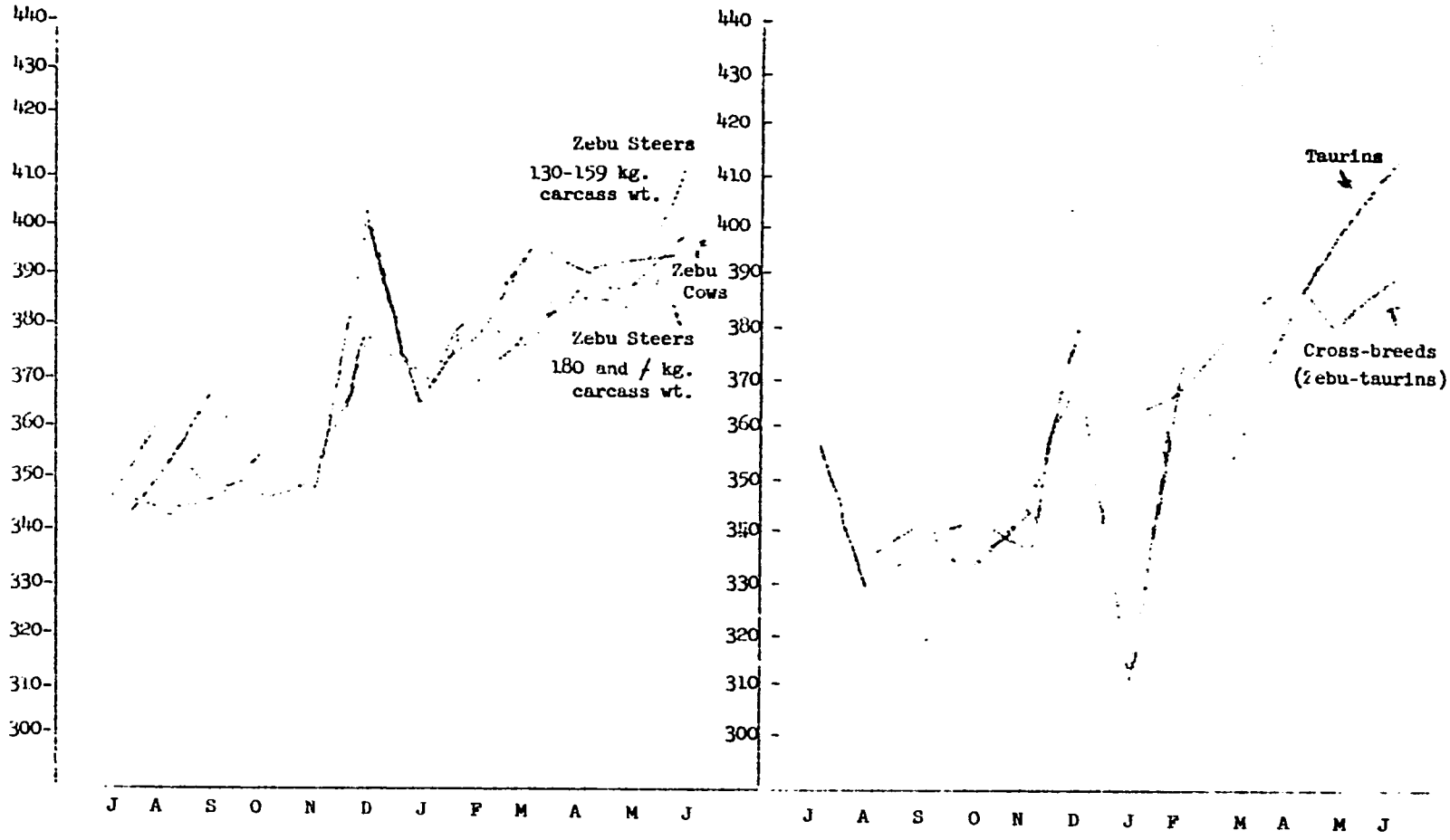
Table 35 presents average monthly prices in Bouaké for five different types of cattle: zebu steers with carcass weights of from 130 to 159 kg. (the average type of Sahelian animal sold in Ivory Coast), "extra" quality

Table 35 Average Monthly Prices for Cattle in Bouake, July 1976-June 1977
(in F CFA per kg. carcass weight)

Type of Animal	July 76	Aug.	Sept.	Oct.	Nov.	Dec.	Jan. 77	Feb.	Mar.	April	May	June
Zebu Steer: 130-159 kg. carcass weight	346	362	348	352	347	403	365	382	376	387	385	411
N	15	11	15	22	34	35	42	53	27	23	23	18
Zebu Steer: Carcass weight of 180 kg. or more	340	351	368	346	348	377	370	368	377	387	387	398
N	15	26	48	46	59	32	52	29	40	24	17	8
Zebu Cows	348	345	347	356	346	381	370	379	396	391	393	395
Ave. carcass weight (kg.)	151	141	147	143	145	138	145	141	139	140	129	134
N	8	12	16	16	27	31	19	21	19	18	26	31
Taurins	____	335	342	334	344	371	314	381	354	384	400	411
Ave. carcass wt.	____	122	130	133	141	131	147	111	116	133	111	108
N	____	6	10	10	3	5	3	8	8	10	3	5
Cross-Breed (Taurin X Zebu)	360	330	341	344	339	384	363	368	382	391	377	390
Ave. carcass wt.	151	134	165	150	157	152	139	138	145	150	142	130
N	5	6	2	14	19	30	40	26	21	33	26	12

Source: ELP field study, Bouaké.

FIGURE 3



Average Monthly Prices for Cattle in Bouaké, July 1976-June 1977

(in F CFA per kg. carcass weight)

zebu steers with carcass weights of 180 kg. or more, zebu cows, taurins, and cross-breed zebu-taurin animals. 1/ These data are also shown graphically in Figure 3. From Figure 3 it is clear that cattle prices were rising throughout most of the study period. The average price per kilogram carcass weight of all zebus recorded in the study rose from 344 F CFA in July 1976 to 400 F CFA in June 1977; for taurins and cross-breeds it went from 333 F CFA in August 1976 to 396 F CFA in June 1977. It is also clear that when prices are expressed in terms of F CFA per kilogram carcass weight, no premium was paid for heavy zebus as compared to average-weight ones. Nor was a lower price paid per kilogram for cows. (It should be noted, however, that the average weight of the cows slaughtered in Bouaké is rather high--the average for the sample during the year was 140 kg. These aren't the very thin cows one sees slaughtered in the northern regions; those animals are generally too weak to be shipped south and hence are slaughtered for local consumption in the north.) The average price per kilogram carcass weight for cows during the entire year of the study was 371 F CFA; for steers with 130-159 kg. carcasses it was 372 F CFA, while for heavy steers (180 kg. and over carcass weights) it was 368 F CFA. This uniformity in price per kilogram carcass weight for zebus attests to the fact that butchers accurately estimate the dressing percentage of animals they buy and that there is no special premium paid for the meat of heavy versus light animals. Since dressing percentages increase as liveweights increase, the price per kilogram liveweight of large animals is higher than that of small animals, however. 2/

It is also clear, however, that average prices paid for taurins, and to a lesser extent, cross-breeds, were lower than those paid for zebus of roughly equivalent weight. The average price per kilogram carcass weight paid for taurins throughout the period was 361 F CFA, and for cross-breeds it was 364 F CFA, compared to 372 F CFA/kg. for the zebu steers with carcass weights of 130-159 kg. The price margin between taurins and zebus was most marked during the first nine months of the study; when prices for zebus started to approach 400 F CFA/kg. carcass weight (April-June) the margin disappeared. The price margin between zebus and taurins reflected the butchers' preference for meat from zebus. Of the 29 wholesale butchers with whom we conducted in-depth interviews in Bouaké, 16 (55%) said [illegible] they had no preference between zebus and taurins; for these latter, only the price of the animal in relation to its carcass weight was important. Not a single butcher expressed a preference for taurins. The butchers who preferred zebus (this included all those who sold to the "quality" market, e.g., supermarkets, hotels) said that their customers preferred the meat from zebus because it is fattier and "finer" than meat from taurins. For those selling the rear quarters of their animals to the first-class retailers there is the added advantage that the rear quarters of zebus weigh proportionally more (roughly 52% of the total carcass weight) than those of taurins (approximately 48% of the carcass weight). It appears that during the last months of the study, when butchers' profit margins were being squeezed, some butchers switched to buying taurins in spite of their preferences for zebus, and as a result the price differential between the two types of animals disappeared.

1/ A much more detailed discussion of price differentials between various types of animals will be presented in the final SLP report, based on multiple regression analysis of the data collected in Bouaké.

2/ Data collected from October 1976 through January 1977 in Bouaké showed an average dressing percentage for zebu steers with liveweights between 300 and 350 kilograms of 48.0%; for zebu steers with liveweights over 350 kg. it was 51.5%; for cows, 47.7%. These dressing percentages correspond to the carcasses as they were weighed in Bouaké, without tails or kidneys. Inclusion of these parts in the carcass weights would raise the dressing percentages by roughly 0.5%.

In addition to their general upward trend from July 1976 to June 1977, prices for cattle in Bouaké showed distinct seasonal variations. Looking at the data for zebus (for which the sample size is much larger than for taurins), one sees that in July and August the price per kilogram carcass weight of larger steers was below that of the smaller steers. July and August is usually a period in which there are a large number of heavy animals entering the market from Northern Ivory Coast and Southern Mali. These are animals which have had fairly good grazing since the rains began in those areas in April; they start to enter the Bouaké market in late May. At the same time, the demand for heavy, well-fed animals for the first-class retailers starts to fall off during June, as many of the expatriates leave the country on vacation and many higher-income Africans return to their villages for their vacations. In September the pattern of July and August was reversed, with a premium being paid for the heavier animals. This reflects two phenomena the return of Europeans and high-income Africans to the city at the end of their vacations, with the resulting increase in demand for "quality" meat by the first-class retailers; and the high prices paid for large cattle during the last week of September, which was the end of the month of Ramadan. During the month of Ramadan, Moslems fast between sunrise and sunset; the end of this month is celebrated by feasting and beef consumption is heavy during this period. Butchers thus try to slaughter larger animals during this time in order to match the increased demand for meat.

In October the demand for large animals fell off, as did their prices. Butchers reported that consumer demand for meat was fairly low during this period. They attributed this to the fact that many of their customers were short of cash due to the heavy expenses they had to pay in September for sending their children back to school and for celebrating the end of Ramadan, and because most of the Moslems were saving up money to buy a sheep for Tabaski. 3/ Prices stayed around 347 F CFA per kilogram carcass weight through November, then shot up drmatically in December. The increase in prices was due to two causes: a sharp increase in demand due to the numerous religious and harvest festivals (especially in the forest zone, where people were beginning to be paid for their cash crop harvests), and a shortage of cattle transport, since most of the trucks and train cars were in use for the coffee and cocoa harvests. This latter factor resulted in fewer animals than usual arriving in the market. Since fewer animals arrived in the market and many additional buyers were present looking for animals to sell in the villages, prices rose. Demand was strongest for medium-sized animals and their prices rose the fastest; these were the animals destined to be slaughtered in the villages. Most of the villages were not large enough to warrant slaughtering a very heavy animal, so the increase in demand for large animals was somewhat lower and their prices did not rise as high as those of the smaller animals. Another factor leading to the high demand for small animals was the fact that during this period many butchers were losing money. The price of most animals per kilogram carcass weight exceeded both the wholesale and the retail prices of meat, which at that time was 350 F CFA/kg. and 375 F CFA/kg., respectively. Many butchers felt that they had to keep slaughtering during this period in order to keep their customers and hopefully pay both their variable costs and part of their fixed costs (market stall rental, amortization of their license, etc.). Since they were losing money anyway, they preferred to buy small animals; their loss per kilogram of meat was greater but the total loss was less.

The importance of the transportation constraint during this period of peak demand can be seen by comparing average prices paid for cattle in the producing regions in November and December, just prior to the period of peak demand in the south, with prices paid in the previous two-month period (September and October). One would expect that in producing areas which face

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3/ In 1976, Tabaski was on December 4.

no transportation contraint (e.g., areas which export animals to market largely on hoof) there would be an appreciable rise in cattle prices in the four to eight weeks prior to the period of peak demand in the coastal areas. Cattle merchants, anticipating the higher demand in the south in December and early January, would begin buying up animals in November and early December to send south by hoof, and this would bid up prices. In contrast, in areas dependent on means of livestock transport (e.g., rail) known to be unavailable or unreliable during the period of peak demand, the higher prices in the south would not be reflected in a rise in cattle prices in November and December. Cattle merchants would not bid up prices in anticipation of the high demand in the south, because they would have no sure means of transporting their animals south to take advantage of these high prices.

When price data are examined for the three regions which are the main suppliers of cattle to southern Ivory Coast (Northern Ivory Coast, Mali and Upper Volta) one sees the patterns described above. In 1976, prices for males sold from herds covered by SODEPRA extension programs in five regions of Northern Ivory Coast rose an average of 18% per animal during the period November-December as compared to September-October (6, p. 3). Most animals sent from Northern Ivory Coast to the forest zone come south by hoof, as do most Malian animals. Monthly price data for the major export market of Kati in Mali are available for 1975, but not as yet for 1976. Prices per animal in Kati rose 10% between September-October 1975 and November-December of that year (3, p. 27). Since November and December are well into the dry season, it is likely that prices per kilogram rose even more than 10%, as the animals were probably losing weight throughout this period. In contrast, Herman's data indicate that prices per head in Djibo, Upper Volta, fell 1% from September-October to November-December 1976, while in Pouytenga, prices per head fell 8% over the same period (1). Many of the animals sold in Djibo and Pouytenga are trekked to Ouaga for export by train to Ivory Coast. Since there is a seasonal shortage of train cars for cattle transport in December, the anticipated rise in cattle prices in Ivory Coast did not lead to higher prices in these two Voltaic markets, as cattle merchants knew that they could not take advantage of the high prices in the south.

Prices for cattle in Bouaké fell in January from their December peak, and then gradually rose through April. Supplies of animals on the market were reduced somewhat during this period as this was the end of the dry season. After the onset of the rains in April, well-fed animals from Northern Ivory Coast began arriving in the market and prices were stable between April and May. In June, the seasonal shortage of Voltaic cattle in the Abidjan market (described in Chapter II) led cattle merchants to start shipping animals from Bouaké to Abidjan, and this increased demand led to a rise in cattle prices in Bouaké. Prices for medium-sized animals rose faster than for large animals, due to both the large number of heavy animals arriving in the market from Northern Ivory Coast at this time and the seasonal decline in the demand for quality meat for the first-class retailers.

CATTLE PRICES IN OTHER MARKETS

Abidjan--Prices of cattle in Abidjan reflect the fact that Abidjan is very dependent on the rail system for delivering its supply of slaughter animals. When rail cars are not available in the northern areas to transport cattle to Abidjan, prices rise rapidly, and the inability to hold animals in Abidjan makes the price fluctuations even wider.

The analysis of the price data from Abidjan which follows will focus on average-sized animals (zebus with carcass weights of 130 to 159 kg.). This is done to overcome the methodological problem mentioned earlier of small and large animals in the Abidjan sample having seemingly very high and very low prices, respectively. Table 36 presents average monthly prices in Abidjan for zebu steers with 130 to 159 kg. carcass weights from November 1976 through June 1977 and compares them with prices of similar animals in Bouaké. These data are presented graphically in Figure 4.

Figure 4 Prices for Zebu Steers with Carcass Weights of 130-159 kg.

Abidjan and Bouaké, Nov. 1976 - June 1977

(F CFA per kg. Carcass Weight)

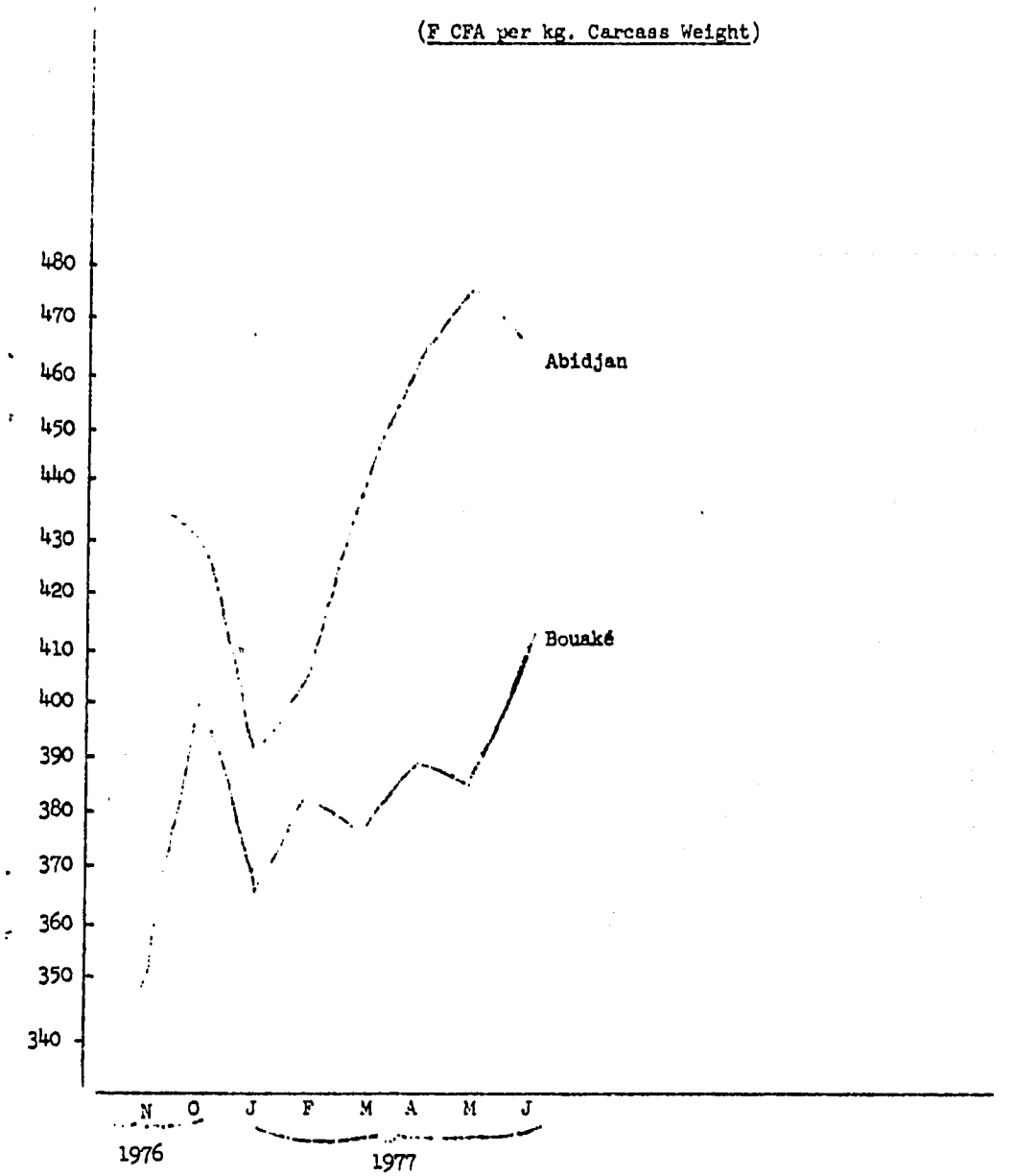

Table 36 Average Monthly Cattle Prices in Abidjan and Bouaké: Zebu Steers of 130-159 kg. Carcass Weight: November 1976 - June 1977 (in F CFA per kg. carcass weight)

	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
Abidjan	436	430	391	405	438	461	474	464
N	11	8	27	28	37	27	30	9
Bouaké	347	403	365	382	376	387	383	411
N	34	35	42	53	27	23	23	18
Difference	89	27	26	23	62	74	89	53

Note: The price figure for November for Abidjan is only for the last two weeks of the month.

Source: Table 35 and ELP survey in Abidjan.

As one would expect, prices for cattle in Abidjan are higher than those in Bouaké. It is interesting to note how much the price margin between the two markets varies, however. Prices were very high in November in Abidjan, as very few cattle arrived in the market either by train or truck. Almost all available trucks and train cars, as well as many of the livestock merchants, were involved at this time in shipping sheep south for Tabaski; hence there were few means available to move cattle into Abidjan. Bouaké was receiving adequate cattle supplies during this time from herds arriving on hoof, but a lack of transport prevented cattle merchants from shipping them on to Abidjan, so the large price margin between the two cities was maintained. In December, with the passing of Tabaski, the transport situation eased somewhat (although it still remained tight) and prices declined slightly in Abidjan. At the same time, prices were rising rapidly in Bouaké for the reasons discussed earlier, so the price margin between the two cities fell from 89 F CFA per kg. carcass weight to 27 F CFA. Prices fell in both cities in January, and the margin stayed at roughly the same level, 26 F CFA per kg. In February prices rose in both cities and the margin declined slightly, to 23 F CFA per kg. carcass weight. During the period December-February there were practically no shipments of cattle between Bouaké and Abidjan; this was because the cost of transport between the two cities was almost exactly equal to the price margin, leaving no profit margin for arbitrageurs. 4/

4/ Based on interviews with ten cattle merchants in Bouaké who shipped cattle to Abidjan between April and July 1977, we were able to establish that the average cash expenditure for shipping 25 animals by truck from Bouaké to Abidjan was 64,750 F CFA, broken down as follows: truck rental = 50,000 F; salary of the herder and his return fare = 5,000 F; straw = 500 F; loading and unloading charges = 6,750 F; other charges = 2,500 F. This averages out to 2,590 F CFA per head. Upon arrival in Abidjan, a 500 F per animal market tax is charged, bringing the total to 3,090 F CFA. If one assumes that an animal with a 150 kg. carcass was purchased in Bouaké at 383 F CFA per kg. carcass weight (the average price for the period December 1976-February 1977), it would have cost 57,450 F CFA. If the risk of mortality in shipment between Bouaké and Abidjan is 1%, this implies an additional cost of 575 F CFA per animal, bringing the total cost of arbitrage per animal between Bouaké and Abidjan to 3,665 F/head or 24.4 F CFA per kilogram carcass weight, assuming no loss of carcass weight en route. During the period December - February, the mean price margin between the two cities was 25.3 F CFA per kg. carcass weight; hence there was no incentive to ship animals from Bouaké to Abidjan.

In March, prices in Abidjan began to rise sharply, in part because of the fact that due to a delay in deliveries, AGRIPAC ran out of frozen meat to sell for a period of about ten days. This led to a large increase in the demand for fresh meat and consequently for cattle. This was accentuated by the normal seasonal shortage of Voltaic cattle on the Abidjan market (see p. 40), which began to be felt in late March. The shortage of Voltaic cattle in Abidjan became worse in April and May, and the price margin between Bouaké and Abidjan widened. As a result, arbitrage between the two markets became profitable, and cattle merchants began sending animals from Bouaké to Abidjan. The margin widened to 89 F CFA/kg. in May, then, partly as a result of this arbitrage of animals between the two markets, fell to 53 F CFA in June. It should be noted that it was roughly two months between the time when the inter-city price margin increased markedly in March and when it began to decrease again as a result of spatial arbitrage in June. This suggests that the traditional marketing system is not always as quick to react to market changes as some of its proponents have suggested.

Northern Ivory Coast--Data on cattle prices in late 1976 in Northern Ivory Coast are available from two sources: studies carried out by the Cellule Statistique of SODEPRA's extension program office in Korhogo (6, 7) and information on the prices paid in Tingrela and other northern markets for animals destined for the SODEPRA feedlot at Ferkéssédougou (8). The Cellule Statistique carried out a survey of prices paid for slaughter animals by butchers in Odienné, Boundiali and Bouna; prices in this study were reported in terms of F CFA per kilogram carcass weight. The price data from the feedlot in Ferké were reported in terms of F CFA per kilogram liveweight and were converted to a carcass weight basis using a dressing percentage of 48%. Table 37 presents these data for the period June-December 1976. The prices refer only to males; for Odienné, Bouna and Boundiali it refers to animals four years or older. In Odienné, almost all the animals included in the sample were N'damas, while in Bouna the sample was entirely Boualés. The data for Boundiali and Tingrela refer to zebus.

From these data it appears that prices were higher in the northeast and the northwest of the country (Bouna and Odienné) than in the north central region (Boundiali). While the higher prices for animals for Odienné can be explained by the strong demand for N'damas for animal traction projects, it is not clear why prices should be higher in the east (especially given the state of the Ghanaian market) than in Boundiali, which lies on a major trade route for animals, and is thus influenced by the high prices in the south. It also seems odd that the price of cattle in Tingrela (north of Boundiali) would be higher than those in Boundiali itself. Part of this may be explained by the fact that the animals purchased in Tingrela were essentially trade cattle destined for slaughter in the south, while many of the animals slaughtered in Boundiali may have been ill or injured and thus unable to be shipped south (i.e., Boundiali may rely primarily on cull and injured animals from local herds for its meat supply). In any case, it seems that the prices reported for Boundiali are somewhat low.

Table 37 Prices for Cattle in Northern Ivory Coast, June - December 1976 (in F CFA per kg. carcass weight)

Market	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
Odienné (N'damas)	301		304		296	298	307	302
N	29		166		49	52	47	
Ave. Wt. a/	107		114		109	120	111	
Bouna (Boualés	—	304	297	319	294	—	—	304
N	—	24	37	29	19	—	—	
Ave. Wt. a/	—	86	85	103	90	—	—	
Boundiali (Zebus)	306	250	255	285	272	278	256	286
N	24	8	14	13	9	11	5	
Ave. Wt. a/	136	192	141	138	132	155	12[illegible]	
Tingrela (Zebus)	—	—	—	—	326	328	2	325
	—	—	—	—	139	38	114	
Ave. Wt. a/	—	—	—	—	112	126	113	

a/ Carcass weight. For Tingrele data, liveweights converted to carcass weights using a dressing percentage of 43% (see p. 72, note 2/).

Sources: SODEPRA, Operation Encardrement Nord, Cellule Statistique, "Enquête dans les Abattoirs de Odienné, Boundiali et Bouna de Juin-Decembre 1976" (Korhogo, May 1977) and SODEPRA, Project d'Embouche Bovine de Ferkéssédougou, unpublished data.

MARGINS FOR CATTLE TRADERS

The data just presented on cattle prices in different regions of Ivory Coast and the transport costs for cattle presented in Chapter III permit the calculation of livestock traders' margins between Northern and Southern Ivory Coast. Similarly, data on cattle prices in Upper Volta and Mali provided by Herman and O.M.BE.VI. can be used with the transport cost information in Chapter III to calculate trade margins for the routes Upper Volta-Southern Ivory Coast and Mali-Southern Ivory Coast. These calculations will be based on the average prices paid for zebu steers of 130-159 kg. carcass weights in Abidjan and Bouaké in the period November 1976-January 1977 and in the producing regions of Northern Ivory Coast in the period October-December 1976 (a month's "lag" is allowed for the transport of the animals between the producing and the consuming regions). For Upper Volta an average price of 250 F CFA per kilogram carcass weight will be used (this price was supplied by Herman); and for Mali (Koutiala and Sikass) a figure of 290 F CFA per kilogram carcass weight will be used. This latter price is drawn from O.B.BE.VI. documents: in early 1977 the price per kilogram carcass weight of export cattle in the market of Kati (near Bamako) was 315 F CFA (9, p. 11), while in Doukoloma (north of Segou) it was roughly 275 F CFA (10, p. 6). It is reasonable to assume that the price in Sikasso and Koutiala was intermediate between these two prices, as these cities are nearer the major trade routes than Doukoloma but they lack the large consumption demand for meat present in Bamako.

Average prices paid for zebu steers of 130-159 kilograms carcass weight between November 1976 and January 1977 were 372 F CFA/kg. in Bouaké and 420 F CFA/kg. in Abidjan. For calculating traders' margins these prices should be reduced by roughly 2 F CFA/kg. carcass weight, as they include the intermediaries' fees which are paid by the purchaser. The average price paid in Tingrela by SODEPRA for animals for the feedlot in Ferké during the period October-December 1976 was 325 F CFA. Using these prices and the transport costs calculated in Tables 28-32 (Chapter III) one can calculate cattle merchants' margins for the major trade routes. These calculations are presented in Tables 38 and 39.

Table 38 shows that given the prices and costs of late 1976 and early 1977, it was more profitable (per trip) to ship cattle to Bouaké on hoof than by train or by truck. The average profit per head using hoof transport from Tingrela to Bouaké was 3,279 F CFA and from Sikasso it was 2,921 F CFA. By contrast, the margin (on the average) for traders using truck transport between Tingrela and Bouaké was negative. Truck transport may have been profitable in certain instances when there were temporary shortages of cattle in Bouaké and merchants could react quickly by sending animals south by truck, but in most cases it did not pay. This explains why few animals are transported from Northern Ivory Coast to Bouaké by truck (out of 11,541 cattle recorded as arriving in Bouaké from Northern Ivory Coast in 1976, only 480 (4%) came south on trucks (11)). Mixed hoof-train transport from Sikasso to Bouaké was also considerably less profitable than straight hoof transport; it may have been preferable in those instances when it reduced weight losses below those of hoof transport. The margin for shipping animals to Bouaké by hoof is modest, roughly 3,000 F CFA on a 50,000 F CFA investment (6% return on capital per trip). The time involved in buying the animals and arranging the shipment is such that roughly five to six rotations of capital can be made per year, for a yearly return on capital of 30-36%. It should be noted that the prices in the producing areas used in this analysis are those of major cattle markets in these regions. To the extent that prices in the countryside (buying directly from the cattle raisers) are lower, the profit margins of traders would be higher per rotation of capital, although the time involved in buying the animals individually from the cattle raisers would slow down the rate of capital rotation. 5/

Table 39 indicates that margins for shipping cattle to Abidjan were somewhat above those for shipping animals to Bouaké. It must be remembered, however, that during part of the period under analysis (i.e., November 1976) it was extremely difficult to ship cattle to Abidjan because of a lack of transport (see p. 75), and as a result, prices were unusually high. It is also likely that cattle merchants demand a somewhat higher risk premium to ship animals to Abidjan because of the higher incidence of butchers defaulting on debts in Abidjan than in Bouaké.

Table 39 shows, as did Table 38, that on a per shipment basis it is much more profitable to rely on means of transport that involve some trekking of animals than to rely exclusively on truck transport. The margin per head for mixed transport of animals from Tingrela to Abidjan during this period was roughly 3.5 times that of truck transport. Assuming it takes three days to buy the animals in Tingrela and arrange to send them south, a week to sell them in Abidjan, and using the number of days in transit indicated in Table 30 (1 day for truck transport and 26 days for mixed transport), the time needed for one rotation of capital using truck transport can be calculated as 11 days and that for mixed transport as 36 days. Hence, the rate of capital rotation for truck transport is 3.3 times that of mixed transport. Given the fact that truck transport requires a slightly higher cash outlay per head (58,000 F vs. 54,000 F) and that the faster capital rotation does not quite offset the higher margin per trip earned with mixed transport, the annual rate of return to

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5/ A detailed analysis of village-level cattle prices in Northern Ivory Coast (based on data collected by SODEPRA) will be included in the final ELP report.

capital is less in shipping animals by truck than in using mixed transport. This explains why few cattle are shipped from Northern Ivory Coast to Abidjan by truck. Table 39 also indicates that, on the average, it did not pay to ship cattle by truck from Mali to Abidjan. It should be noted, however, that charges for hauling cattle from Mali to Abidjan by truck vary considerably, depending on the number of empty Ivoirian trucks in Mali competing for back-haul cargoes. Thus at certain times of the year it may pay to ship cattle by truck between Mali and Abidjan, but in general it does not. Mixed transport, however, does appear profitable, yielding a return per trip of 4,426 F CFA per head on an investment of 53,885 F CFA, an 8.2% return on capital.

The most profitable trade route seems to be Ouagadougou-Abidjan, yielding roughly a 12% return on investment per trip. Again it must be emphasized, however, that the rail transport on which this profitability is dependent was largely unavailable to cattle merchants during November (due to heavy shipments of sheep for Tabaski), and as a result cattle prices rose. Those who succeeded in shipping cattle to Abidjan during this period earned a healthy profit, but not all the merchants having cattle to export from Ouagadougou were able to do so. It does appear, however, that the trade in Voltaic cattle to Abidjan is more profitable than that of Malian cattle. The existence of a rail link between Upper Volta and Abidjan serves to favor Voltaic exports to the coast.

The margins indicated in Tables 38 and 39 appear modest and seem to indicate a rather efficient system of spatial arbitrage. While gross margins are large (e.g., the sale price of a steer in Abidjan is roughly 50% above its purchase price in Ouaga), the bulk of these gross margins is accounted for by the high transport costs and export taxes involved in shipping cattle between the producing regions and the coast, and not by the cattle traders' profit margins.

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Table 38 Estimated Margins for Shipping a 150 kg. Steer to Bouaké from Northern Ivory Coast and Mali (in F CFA)

I. Purchase of animal in Tingrela

Expenses	Transport: Hoof	Transport: Truck
Purchase of animal 150 kg. X 325 F/kg.	48,750	48,750
Transport costs per animal (from Table 28)	2,361	5,730
Total Expenses	51,111	54,480
Weight loss estimated at 2% of carcass weight = 3.0 kg.		
Sale of animal in Bouaké 147 kg. X 370 F/kg.	54,390	54,390
Net Margin	3,279	-90

II. Purchase of animal in Sikasso

Expenses	Transport: Hoof	Transport: Hoof to Ferkéssédougou; Train from Ferké to Bouaké
Purchase of animal 150 kg. X 290 F/kg.	43,500	43,500
Transport costs per animal (from Table 29)	6,859	8,497
Total Expenses	50,359	51,997
Weight loss estimated at 4% of carcass weight = 6.0 kg.		
Sale of animal in Bouaké 144 kg. X 370 F/kg.	53,280	53,280
Net Margin	2,921	1,283

Source: Text and Tables 28 and 29.

Table 39 Estimated Margins for Shipping a 150 kg. Steer to Abidjan from Northern Ivory Coast, Mali and Upper Volta (in F CFA)

I. Purchase of animal in Tingrela

Expenses	Transport: Truck	Transport: Hoff to Bouaké; Truck from Bouaké to Abidjan
Purchase of animal 150 kg. X 325 F/kg.	48,750	48,750
Transport costs per animal (from Table 30	9,296	5,606
Total Expenses	58,046	54,356
Weight loss estimated at 5% of carcass weight = 7.5 kg.		
Sale of animal in Abidjan 142.5 kg. X 418 F/kg.	59,565	59,565
Net Margin	1,519	5,209

II. Purchase of animal in Koutiala, Mali

Expenses	Transport: Truck	Transport: Hoof to Ferkéssédougou; Train from Ferké to Abidjan
Purchase of animal 150 kg. X 290 F/kg.	43,500	43,500
Transport costs per animal (from Table 31)	22,886	10,385
Total Expenses	66,386	53,885
Weight loss estimated at 7% of carcass weight = 10.5 kg.		
Sale of animal in Abidjan 139.5 kg. X 418 F/kg.	58,311	58,311
Net Margin	-8,075	4,426

III. Purchase of animal in Ouagadougou

Expenses	Transport: Train
Purchase of animal, 150 kg. X 250 F/kg.	37,500
Transport costs per animal (from Table 32)	13,451
Total Expenses	50,951
Weight loss estimated at 9% of carcass weight = 13.5 kg.	
Sale of animal in Abidjan, 136.5 kg. X 418F/kg.	57,057
Net Margin	6,106

Source: Text and Tables 30-32.

CHAPTER V: THE RETAIL MEAT TRADE

The structure of the retail meat trade has already been discussed in Chapter II (see pp. 47-49); this chapter will focus on the profit margins of both first-class and second-class butchers, and problems facing these professions.

RETAIL BEEF PRICES

In theory, meat prices in Ivory Coast are fixed by the government in order to hold down the cost of living. The Ministry of Economic Affairs and Finance sets these prices for second-class retailers in Bouaké and Abidjan and for all first-class retailers throughout the country. In areas outside of Bouaké and Abidjan, prices for second-class retailers are set by the prefets and sous-prefets in each region. In reality, the official prices for Abidjan and Bouaké are completely out of date, not having been revised since 1974 and 1975, respectively. In these two cities, the official prices are not respected and price-control officials generally turn a blind eye to the situation, realizing that given the current price of cattle, butchers are obligated to sell above the official prices. 1/ Nonetheless, the official prices act as a brake on price rises, as butchers are aware that they are selling above the officially-sanctioned level and that if they raise their prices too rapidly the price-control agency is likely to react unfavorably, possibly imposing fines. It appears that in some areas outside of Abidjan and Bouaké, especially in Northern Ivory Coast, price-control agents try to enforce the official prices. This results in only lower-quality animals being slaughtered in these regions, as the better animals move towards Abidjan and Bouaké where meat prices are "freer" and hence prices for cattle are more attractive.

PRICES PRACTICED BY SECOND-CLASS RETAILERS

Fresh beef is sold on the traditional market in Abidjan and Bouaké both by weight and in small unweighed piles or "tas" of meat. Most beef sold by weight is "viande avec os," a mixture of meat, bones, fat, and stomach. A small amount of boneless meat is also sold by kilogram. The tas, generally sold for between 25 F CFA and 100 F CFA, are composed of a mixture of meat, offals, bones and fat. They are primarily sold by small retailers, meat vendors, and apprentice-butchers. Occasionally wholesale-retail butchers will sell by tas in order to get rid of meat unsold near the end of the day, but most of their sales are by kilogram. The sale of meat by small tas is an adaptation to a market in which many of the customers have very limited budgets. The mixture of offals with meat creates a lower-priced (and lower-quality) product which poorer customers can afford to buy (a more detailed discussion of the sale of meat by tas and how it reflects consumer preferences is presented in Chapter VI).

During the period of the study (July 1976 to July 1977), retail prices for fresh beef with bones in Bouaké rose from 350 F CFA per kilogram to 400 F CFA per kilogram. Prices first rose to 375 F CFA per kilogram in mid-September as prices for cattle, especially heavy ones, rose (see Figure 3). Retail beef prices were stable from mid-September to near the end of December, when butchers again raised their prices (to 400 F CFA per kilogram) in response to the rising cattle prices. As cattle prices fell in January, so did retail prices (back to 375 F CFA per kilogram), but they quickly returned to 400 F CFA per kilogram in February as cattle prices started their upward climb. From February through July 1977, the price remained stable at 400 F CFA per kilogram. Throughout the entire period, boneless fresh beef cost 50 F CFA per kilogram more than did fresh beef with bones.

1/ The official price for fresh beef with bones in Abidjan is 300 F CFA/kg., and 350 F CFA/kg. for boneless fresh beef; in Bouaké, the corresponding official prices are 250 F CFA/kg. and 300 F CFA/kg. (1, 2). As will be shown later, these prices are roughly 150-200 F CFA/kg. below the prices actually practiced in these markets in early 1977.

Frozen beef, mainly South American meat imported by AGRIPAC, sold for between 50 and 100 F CFA per kilogram less than fresh meat. From July through September frozen beef was sold retail for 300 F CFA per kilogram with bones and 350 F CFA per kilogram boneless. AGRIPAC cut prices by 20 F CFA per kilogram for both boneless meat and meat with bones during September and October, then raised prices back to 300 F CFA per kilogram for meat with bones and 350 F CFA for boneless meat. (AGRIPAC has always maintained a 50 F CFA differential between meat with bones and boneless meat.) The price of meat with bones remained at 300 F CFA until March, when it rose to 325 F CFA per kilogram. In April it rose again to 350 F CFA per kilogram, thus reestablishing a 50 F CFA per kilogram margin between it and the price of fresh beef. As will be shown in Chapter VI, the strong consumer preference for fresh meat allows these price differentials to be maintained.

In contrast to Bouaké, retail meat prices in Abidjan showed more fluctuation, both over time and between neighborhoods. Average beef prices for the Adjamé and Treichville markets from January to May 1977 are shown in Table 40. Prices for fresh meat with bones varied from between 400 to 500 F CFA per kilogram depending on the market and the month. Prices were almost always higher in Treichville than in Adjamé; this probably reflects the fact that Treichville is a richer neighborhood than Adjamé and has a larger European and Lebanese population. Frozen meat generally sold for between 50 and 100 F CFA less per kilogram than fresh meat in both markets.

MARGINS FOR SECOND-CLASS BUTCHERS

Based on the data on cattle prices presented in the previous chapter and information on retail and wholesale prices, net margins can be estimated for butchers slaughtering in Abidjan and Bouaké. These estimates are presented in Tables 41-43. The prices and costs used in these tables were those observed during the field studies carried out in Bouaké and Abidjan. Most of the cost data for Abidjan were gathered in the February-April period, while in Bouaké they were gathered somewhat later, so the dates to which average costs and prices refer differ slightly between the two cities. Most of the cost and receipt items listed in Tables 41-43 are self-explanatory, but a few points should be made:

--Butchers on the African market sell relatively little boneless meat. It is primarily sold to European and Lebanese customers, and the total amount of boneless meat sold usually doesn't exceed ten kilograms per animal. This meat comes exclusively from the rear quarters.

--Wastage in the cutting up of the carcass is fairly low. The only losses are the scapula, which is not sold, and bone splinters. These together are estimated at roughly one kilogram.

--In Bouaké, the apprentice butchers are obligated to buy the fifth quarter of the animal (except for the stomach and the hide, which are sold by the butcher), daily for a fixed price, and they bear the risk in case of seizure of the internal organs. In Abidjan, however, the butcher sells the entire fifth quarter (except the hide) to retailers and takes the risk himself.

--In Bouaké, the butcher mixes the stomach with the meat and sells this combination retail at 400 F CFA/kg.

--In Abidjan, due to the large number of first-class retailers, a butcher can sell the rear quarters at a higher price per kilogram than the front quarters.

Table 40 Average Retail Beef Prices in Adjamé and Treichville, January - May, 1977 (in F CFA per kg.).

Month	Adjamé				Treichville			
	Fresh Beef		Frozen Beef		Fresh Beef		Frozen Beef	
	With Bones	Boneless	With Bones	Boneless	With Bones	Boneless	With Bones	Boneless
January	400	450	300	350	450	500	400	450
February	488	438	417	367	450	520	375	425
March	466	583	375	433	500	617	400	450
April	475	550	363	413	500	600	366	435
May	466	533	400	450	500	600	425	475

Note: Based on weekly observations of sales in the Adjamé and Treichville markets.

Source: ELP field study, Abidjan.

Table 41 Estimated Net Margin for a Butcher Slaughtering a 150 kg. Carcass Weight Steer in Bouaké (Prices and costs as of April - June, 1977). in F CFA

Expenses	
Purchase of animal: 150 kg. X 394 F CFA/kg. a/	59,100
Slaughter tax	750
Veterinary inspection	450
Transport of meat from the abattoir to the market	200
Rental free for market stall: 3,700 F CFA/month b/	123
Butchers' Union fees	
5,000 F CFA per year annual dues	14
100 F CFA per day contribution collected at the market	100
Amortization of butcher's license (average cost per year = 108,800 F CFA c/	302
Risk of seizure of carcass: d/ 0.3% of amount invested in the animal	183
Paper to wrap meat, sharpening of tools, etc.	200
Total Expenses	61,422
Receipts: I. Sale of 50% of meat retail, 50% wholesale	
Filet: 4 kg. X 700 F CFA/kg	2,800
146 kg. of remaining carcass, of which:	
73 kg. sold wholesale @ 375 F CFA/kg.	27,375
10 kg. sold retail (boneless) @ 450 F CFA/kg.	4,500
59 kg. sold retail (with bones) @ 400 F CFA/kg.	23,600
3 kg. of unsold meat (with bones) sold the next day @ 350 F CFA/kg. e/	1,050
1 kg. wastage (bones)	0
Stomach: 8.5 kg. @ 400 F CFA/kg.	3,400
Sale of fifth quarter (except hide) to apprentices	6,000
Hide	350
Total Receipts	69,075
Net Margin	7,653

(continued on next page)

Table 41: Continued

Receipts: II. 100% retail sale of meat

Filet: 4 kg. X 700 F CFA/kg.	2,800
146 kg. of remaining carcass, of which:	
10 kg. sold boneless @ 450 F CFA/kg.	4,500
132 kg. sold with bones @ 400 F CFA/kg.	52,800
3 kg. of unsold meat (with bones) sold the next day @ 350 F CFA/kg.	1,050
1 kg. wastage (bones)	0
Stomach: 8.5 kg. @ 400 F CFA/kg.	3,400
Sale of fifth quarter (except hide) to apprentices	6,000
Hide	350
Total Receipts	70,900
Net Margin	9,478

Notes: a/ Average of monthly prices in Bouaké for steers of 130-159 kg. carcass weight in April, May and June, 1977 (see Table 35).

b/ Average rental fee for market stalls of 29 wholesale-retail butchers interviewed in Bouaké during the c urse of the study.

c/ The cost of butchers' licenses varies according to the number of animals slaughtered per year and the rental fee of the butcher's market stall. The figure of 108,800 F CFA is an average drawn from the interviews mentioned in note b/.

d/ 0.3% rate based on data on seizures of carcasses provided by the Veterinary Service in Bouaké. Since the apprentices in Bouaké are obligated to pay the butcher 6,000 F CFA for the fifth quarter of the animal even if some of the internal organs are seized, the only risk that the butcher bears is that of seizures of the entire carcass (see p49).

e/ Butchers interviewed in Bouaké reported having an average of 3 kg. of unsold meat per day, which was generally sold at a lower price the next day.

Source: ELP field study in Bouaké.

Table 42 Estimated Net Margin for a Butcher Slaughtering a 200 kg. Carcass Weight Steer in Bouaké and Selling the Rear Quarters to a First-Class Retailer (Prices and costs as of April - June, 1977): in F CFA

Expenses	
Purchase of animal: 200 kg. X 391 F CFA/kg. a/	78,200
Slaughter tax	750
Veterinary inspection	450
Transport of meat from the abattoir to the market	200
Rental fee for market stall: 3,700 F CFA/month	123
Butchers' Union fees 5,000 F CFA per year annual dues	14
100 F CFA per day contribution collected at the market	100
Amortization of butcher's license (average cost per year = 120,000 F CFA b/	333
Risk of seizure of carcass: c/ 0.3% of amount invested in the animal	240
Paper to wrap meat, sharpening of tools, etc.	200
Total Expenses	80,610
Receipts	
Fiet: 5 kg. @ 700 F CFA/kg.	3,500
Rear quarters sold to first-class retailer: 120 kg. @ 400 F CFA/kg.	48,000
80 kg. of remaining carcass, of which: 76 kg. sold retail (with bones) @ 400 F CFA/kg.	30,400
3 kg. of unsold meat (with bones) sold the next day @ 350 F CFA/kg.	1,050
1 kg. wastage (bones)	0
Stomach: 10.5 kg. @ 400 F CFA/kg.	4,200
Sale of fifth quarter to apprentices (except hide and stomach)	6,000
Hide	350
Total Receipts	93,500
Net Margin	12,890

Notes: a/ Average monthly price in Bouaké from April to June 1977 of steers with carcass weights of 180 kg. or more (see Table 35).

b/ The average cost of licenses of butchers selling to supermarkets is somewhat higher than for other butchers due to the larger number of animals they slaughter.

c/ See note d/, Table 41.

Source: ILP field study in Bouaké.

Table 43 Estimated Net Margin for a Butcher Slaughtering a 150 kg. Carcass Weight Steer in Abidjan (prices and costs as of February - April, 1977): in F CFA

Expenses	
Purchase of animal: 150 kg. X 435 F CFA/kg. a/	65,250
Slaughter tax, veterinary inspection, cold room charges	2,500
Transport of meat from the abattoir to the market	300
Rental of market stall: 500 F CFA/day	500
Butchers' Union fees	
5,000 F CFA per year annual dues	14
100 F CFA per day contribution collected at the market	100
Amortization of butcher's license (120,000 F CFA per year) b/	333
Payment of apprentices for slaughtering the animal	500
Losses through seizures	
Carcass: 0.3% of amount invested in the animal c/	208
Internal organs: 7.6% of the value of the "abats roughes" (4,800 F CFA) d/	365
Total Expenses	70,070
Receipts: Entire carcass sold wholesale	
Sale of front quarters: 72 kg. @ 375 F CFA/kg.	27,000
Sale of rear quarters: 74 kg @ 425 F CFA/kg.	31,450
Sale of filet: 4 kg. @ 800 F CFA/kg.	3,200
Sale of fifth quarter:	
Tail	800
Tongue	300
Kidneys: 150 F CFA each	300
Feet: 400 F CFA each	1,600
Liver: 400 F CFA/kg. X 5 kg.	2,000
Head)	
Heart)	
Stomach)	
Intestines)	6,000
Lungs)	
Spleen and pancreas)	
Hide	1,100
Total Receipts	73,750
Net Margin	3,680

Notes: See following page.

Source: ILP field study in Abidjan.

Table 43: Notes

a/ Average monthly price in Abidjan for steers with carcass weights of 130-159 kg. from February to April, 1977 (see Table 36).

b/ Average cost of butcher's license is higher in Abidjan than in Bouaké.

c/ See note d/, Table 41.

d/ Based on data on seizures of internal organs at the Bouaké Abattoir; "abats rouges" include the heart, lungs, kidneys, liver, spleen, and pancreas.

Tables 41-43 indicate fairly modest net margins for butchers in Abidjan and Bouaké. The net return to capital and labor of a butcher slaughtering a 150 kg. carcass weight steer in Bouaké and selling half of the meat wholesale (about half of the butchers in Bouaké follow this pattern) was 7,653 F CFA, which is equivalent to 12.5% of his total expenses. If he sold it entirely retail, his net margin would increase to 9,478 F CFA or 15% of his total costs, although his total labor input would be greater. (If he had sold all the meat retail at the official prices of 300 F CFA/kg. boneless and 250 F CFA/kg. with bones, he would have lost 14,772 F CFA.) Butchers who slaughtered large animals and sold the rear quarters to first-class retailers tended to fare slightly better, earning 12,890 F CFA per head, or a 16% return on total costs. In all these examples, the margins are modest, especially when compared with those earned by the first-class retailers (see below). It should be noted that with the increase in cattle prices in June 1977, these margins fell. Using June's cattle price of 411 F CFA/kg. carcass weight in the first example in Table 41 reduces the net margin to 5,103 F CFA per head, or an 8% return on costs.

Given the higher price of cattle in Abidjan and the higher costs butchers must pay, net margins are even less than in Bouaké. The net margin for a butcher working solely as a wholesale butcher is very low 3,680 F CFA per head, or a 5% return on total costs. If the front quarters are sold retail at 475 F CFA/kg., the net margin increases to 10,880 F CFA, or 15% of total costs. It is thus clear why many butchers do not follow the official rules forbidding "chevillards" to sell retail. The relatively low net margins for butchers combined with the wide price fluctuations for cattle in Abidjan lead many butchers to lose money on certain days, which in turn causes some of them to default on their debts.

PRICES AND MARGINS OF FIRST-CLASS RETAILERS

As with the second-class retailers, retail prices are officially set for the European-style butcher shops and supermarkets. These prices were set in 1974; since late 1975 there has also existed a set of "tolerated" prices for locally-slaughtered meat which are above the official prices. These are the prices currently in use by most first-class retailers. In addition, under an agreement between the Ministry of Commerce, the Ministry of Animal Production, and the first-class butchers' union, the retail price of imported chilled meat has been indexed to the wholesale price paid by the butcher. For example, if a first-class retailer purchases a rear quarter of Argentinian chilled beef for 700 F CFA per kilogram, he is permitted to sell the filet at 3.6 X 700 = 2,520 F CFA/kg.; steaks at 3.2 X 700 = 2,240 F CFA/kg.; and so forth. These coefficients were calculated so as to allow a 33% net margin for the butchers, which is approximately the margin earned by butchers in France (3). The official prices, the "tolerated" prices and the indices allowed for first-class retailers are shown in Table 44.

Table 44 Official Prices, "Tolerated" Prices and Indices for Imported Meat Allowed First-Class Retailers (in F CFA/kg.)

Type of Meat	Official Price 1st Choice Quality	Official Price "Extra" Quality	Tolerated Price 1st Choice Quality	Tolerated Price "Extra" Quality	Index
Filet	950	1,100	1,250	1,405	3.6 X wholesale pric
Meat for grilling (steaks, etc.)	800	950	1,100	1,240	3.2 X wholesale pric
Roasts	650	800	910	1,020	2.6 X wholesale price
Meat for braising	340	360	440	440	1.6 X wholesale price
Stew meat	300	300	370	370	1.2 X wholesale price

Source: Ministere de la Production Animale.

As Table 44 indicates, the "tolerated" prices for locally-slaughtered meat (i.e., the prices currently used by most first-class retailers) are between 27% and 37% above the official prices. They are not "floating" prices as are the indexed prices for imported chilled meats; thus, as the wholesale price of locally-slaughtered meat increases and the "tolerated" prices remain unchanged, the retailers' margin is eroded. Given the wholesale price of meat in Abidjan in early 1977, the "tolerated" prices permitted a net margin of roughly 26%; with the increase in cattle and wholesale meat prices in 1977, this margin has been reduced. The fact that the retail price of local meat has been frozen while that of imported chilled meat has been indexed to its wholesale price has given retailers an incentive to sell imported meat, as the net margin that can be earned with it is higher than that with local meat. This has the effect of reducing the demand for choice animals in Abidjan and boosting the demand for imported, largely non-West African, chilled meat.

CITATIONS

Ministère de l'Economie et des Finances, Arrete No. 815/MEF du 30 mai 1974 portant fixation des prix de viande dans les boucheries de 2ème classe en Abidjan.

2. Ministère de l'Economie et des Finances, Arrete No. 99/PB/DAF du 30 juin 1975 portant fixation des prix de la viande dans les boucheries de 2ème classe Departement de Bouaké.

3. Ministère de la Production Animale, "Methode de Calcule du Prix de la Viande" (by Dr. Delestre), Abidjan, n.d.

CHAPTER VI: CONSUMER PREFERENCES FOR MEAT

In order to project future trends in cattle and meat marketing in Ivory Coast, it is useful to have and idea of consumer preferences in the country, both between beef and other meats, and among different types of beef (e.g., fresh vs. frozen). This chapter will discuss these preferences and compare the relative prices of various sources of animal protein in the Ivorian diet.

PREFERENCES AMONG DIFFERENT SOURCES OF ANIMAL PROTEIN

It was shown in Chapter I that beef is the most widely consumed red meat in Ivory Coast and the second most widely consumed source of animal protein (after fish). The relatively heavy consumption of fish and beef is due to the fact that they are the cheapest major sources of animal protein available on the market. This can be seen in Table 45, which compares the retail prices during June 1977 of different sources of animal protein, including the various types of beef sold in Bouaké and Abidjan. As can be seen, frozen fish is the cheapest source of animal protein available, costing roughly half as much per kilogram as does fresh beef (with bones) in Bouaké. In Abidjan, due to the higher price of beef and the lower price of fish, the relative price of frozen fish is even lower--36% of the price of fresh beef with bones. 1/ In Abidjan, smoked fish is the second cheapest source of animal protein on a per kilogram basis, costing 60% of the price of fresh beef with bones. In Bouaké, it is relatively more expensive, costing 70% of the fresh beef price. The cheapest red meat in both cities is a mixture of fresh beef and offals sold in small piles ("tas") at 25 to 50 F CFA each. As mentioned in the previous chapter, fresh beef is sold by the kilogram, both with and without bones, and in small "tas" of mixed meat and offals. There are several sizes of tas available, being sold for between 25 F CFA and 200 F CFA. In general, the smaller the tas, the larger the proportion of offals and the lower the quality of the meat in the tas (e.g., more meat from the head). The smaller tas also have a lower cost per kilogram (this is discussed in detail later in this chapter). Hence the small tas represent a relatively cheap source of animal protein, costing 61% of the price of fresh beef with bones in Bouaké and 66% of that price in Abidjan.

Imported frozen beef is the next cheapest source of animal protein, costing between 80% and 87% of the price of fresh beef. It is interesting to note that the price level of fresh beef rather than the cost of transport and storage seems to set the retail price level of frozen meat. In Bouaké, where fresh beef is sold at 400 F CFA/Kg. with bones, sellers of frozen beef are constrained to sell it at 350 F CFA/Kg., whereas in Abidjan, where the price of fresh beef is higher, so is the price of frozen beef, despite lower transport and storage costs. (As will be shown later in this chapter, there is a strong preference among consumers for fresh meat, which explains why a price margin is maintained between the two meats.)

1/ Due to transport and storage costs, the price of frozen fish (most of which is imported) becomes higher the farther north one goes. This is just the opposite of the pattern for fresh beef prices, which increase the farther south one goes (again because of transport costs). Hence the relative cost of frozen fish compared to fresh beef rises rapidly as one goes north in the country.

able 45 Retail Prices of Major Sources of Animal Protein, Bouaké and Abidjan June 1977

Item	BOUAKE Price per kg. (F CFA)	BOUAKE Price as a % of Price of Fresh Beef (with bones)	ABIDJAN Price per kg. (F CFA)	ABIDJAN Price as a % of Price of Fresh Beef (with bones)
Fresh beef, with bones	400	100,0	500	100,0
Fresh beef, boneless	450	112,5	600	120.0
Frozen beef with bones	350	87,5	400	80.0
Frozen beef, boneless	400	100.0	450	90.0
Fresh beef - offals, sold by the pile a/	245	61.3	331	66.2
Mutton/goat (with bones)	600	150.0	750	150.0
Pork (with bones)	450	112.5	n.a.	—
Chicken b/	714	178.5	n.a.	—
Frozen fish c/	198	49.5	182	36.4
Smoked fish d/	281	70.3	300	60.0

Notes: Chicken, fish, and beef mixed with offals are sold by the pile or unit; prices were established by purchasing and weighing the items. Prices for meats sold by the kilogram were established by observing actual purchases.

a/ 50 F CFA "tas" of meat and offals (N = 12)

b/ Price of live chicken expressed in F CFA per kg. dressed weight (N = 2)

c/ Frozen cheinchard, the cheapest frozen fish on the market.

d/ Smoked cheinchard.

n.a. Not available

Source: ELP field studies in Bouaké and Abidjan.

Compared to beef, other meats are rather expensive. The ratio between the price of pork and that of fresh beef is 1.13; for mutton and goat meat it is 1.5 and for chicken it is almost 1.8. 2/ Pork consumption is limited, in part because of religious reasons (roughly a third of the Ivorian population is Moslem); and among much of the population poultry and mutton are consumed only on special occasions (religious festivals, etc.). For this reason, most of the mutton consumed does not pass through the commercial meat marketing system, but is rather slaughtered at the homes of the consumers. 3/

Bollinger (2), in a study conducted throughout Ivory Coast from July 1974 to February 1975, asked his respondents (N = 693) to list their preferences for various types of animal protein. Since Bollinger used a random sample of the Ivorian population (stratified by region and urban-rural residence), his results should give a fairly accurate picture of Ivoirian consumer preferences. He found that while fish and beef were the most widely consumed forms of animal protein, these were not the most preferred sources. 4/ Based on his interviews, Bollinger was able to establish the following ranking of consumer preferences:

Table 46 Ranking of Consumer Preferences Among Sources of Animal Protein in Ivory Coast

1.	Mutton	6.	Turkey	11.	Duck
2.	Beef	7.	Fish	12.	Snails
3.	Chicken	8.	Goat	13.	Pork
4.	Guinea fowl	9.	Rabbit		
5.	Agouti	10.	Pigeon		

Source: D. Bollinger, Le Marché Ivoirien des Volailles, des Oeufs, des Porcet de la Charcuterie, Tome 1, p.42.

As can be seen, mutton is the most preferred source of animal protein, followed by beef, poultry, agouti, fish, goat meat, and lastly, pork. This ranking can give a rough idea of cross-elasticities of demand among the various sources of animal protein. For example, one would expect that since beef is generally preferred to fish, a rise in the price of fish relative to beef would lead to a relatively large shift in consumption from fish to beef. In contrast, an equivalent rise in the price of beef relative to fish would most likely lead to a smaller shift in consumption towards fish, since fish is less preferred than beef. The fact that beef is preferred to most other sources of animal protein implies that if the Ivoirian government wishes to shift the pattern of consumption away from beef towards the meat of animals with shorter reproductive cycles, such as poultry, fish, swine, and small ruminants, in order to reduce dependence on imports (see p.43), rather large changes in the prices of these meats relative to beef will be needed. The one exception is mutton, which is the most preferred meat among Ivoirian consumers. If the price of mutton relative to beef declined significantly, a substantial shift in consumption would probably take place.

2/ Most of the "mouton" sold on the African markets in Abidjan and Bouaké is in reality goat meat.

3/ This is seen most clearly during the festival of Tabaski, when every Moslem head of household having the financial means to do so is obligated to slaughter a ram.

4/ 46% of Bollinger's sample reported that the "regularly" consumed beef, compared to 11% for goat meat and mutton, 11% for chickens, and 3% for pork; 35% of the sample reported consuming fresh or frozen fish regularly, and 64% said they regularly ate smoked fish (2, p. 37).

PREFERENCES AMONG DIFFERENT TYPES OF BEEF

Fresh vs. Frozen-- Bollinger's study was conducted before the large imports of frozen meat began in late 1975, so it provides no information on consumer preferences between fresh and frozen beef. In order to gather information on these preferences, my enumerators and I carried out 144 interviews with buyers of beef in various markets in Bouaké between May and July 1977. The characteristics of the sample interviewed are presented in Table 47.

Table 47 Characteristics of Sample Interviewed in Study of Consumer Meat Preferences, Bouaké (in %)

I.	Ethnic group		II.	Religion	
	Baoulé a/	25.0		Christian	22.9
	Dioula b/	38.2		Moslem	44.3
	Other	34.0		Animist	30.0
	No response	2.8		No response	2.8
III.	Occupation of head of household		IV.	Beef purchased	
	Farmer	2.1		Frozen	40.3
	Skilled worker	17.9		Fresh	59.7
	Laborer	11.4			
	Office worker-- civil servant	19.3			
	Merchant	19.3			
	Transporter	4.3			
	self-employed (tailors, etc.)	1.4			
	Other	16.4			
	Unemployed	7.9			

a/ Baoulés are the principal ethnic group in the central region of Ivory Coast.

b/ The term "Dioula" siginifies all those people from Northern Ivory Coast, Guinea, and Mali speaking a language of the Mandé group. This includes most non-Voltaic northerners in Bouaké.

As can be seen, the sample is more heavily Moslem than the Ivoirian population as a whole; this reflects the heavy Islamic influence in Bouaké. When one looks at the characteristics of the sample according to type of meat purchased, certain points become clear. As shown in Table 48, there are no significant differences in the ethnic distribution of those who bought frozen meat and those who purchased fresh meat. Nor are the differences in religion striking. A slightly higher of the purchasers of frozen meat were Christian as compared to fresh meat purchasers, and a slightly smaller percentage were Moslem, but the differences are not great. The main distinguishing characteristics between the two groups are family size and weekly expenditure per person for meat and fish. Purchasers of frozen meat have larger families (6.8 persons on the average vs. 5.0) and spend roughly 80% as much per person on animal protein as do purchasers of frozen meat (not all this difference in expenditure is due to the lower price of frozen meat; frozen meat cost 87.5% of the price of fresh meat during this period.) This suggests that the lower price of frozen meat attracts clients with large families and limited budgets. This view was confirmed in the interviews; the respondents were asked why they purchased the type of meat they did and which type they would have purchased had the prices been equal. Fifty-six percent of the purchasers of frozen meat said that they bought it because of its lower price; according to them, had the prices been equal, they would have purchased fresh meat because they felt it

Table 48 Characteristics of Purchasers of Fresh and Frozen Beff. Bouaké May - July, 1977 (in%)

	BEEF PURCHASED	
	Fresh	Frozen
Ethnic Group		
Baoulé	24.4	25.9
Dioula	38.4	37.9
Other	36.0	31.0
No response	1.2	5.2
Religion		
Christian	21.4	25.0
Moslem	45.2	42.9
Animist	29.8	30.4
No response	3.6	1.8
Average weekly expenditure per family for fish and meat	2,348 F CFA	2,519 F CFA
Average family size		
Adults	2.8	3.6
Children	2.2	3.2
Total	5.0	6.8
Average weekly expenditure for fish and meat per person	470 F CFA	370 F CFA

had a better taste. 5/ Of the 44% who expressed a preference for frozen meat, most said that they preferred it because of its tenderness rather than for its flavor. When purchasers of fresh meat were asked why they purchased the fresh meat, 55% said that fresh meat was more flavorful than frozen meat, 22% said it "looked better" than frozen meat (it had some blood in it, had less fat, etc.), and 23% mentioned other reasons. Chief among the latter were the beliefs by Moslem consumers that the frozen carcasses came from animals that had not been slaughtered according to Moslem customs and that the meat was not beef (several respondents stated that they thought it was horse meat). In total, 82% of the entire sample (both buyers of fresh and frozen meat) expressed a preference for fresh meat. It is this strong preference for fresh meat that accounts for the price differential between fresh and frozen meat. The director of meat sales for DISTRIPAC told me that it is necessary to keep at least a 50F CFA/kg. difference in price between frozen and fresh meat in order to prevent a massive shift of purchases away from frozen to fresh meat (1).

Preferences Among Different Types of Fresh Beef -- The "conventional wisdom" has it that African consumers make few quality distinctions in buying meat (for example, see 3, pp.30-35). While it is true that most African consumers do not pay a premium for very tender meat, it is not true to say that they make no quality distinctions. These distinctions generally do not have to do with the tenderness of the meat. Given the traditional method of preparing meat in sauces which are boiled for several hours, there is little reason to pay a premium

[illegible] of fat.

5/ The figure of [illegible]% may understate the percentage of buyers who purchase frozen meat because of its low price; when asked these questions, several people responded indignantly, apparently insulted by the implication that they had purchased frozen meat because they didn't have enough money.

for tender meat. Rather, the consumer looks for a meat which will retain its flavor and texture in the sauce, and has an ample amount of fat. As mentioned in Chapter IV, the smaller amount of fat in the meat from taurins as compared to zebus accounts in part for the lower prices paid for these animals. Butchers interviewed in Bouaké stated that their customers prefer the fattier meat from zebus and that it is harder to store unsold beef from taurins (in order to sell it the next day) as the lack of fat leads to dehydration of the meat. 6/

In addition, there is a strong preference among consumers for meat as opposed to offals. This is clearly reflected in the price of the various "tas" or small piles of meat sold on the African market. As mentioned in Chapter V, beef is sold in Abidjan and Bouaké both by the kilogram and by the tas, the tas being composed of a mixture of beef, fat, bones, and various offals. The composition of the tas varies according to its price. In general, the cheaper tas have a higher percentage of offals and less meat in them than do the more expensive ones. The smaller tas also generally contain a lower quality meat (very tough, bloody meat from the head, for example) than do the larger tas. Accordingly, the price per kilogram of the smaller tas is considerably less than of the more expensive ones. This is seen in Table 49, which shows the price per kilogram of various sizes of tas in Bouaké from July 1976 through July 1977. These data were established by weekly purchases and weighings of the tas. The price per kilogram of the 25 F and 50 F tas is markedly lower than that of the 100 F tas; on the average, the price per kilogram of the 25 F tas was 61% of that of the 100 F tas, while the 50 F tas cost 56% as much per kilogram as did the larger tas.

Data on the first 79 price and weight observations of beef sold by tas were analyzed in Ann Arbor with the aid of a computer. This analysis permits one to see clearly the quality differences among the tas (a couple analysis of all these data will be presented in the final ELP report). The characteristics of the tas analyzed were the following:

Price	Average Percent of Total Weight			
	Meat	Offals	Fat	Bones
100 F CFA (N= 27)	62.4	62.9	13.5	17.2
50 F CFA (N = 26)	40.0	30.1	17.5	12.4
25 F CFA (N = 26)	43.3	33.5	18.8	4.4

The tas of 100 F had a significantly higher proportion of meat and a lower proportion of offals and fat than did the cheaper tas. In addition, the offals contained in the 100 F tas tended to be the ones more appreciated by consumers, e.g., liver and stomach, as opposed to intestines and spleen, which were found often in the smaller tas. In order to get a better idea of the quality prefe-

6/ Both butchers and consumers, however, also complain if beef is "too fat," i.e., if the carcass is covered by a thick layer of fat. (This is one of the complaints voiced by consumers about the frozen meat from Argentina.) What the consumer looks for, in short, is meat from a well-fed, but not a "finished" animal.

Table 49 Price Per Kilogram of Meat and Offals Sold by "Tas" in Bouaké (in F CFA per kg.)

Month	Price of Tas 25 F CFA	50 F CFA	100 F CFA
July 1976	223	206	368
August	214	201	375
September	244	199	397
October	225	223	394
November	216	214	415
December	252	243	436
January 1977	276	241	457
February	285	286	397
March	289	247	395
April	275	253	476
May	274	245	476
June	259	228	403
July	267	230	381
Average	254	232	413

Note: Data based on weekly purchase and weighing of 3 tas of each price.
Source: ELP field study, Bouaké.

-rences of consumers, the total price of each tas was regressed against the weight of the meat, fat, offals, and bones it contained, using the following equation:

$$P = a_1D_1V_{100} \quad a_2D_2V_{50} \quad a_3D_3V_{25} \quad bG \quad c_1D_1A_{100} \quad c_2D_2A_{50} \quad c_3D_3A_{25} \quad dO$$

Where: P is the price of the tas in F CFA

D_1 is a dummy variable signifying a 100 F tas (i.e., $D_1 = 1$ when $P = 100$, otherwise $D_1 = 0$)

D_2 is a dummy variable indicating a 50 F tas

D_3 is a dummy variable signifying a 25 F tas

V_{100}, V_{50}, and V_{25} are the weight in grams of the meat in the 100 F, 50 F, and 25 F tas, respectively

G is the weight in grams of the fat in the tas

A_{100}, A_{50}, A_{25} are the weight in grams of the offals in the 100 F, 50F, and 25 F tas, respectively

O is the weight in grams of the bones in the tas.

By using separate variables for the meat and offal content of each price class of tas, one can see whether consumers make distinctions between the quality of meat and offals in these different tas. The coefficients of the variables V_{100}, V_{50}, V_{25}, A_{100}, A_{50}, A_{25} are the implicit prices (in F CFA per gram) of meat and offals in each of the different sized tas. The results of this regression were the following:

Variable	Coefficient	T-Statistic	$R^2 = .927$
V100	.4146	19.49	
V50	.2189	6.53	
V25	.1910	4.31	
G	.2590	7.69	
A100	.4027	6.87	
A50	.1465	4.77	
A25	.2166	3.96	
O	.2084	3.52	

It is clear from the coefficients that consumers have a strong preference for the meat and offals in the 100 F tas; the implicit prices for them are approximately twice those of the meat and offals in the smaller tas. It is also clear that consumers value some fat in their diet; the implicit price for fat in the tas is roughly 260 F CFA/kg. It appears that the smaller tas are considered a "poor man's food" to be purchased when there isn't enough money to buy higher quality meat. One would expect, then, that as incomes rise there would be a shift in consumption towards a higher grade of meat. This would not be a dramatic shift to European-style eating habits with their emphasis on tender meat. Nonetheless, one can expect that if incomes continue to rise in the coming years, a premium will develop in Ivory Coast for well-fed (but not necessarily "finished") animals.

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1. Mr. Ahoussou, personal communication.

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