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LIVESTOCK PRODUCTION AND DISTRIBUTION IN THE MALIAN ECONOMY

Supplementary Report Prepared for
the U.S. Agency for International Development

by

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The author of this report, employed by the U.S. Agency for International Development under contract No. AID/CM/afr-C-73-6 dated January 1, 1973, was a member of a team which visited Mali in February, 1973 for the purpose of developing a conceptual program to increase cattle production in that country. The team's report, entitled Mali Livestock Design Study: A Conceptual Program to Increase Meat Production, was presented to U.S.A.I.D. in Washington on March 21, 1973. That report was based on a preliminary analysis of the information gathered by the team in the field, and it was expected that a final report, resulting from a more detailed analysis, would follow. Since then, however, the other outside consulting member of the team, Dr. Wilford Morris, has been assigned responsibility for coordinating the livestock program in Mali. Because of limitations of his time and because of the lack of need for his communicating his detailed findings to the coordinator, it was felt that he did not need to participate in the writing of the present report. Nevertheless, it seemed desirable that the results of further analysis by the other outside consultant be made available to those developing the Malian livestock program. Consequently, this report, which is more limited in scope than that of March 21, is submitted as a supplement to the March 21 report rather than as a final version of it. The present report does not alter any of the conclusions or recommendations of the earlier report but only places some of these on a firmer and more explicit basis of analysis.

What follows is divided into two parts, the first a discussion of the place of the livestock sector in the Malian economy and the second an examination of the relative efficiency of the livestock distribution system. In the first part, a discussion of the current situation and recent history of the Malian economy is followed by a quantitive estimate of the relative importance of the cattle sector in terms of GDP and of total exports. The growth of Mali's major exterior markets is described and projections are formulated of future demand in these markets. An analysis is presented of the interaction of demand and supply and of the determination of equilibrium via price increases. The importance of Mali's comparative advantage in livestock is emphasized, but the problems which this creates for public policy are also noted, especially with respect to ensuring that the Bamako market is supplied with meat. Finally, some of the policy options available to the government of Mali are analyzed. In the second part of the report the commercial distribution system for cattle is described, including internal as well as external trade. Estimates of regional price variations, distribution costs, and commerical profits are presented. Finally, there is an evaluation of the efficiency of the commercial sector and of the need for government intervention in its development. A series of appendix tables gives details concerning methods of estimations as well as a substantial body of data.

LIST OF ABBREVIATIONS

FAC	France, Secrétariat d'Etat aux Affaires Etrangères, Fonds d'Aide et de Coopération
FAO	Food and Agricultural Organization of the United Nations
FED	Communautés Economiques Européenes, Fonds Européen de Développement
IBRD	International Bank for Reconstruction and Development
IFAN	Institut Fundamental de l'Afrique Noire
OMBEVI	Office Malien du Bétail et de la Viande
OMVS	Organisation pour la Mise en Valeur du Fleuve Sénégal
SEDES	Societe d'Etudes pour le Développement Economique et Social
SOMBEPEC	Societe Malienne du Bétail et d'Exploitation des Peaux et Cuirs
SONEA	Societe Nationale de l'Exploitation des Abattoir

I. THE CATTLE SECTOR IN THE MALIAN ECONOMY

General Economic Background

Mali, with an area of 1,240,000 square kilmeters, extends from the Saharan zone in the north to the Guinean zone in the south of the West African region. Only about one quarter of the country is in the Soudanian and Guinean zones, where rainfall is adequate for regular agriculture. The Sahelian zone to the north, which comprises another quarter of the total land area, is the major livestock region. Rainfall varies, both in total and in its distribution, with about 1,300 millimeters falling in the south during a rainy season of about five months starting in June, and both the amount and duration of rain tapering off to less than 100 millimeters in the north.

These ecological conditions are modified, however, by the Niger River which flows from west to east a distance of 1,700 kilometers within Mali. A substantial portion of this river and its tributary, the Bani, regularly overflows its banks, forming the vast Interior Delta extending approximately from Ségou in the southwest to Timbuktu in the northeast. This makes possible the cultivation of large areas under irrigation and provides excellent pasture during the dry season and an abundance of fish.

Mali has one of the lowest levels of per capita GDP in the world, only $54 in 1970. Furthermore, the rate of growth of GDP equal to about 2.6 percent per annum between 1959 and 1969 was not much greater than the approximately 2.0 percent rate of population increase during the same period. The rate of population growth is probably rising, moreover, since the crude birth rate in Mali of over 50 per thousand is very high, and the mortality rate of approximately 30 per thousand, which existed in the early 1960's is probably closer today to 25 per thousand with improved health conditions.[1] As the population of five and one-half million people accelerates, it will become increasingly difficult to achieve gains in per capita living standards.

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[1]Population estimates suffer from inadequate data. The best base year estimated is that available from a sample survey made in 1960/61 and the work of a U.N. expert in 1963 which put the mid-1968 population at about 4.8 million. Carrying the population forward from 1968 by using an annual rate of growth of 2.5 percent assumed by the Malian government statistical service, we derive a mid-1973 estimate of just under 5.5 million inhabitants. This 2.5 percent estimated growth rate would result from a crude birth rate of 50 per 1000 and mortality rate of 25 per 1000, which is consistent with estimates from other West African countries at a similar stage of development. The mid-1973 estimate does not, however, take into account deaths resulting directly or indirectly from the 1972-73 drought since an accurate assessment of these effects will not be possible for some time.

The low level of aggregate per capita income does not indicate the substantial differences which exist in the distribution of income. Although the family budget studies which would be necessary to fully describe these differences have not been undertaken on a broad scale, there is some scattered evidence on per capita food consumption which does reveal the magnitude of the problem.[2] In the urban areas, and especially in Bamako, surveys have indicated that most people are adequately supplied with energy-producing foods, because these can be stored and made available all year round and because incomes are fairly evenly distributed. Per capita annual meat consumption has been estimated at 40 kilograms in Bamako and 32 kilograms in the other cities of more than 5000 inhabitants.[3] Although there is some evidence that this consumption has declined slightly or has at least stagnated since 1964, it is still a relatively high level by African standards.[4]

The situation in rural areas is, however, quite the reverse. Toward the end of the dry season and before the new harvest is in, the level of food consumption may fall to very low levels for several months -- often below 1,500 calories per day for certain population groups. Per capita meat consumption, estimated at 20 kilograms per year, is much lower than in the cities, though this may be offset in part by increased consumption of fish and milk in some areas. Of even greater importance, the production of food has remained relatively stagnant over the past two decades at the same time that the population has increased by over 50 percent. One way in which this has been accomplished appears to have been by a partial shift from grains to manioc, which, despite its higher caloric yields and lower labor requirements, is a poorer food from a nutritional point of view.[5]

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[2]The results of these surveys are summarized in Jacques Meyer May, The Ecology of Malnutrition in the French-Speaking Countries of West Africa and Madagascar, New York, Hafner, 1968, pp. 299-310.

[3]FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, pp. 323-36.

[4]Per capita meat consumption in Abidjan, for example, has been estimated as between 21.2 and 23.7 kilograms per annum. Mali, Ministère de la Production and FED, Projet d'Exécution pour la Création du Centre d'Embouche de Niono, Paris: SEDES, 1972, Appendix VI, p. 32.

[5]Latham, Michael, Human Nutrition in Tropical Africa, Rome: FAO, 1965, pp. 173-74.

The Malian economy is predominantly rural with about 90 percent of its population engaged in agriculture, which accounts for about 50 percent of GDP. Although a process of urbanization is currently under way, with Bamako, the largest city, growing at an annual rate of about 5 percent and some of the smaller cities growing at 3 to 4 percent, the basic structure of the economy has not yet been substantially altered. The most important change in the occupational structure which has taken place since the Second World War is the increase in the number of persons working in the government and commercial sectors. Although not very large in an absolute sense, these sectors have been the spearhead of economic change in Mali in the past and are likely to continue this role in the future.

The Malian government following independence pursued an ambitious program designed to develop a socialistic economy. The size of the government was considerably expanded and a number of state enterprises were established in the areas of commerce and industry. Price controls were employed at all levels.

Despite considerable investment, production increased only slightly. Farmers were discouraged by low prices. The state enterprises were inefficiently managed. Continued balance-of-payments deficits depleted foreign exhange reserves, and government budget deficits, financed largely by bank credit, resulted in severe inflation. Due to the excess demand for imported and domestic goods at official prices, clandestine trade developed on a large scale, resulting in an important loss of government revenue.

In 1967, Mali agreed to return to the French monetary zone. In return for convertibility of the Malian franc, current budget support by France, and access to foreign exchange reserves of the compte d'opérations, the Malian government agreed to a devaluation of the Malian franc by one half, to improve the accounting methods of state enterprises, to restrict credit available from the new central bank, and to lift restrictions on imports and transfer payments. When the new government came to power in 1968, it raised the prices of a number of critical consumer goods and eased restrictions on private traders.

In 1970, a three-year rehabilitation plan was initiated which had as major goals the bringing of the balance of payments into equilibrium and the elimination of the government budget deficit. By early 1973, however, it was clear that the Malian Government was far from its intended objectives. The official budget deficit was running at a level of about 3.5 billion Malian francs, with France covering about 2 billion and the rest being subject to deferred payment. In fact, the actual deficit was considerably greater since not all relevant items are included in the official accounts. Furthermore, Mali continues to suffer from a considerable deficit in the balance of payments even though it is far from meeting the existing schedule of external debt service. In all, France has given a total of about 10 billion Malian francs ($20 million) of budget support since 1968 and has permitted Mali to draw on the compte d'opérations for over 30 billion Malian francs ($60 million). The major constraint imposed on the Malian economy by France has been its influence on the central bank's policy of tight credit restriction. In view of its dependence on France, moreover, the Malian government is concerned to bring its balance of payments and government budget into equilibrium.

With the easing of trade controls and the lowering of customs duties on exports and imports, the resulting expansion of foreign trade helped to increase government revenues. On the other hand, government expenditures continued to expand under a public policy of offering employment to all school graduates. Although recently this practice has been somewhat restricted, a pay increase for civil servants, the first in many years, has left the budget in continued deficit.

The pressures for wage increases for civil servants, moreover, are formidable. Their wages remained constant from 1961 until the recent pay increase of 2,000 MF/month ($4.00/month) despite a 70 percent increase in the index of official prices and a more than doubling of the index of free market prices. As Table 1 indicates, furthermore, the price increases for

TABLE 1

Indices of Official Prices, March 1972
1962-63 base = 100

Millet	387.9	Peanut Oil	214.8
Polished Rice	308.1	Sour Milk	202.9
Bread	300.0	Meat	170.7

Source: Mali, Service de la Statistique Générale, de la Compatabilité Nationale, et de la Mécanographie, Bulletin Mensuel de Statistique, March, 1972.

a number of important staples were considerably greater than indicated by the indices. As a result the government has felt compelled to exert every effort to keep the cost of living stable in order to avoid granting wage increases which will raise its level of expenditures and worsen the budget deficit.

The Importance of the Sector

Estimates of the importance of cattle in the Malian economy have been based largely on a 1965 study by Lacrouts, Sarniguet, and Tyc.[6] In this study the estimates of the Service de l'Elevage, derived primarily from the numbers of cattle vaccinated, were critically analyzed, and it was concluded that there were a total of approximately 4,300,000 head of cattle in 1965 and that the herd was growing at an average annual rate of 3 percent.[7]

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[6]FAC and Mali, Ministère du Développement, Exploitation du Chaptel Bovin au Mali, by M. Lacrouts, J. Sarniguet and J. Tyc, Mali: 1965.

[7]See Appendix Table A-1 for Service de l'Elevage estimates since 1954. The estimate given in this table for 1965 differs from the Lacrouts, Sarniguet, and Tyc estimate, which was based on the Service de l'Elevage figure for 1962 carried forward at 3 percent per year. The difference between the two estimates for 1965, however, is well within the 10 percent margin of error assumed in the 1965 study.

The latest revised estimate for 1971 of 4,700,000 head reflects the growth of the herd since 1965 as well as the losses sustained due to the drought in 1969. The losses from the 1972-73 drought, which was much more severe than that of 1969, have yet to be satisfactorily estimated.

Of the 5,350,000 head of cattle estimated for 1970, most were located in or in areas adjacent to the Interior Delta, i.e. Segou, Mopti and Gao, as can be seen from the following table:

TABLE 2

Regional Distribution of the Cattle Population in 1970
(head)

Regions	Cattle Population
Kayes	520,000
Bamako	530,000
Sikasso	480,000
Segou	620,000
Mopti	1,400,000
Gao	1,800,000

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, p.262.

The northern location of most cattle is also indicated by the fact that 4,5000,000 of the total are zebu, not adapted to trypanosomiasis found in the Soudanian and Guinean zones to the south of the 13th parallel.

The most recent estimates of herd composition have been made by SEDES for the FAC and OMVS study. These estimates are based on theoretical models, using alternative parameter values, which are then compared with the information available on actual herd composition.[8] Separate estimates were made for the Interior Delta region and for other areas because of the special conditions which exist within the Delta. The estimates for zebu herds, together with the various parameter values used in their calculation, are given in Appendix Table A-2. The estimates made by Lacrouts, Sarniguet, and Tyc in 1965 are also shown for purpose of comparison. The

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[8]Although the use of a theoretical model is necessary in order to make full use of the fragmentary data available, it suffers from the limitation imposed by the assumption of the stability of parameters over a period of several decades. Given the rapid changes which are taking place today in the herders' economic and physical environment, these parameters are likely to be changing as well. The use of dynamic models which allow for these changes, however, requires a degree of precision of information not yet available.

major difference between these models is that the growth of herd size in regions outside of the Interior Delta is now assumed to be about two instead of three percent and the Interior Delta region has a higher proportion of adult males than do other regions.

The estimation of herd composition presumes that a certain percentage of cattle in each group are sold or slaughtered each year. Applying these percentages to the total number of animals in each group, an estimate of a total off-take of 523,500 head, or 11.5 percent in the Mopti region and 11.7 percent in other regions, of zebu is obtained for 1970. Using average carcass weight for each class obtained from sample surveys, the total tonnage of meat on the hoof produced in 1970 can be estimated. If to this is added the tonnage obtained from taurus or mixed breeds, a total of 67,411 tons of beef carcass meat and 16,853 tons of offals were supplied in that year.[9]

In order to evaluate the relative importance of the livestock sector in the entire economy it is necessary to estimate the value of meat production. Furthermore, since milk is also one of the major outputs of the sector, its value should also be included in the total.[10] The details of this calculation are given in Appendix Table A-4. These estimates differ somewhat from those used in the national accounts of that year because of the different basis of calculating production. It is felt, however, that the assumptions used in the FAC and OMVS study more nearly approximate reality than do those used in the national accounts, though the differences in final results are not very great.

Production of beef meat on the hoof in 1970 is estimated as worth 18,700 million Malian francs, or about 12 percent of GDP. If milk is added, the total value of production was 22,150 million Malian francs, or 14.5 percent of GDP. As for cattle exports, worth about 10,000 million Malian francs,[11] these comprised 36 percent of the value of total exports

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[9]See Appendix Table A-3 for details of these calculations. Similar calculations are given for taurus and mixed breeds in FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, but these have not been included here since our interest is only in the zebu.

[10]If it were possible, the value of manure should be included as well. Unfortunately no basis for valuation exists.

[11]This figure is higher than that calculated in Appendix Table A-4, because it includes re-exports of cattle as well as commercial margins between the herder and the frontier.

and exceeded by far the value of the second most important export, cotton fibers, which were worth less than half of this amount.

Another measure of the relative importance of cattle is the number of people dependent upon this sector for their subsistence. It has been estimated that, out of a total population of 5.5 million inhabitants, there are about 600,000 nomadic and semi-nomadic herdsmen, mostly Peuls, Tauregs, and Moors.[12] In addition, there are a large number of farmers who depend upon 250,000 head of cattle as work animals. Finally, there are the numerous traders, butchers, and others who are occupied either full or part time in activities related to cattle.

The Commercialization of Cattle

Traditionally, cattle in Mali have been raised by nomadic herders who have lived primarily off of their milk and who have followed a seasonal pattern of movement dictated by the availability of rainfall and pasture. As populations have increased in size over time, agriculture has been increasingly extended into the nomadic zones and some herders have at least partially sedentarized. Those who have not themselves grown food have historically traded milk for agricultural products to tide them over the last part of the dry season when milk supplies are low. In either case, however, cattle have been kept primarily for their milk and not for their meat, which was consumed only when animals became useless or for ceremonial occasions.

The establishment of the French colonial regime introduced two fundamental changes into this situation. First, as the administration was established and as urban areas grew in size, the demand for meat by those not in rural areas increased. Second, the colonial government assessed a head tax, which had to be paid in cash and which generally necessitated the sale of a few head of cattle each year in order to meet the tax requirement. As a result, a specialized commercial sector dealing in cattle began to develop.

After the Second World War, as the Europeans pumped money into their African colonies, the size of the government administration increased and the rate of urbanization accelerated. Furthermore, some of the coastal territories, especially Ghana and the Ivory Coast, developed extensive and rapidly growing export sectors, which served to stimulate their entire economies and to raise the standard of living of many of their inhabitants. Because the consumption of beef tended to increase relatively rapidly as incomes grew, the demand for this Malian product expanded quickly, albeit from a relatively low base in the early 1950's.

Some indication of the magnitude of these effects may be seen from the figures in Table 3 on exports, slaughter, and market presentations of

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[12] May, The Ecology of Malnutrition in the French-Speaking Countries of West Africa and Madagascar, p. 282.

TABLE 3

Exports, Slaughter and Presentations of Cattle, Selected Years
(head)

Year	Exports[a]	Slaughter		Presentations
		Bamako	All Mali	
1954	75,500	18,371	44,211	131,853
1959	88,800	23,345	56,965	223,018[b]
1964	167,000	35,520	72,519[c]	n.a.
1968	160,000	24,208	63,355	338,647
1969	170,000	28,803	79,619	502,801
1970	190,000	37,103	78,332	418,147
1971	n.a.	31,341	73,779	442,080

n.a. not available

Notes:

[a]For source of estimates see Appendix Table A-5
[b]Number presented in 1958
[c]Number slaughtered in 1963

Source: Appendix Tables A-5 and A-6

cattle in various years since 1954. Exports in this table have been estimated and are not data on controlled exports, which, as may be seen by comparing these two sets of figures in Appendix Table A-5,are subject to very large errors. The other data are for officially recorded slaughter and market presentations. Although all these data are also subject to a certain degree of error, some general trends may nevertheless be discerned.

It appears that domestic consumption of marketed cattle, for example, rose rather rapidly in Mali until about 1964, after which it remained roughly constant, though declining slightly around 1968. Exports rose even more rapidly, at an average annual rate of 8.4 percent between 1954 and 1964, dipped slightly, and then resumed an upward climb after 1968.[13] Finally, the most pronounced expansion was in the official marketing of cattle, which increased more than three times from 1954 to 1971.

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[13]The extent to which some of these fluctuations are due to changes in the method of evaluation is not known.

These movements are consistent with several explanations. The rapid growth of controlled slaughtering in Mali, and especially in Bamako, during the period 1954-64 coincided with a rapid expansion of the number of government employees after independence and with increased urbaniation.[14] After 1964, however, reductions in real income of civil servants probably lowered per capita beef consumption in the cities.[15] The decrease in controlled slaughter in Bamako was also due, in part, to a relatively high slaughter tax which tended to induce clandestine slaughter.

Exports, which increased from 1954 with the growth of the coastal markets to the south, were impeded to some extent after 1964 by exchange controls and by relatively high taxes. The devaluation of the Malian franc and dismantling of exchange controls in 1967, the elimination of the Ivory Coast import tax on cattle in 1968, and the reduction of the Malian export tax in 1969 served, on the other hand, to stimulate an expansion of the export trade. The rise in cattle prices following the drought of 1969, moreover, acted as a further stimulus, especially in view of the fixed official meat prices which were maintained in Bamako.

What is perhaps even more remarkable than the growth of controlled slaughter or of exports, however, is the increase in the degree of commercialization of cattle as revealed by the figures on market presentations.[16] Even if these data partly reflect a diversion of cattle sales from relatively small, informal markets to larger, organized ones, this in itself is an important phenomenon. The larger markets have the advantage of lower transaction costs, reduced monopoly elements, and better spread of information regarding prices and cattle availability.

The Growth of Exterior Markets

Although data on controlled exports are a very poor approximation to the total level of actual exports, they are probably more useful in determining the direction of trade. Figures on controlled exports by country of destination are given in Appendix Table A-7. Only the more important

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[14]The population of Bamako, for example, increased from about 86,000 in 1950 to close to 130,000 in 1960 and 170,000 in 1966. Hance, William A., Population, Migration, and Urbanization in Africa, New York, Columbia University Press, 1970, p. 240.

[15]FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part I, p. 328.

[16]This is especially true in view of the Malian government's efforts during the 1960's to control the movement and price of cattle, which had the effect of diverting most trade from the major markets. FAC and Mali, Ministère du Développement, Exploitation du Chaptel Bovin au Mali, p.101,2.

conclusions which may be drawn from an analysis of that table are presented here. Principal among these is the continued overwhelming relative importance of the markets of the Ivory Coast and Ghana, which have consistently received over three-fourths of Malian cattle exports. Of these two, the Ivory Coast has traditionally been the most important market. Even during the late 1960's, when controlled exports to Ghana were greater than those to the Ivory Coast, this probably had more to do with efforts to evade taxes and exchange controls than with any real falling off of trade.

On the basis of its studies of livestock all over West Africa SEDES has made estimates of actual exports of Mali to its various markets. These are shown in Table 4.

TABLE 4

Estimated Exports by Country of Destination, 1970
(head)

Destination	Exports of Mali	Mauritanian Exports in Transit	Total Exports from Mali
Ivory Coast	113,000	26,700	140,000
Senegal	2,000	--	2,000
Niger	15,000	--	15,000
Liberia	8,000	1,300	9,300
Upper Volta	20,000	--	20,000
Ghana	31,700	--	31,700
Total	190,000	28,000	218,000

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part 1, p. 297.

Compared with data on controlled exports, these estimates show a lesser relative importance of Ghana and a greater relative importance of the smaller markets. In addition, some of the cattle shown as being exported to Niger probably found their way to the huge and rapidly growing Nigerian market.

The major reason for the ralatively small number of animals being exported to Ghana at present is the severe exchange controls and high taxes imposed in that country. Ghana is potentially a large market, however, with a population in 1970 of about 8,600,000 inhabitants and a per capita income of close to $220.[17] Furthermore, approximately 30 percent of the population lives in cities of 10,000 people or more and their relative importance is increasing. Although the current per capita consumption of meat is very low, only 4.4 kilograms per annum, the potential for Malian exports which would exist if the foreign exchange constraint should become less binding, implies that this country and the Ivory Coast should be considered as the two most important markets of the future.

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[17]Most of the information presented here on the markets of Ghana and the Ivory Coast is taken from Mali, Ministère de la Production and FED, Projet d'Exécution pour la Création du Centre d'Embouche de Niono, Appendix VI.

As can be seen from Table 5, the experience of these two countries with respect to cattle imports has been markedly different.[18] Whereas Ghanaian im-

TABLE 5
Total Imports of Cattle into Ghana and the Ivory Coast,
Selected Years
(000 head)

Year	Ghana	Ivory Coast
1961	110	72
1965	62	103
1970	61	231

Source: Appendix Table A-8.

ports fell by almost one-half between 1961 and 1965 and have remained roughly constant since then, imports of cattle into the Ivory Coast increased at an average annual rate of close to 12 percent. In Ghana, per capita incomes remained stagnant, and severe balance of payments conditions resulted in foreign exchange and other controls restricting the availability of cattle.[19] In the Ivory Coast, on the other hand, real per capita incomes rose at an estimated annual rate of 5 percent over the decade, while population increased at 3 percent and there was a substantial rise in the degree of urbanization. All of these contributed to a growth of demand which was much greater than the growth of domestic production. The result, even allowing for some under-reporting in earlier years, was a phenomenal expansion of imports.

This growth of demand could be accommodated without substantial price increases because of several factors.[20] First, the African market for beef,

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[18] Annual data on the total imports of cattle into Ghana and the Ivory Coast from 1961 to 1970 are given in Appendix Table A-8. Data on imports by country of origin from 1965 to 1970 are shown in Appendix Table A-9.

[19] It has been estimated by the Ghana Food Research Institute that per capita meat consumption in Ghana decreased by over 50 percent during the 1960's. Ankony Angus Corporation, Feasibility Study for Industrial Meat Production in Senegal, prepared for the U.S. Agency for International Development, August, 1971, pp. 192-96.

[20] Estimates of prices paid for live animals in the Abidjan market during the 1960's indicate that increases over the entire decade were no more than 10 percent. This was slightly less than an average annual rate of increase of about 2 percent from 1955 to 1970 in Dakar, Senegal and Kaedi, Mauritania. In Bamako, cattle prices during this period rose only as rapidly as the general rate of inflation. FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, pp. 94-112.

though growing rapidly, was until recently limited in size, especially in relation to the productive potential of the Sahelian herds to the North. Secondly, improvements in animal health due to vaccination against rinderpest and other diseases have helped to prevent losses, resulting in some expansion in the size of herds. Finally, the deterioration of the Ghanaian market due to stagnating incomes and various controls has allowed some of the cattle flows formerly going to Ghana to be diverted toward the Ivory Coast.

There is substantial evidence, however, which indicates that this situation has changed markedly in the past few years. Table 6 shows average prices for first quality cattle (150 kilograms carcass weight) in four West African centers since 1967. It is clear that the price increase, especially

TABLE 6

Average Price per Kilogram of Carcass Weight of First Quality Cattle, Selected Years (MF/kg)

Year	Kaedi	Dakar	Bamako	Abidjan
1967	160	n.a.	200-230	310-320
1969	160-200	208-260	n.a.	n.a.
1970	174	210-270	190-246	n.a.
1971	202	220-300	220-280	380-400
1972	210-250	260-330	260-316	430

n.a. not available

Note: Price estimates were made from independent market observations and are not derived from official "mercuriales," usually regarded as unreliable, which are published in the reports of the Service de l'Elevage.

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part II, p. 110.

since 1970, has been quite considerable, perhaps as much as 15 percent each year. The SEDES study for FAC and OMVS assigns responsibility for this price rise primarily to the 1968-69 drought, which the Service d l'Elevage estimates caused the total cattle population to be reduced from 5,350,000 to 4,707,000 head.[21] On the other hand, the figures for market presentations of cattle given in Table 3, though indicating a sizeable immediate increase in numbers presented in 1969 as a result of the drought, also show a substantial increase over the 1968 figure of the numbers presented in 1970 and 1971. It would appear, therefore, that much of the price rise has been due to a long-term, sustained expansion of demand rather than simply to a short-term fluctuation in supply.[22]

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[21]Appendix Table A-1

[22]The effects of the 1972-73 drought, to be discussed later, will be much more profound and far-reaching in their consequences.

The two basic studies have now been completed by SEDES which will permit an overall determination of the current balance of demand and supply of cattle in the West African region, as well as projections for the next few years.[23] The studies have not yet been completely integrated, however, and the 1969 study needs to be updated. In the meantime, though, using a more limited range of data, it is possible to gain some insight into the basic forces of demand and supply affecting Mali's export market because of the overwhelming importance of Mali as a supplier to the Ivory Coast.

We have already seen in Table 4 the importance of the Ivory Coast as Mali's principal and most rapidly growing customer. In Table 7 is also shown the extent to which the Ivorians are dependent upon Mali. Although Upper

TABLE 7

Origin of Imports into the Ivory Coast, 1965 and 1970
(head)

Year	Country of Origin			
	Mali	Upper Volta	Mauritania	Total
1965	34,000	65,000	2,000	103,000
1970	113,000	59,000	27,000	199,000

Source: Appendix Table A-9 for 1965; FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, p. 297 for Mali and Mauritania, 1970; SCET-Cooperation, La Production Animale Voltaique -- Perspectives de Développement, Paris: 1970 for Upper Volta, 1970.

Volta was the most important source of cattle which were diverted from Ghana to the Ivory Coast, this potential is virtually exhausted now and exports to the Ivory Coast from Upper Volta are not likely to exceed their current level for some time. Furthermore, Mauritania, whose exports to the Ivory Coast increased rapidly during the late 1960's, is unlikely to continue to grow in relative importance as a supplier because of its geographic proximity to Senegal, a country with a rapidly growing cattle deficit.[24] Finally, per

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[23] FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest, Paris: SEDES, 1969 and FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest.

[24] In 1970 it was estimated that Senegal had a deficit of 12,800 tons of beef meat and offals. By 1985 this deficit is expected to grow to 29,000 tons. This implies that over 100,000 additional head of cattle will have to be imported annually by 1985 in order to avoid a rise in the price of cattle. At present Mauritania exports about 72,000 head per year to Senegal. FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part I, pp. 50 and 93.

capita consumption of beef in Ghana is already so low that it is hard to see how many more Malian cattle can be diverted from that country to the Ivorian market. The prospect is, instead, for the stagnation of Ghanaian beef consumption at about its current level. Thus any price rise which occurs in the cattle markets of the Ivory Coast and Mali will be due primarily to the effects of supply and demand in these two countries.

Given the sustained increase of demand for imports of cattle into the Ivory Coast, which averaged 12 percent annually from 1961 to 1970, and given the best estimate of the expansion of the total Malian herd during this same period of from two to three percent per annum, it is clear that at some point the increase in demand was going to catch up with the increase in supply, and a price increase would result. In 1965 Ivorian imports were about 100,000 head and the average annual increment of increased demand for imports was close to 12,000 head. If the size of the Malian herd at that time was estimated correctly at about 4,600,000 head and assuming that the ratio of cattle available for export to total herd size was the same then as the ratio of the number actually exported to total herd size in 1970, the number available for export in 1965 would have been approximately 163,000 head. With a growth rate of three percent, the average annual increase in the number of cattle available for export would have been close to 5000 head, only 7000 head short of the growth of import demand in the Ivory Coast. This difference could have been easily made up by the shift of supply from Chana to the Ivory Coast, by the growth of Mauritanian exports to the Ivory Coast, and by an increase in Mali of the rate of commercialization of cattle for export.

Five years later, however, the situation was quite different. Annual increments to import demand in the Ivory Coast had doubled. The additional cattle available each year in Mali for export, however, had only grown to about 6000 head. Furthermore, the potential for a diversion of cattle from the Ghanaian market was lessening, and the Senegalese market was beginning to demand about 6000 additional head each year from Mauritania. As a result, even without the effects of the 1968-69 drought, and allowing for a substantial margin of error in our calculations, it is clear that tremendous pressure was beginning to build up in the cattle markets to meet growing demand. The inevitable result was a rise in prices.

Demand Prospects for the Future

Projections of meat consumption for the Ivory Coast for 1970, 1975, and 1980 are given in the 1971-75 Plan.[25] Because the basis for these projections is not indicated, however, alternative projections for total meat consumption were calculated in Appendix Table A-10, using the Plan's estimates of population and income growth and applying expenditure elasticities of demand estimated from Ivorian survey data. The two sets of projections, shown in

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[25]Ivory Coast, Ministère du Plan, Plan Quinquennal de Developpement Economique, Social, et Culturel, 1971-75, Abidjan: 1971.

Table 8, are remarkably similar. We have, with some confidence, therefore,

TABLE 8

Projections of Meat Consumption, Production and Deficit in the Ivory Coast; 1970, 1975, and 1980
(tons of meat and offals)

	1970	1975	1980
Consumption of All Meat and Offals (TABLE A-10)	72,600	101,000	135,800
Consumption of All Meat and Offals (1971-75 Plan)	71,000	100,900	134,000
Consumption of Beef (1971-75 Plan)	40,000	59,300	80,000
Production of Beef (1971-75 Plan)	5,400	6,500	9,500
Deficit	34,600	52,800	70,500
Production of Beef (1969 SEDES)	4,000	4,600	5,400
Deficit	36,000	54,700	74,600

Source: Appendix Table A-10; Ivory Coast, Ministère du Plan, Plan Quinquennal de Développement Economique, Social, et Culturel, 1971-75, Abidjan: 1971, p. 153; FAC and Conseil de l'Entente, Supplying Middle-West Africa with Meat, Paris: SEDES, 1969, p. 66.

used the Plan's projections of beef meat consumption to forecast future demand. Table 8 also gives projections of Ivorian beef production, both from the Plan and from the 1969 SEDES study. Although the projections from the latter source are more conservative and probably more accurate in their expectations of future supply increases within the Ivory Coast, both sets of projections indicate a very rapid expansion of import demand during the 1970's, with the deficit doubling over the ten year period.

Most of this increase in demand is due to a rapid growth of the urban population, which, because of higher incomes, consumes three times as much meat, most of it beef, than does the rural population. Alternative demand projections for Abidjan and Bouaké, which assume no increase in per capita consumption of meat, also indicate an approximate doubling during the same period of total meat consumption in these cities because of their rapidly growing populations.[26] Thus the order of magnitude of these projections would appear to be correct to the extent that the Plan indicates correctly

[26] Mali, Ministère de la Production and FED, Projet d'Exécution pour la Création du Centre d'Embouche de Niono, Appendix VI. Estimates in this study of per capita meat consumption in Abidjan actually show a slight decline from 1964 to 1970. These estimates, however, do not take inot account the possibility of an increase in clandestine slaughter as butchers have been squeezed by a combination of upward pressure on cattle prices, an officially controlled price of meat, and a slaughter tax of 2000 Malian francs.

future urban growth.

Projections of future consumption in Ghana are much more difficult to make because of the importance of government taxes and exchange restrictions which might be changed relatively quickly. Although projections were made for the 1969 SEDES study, they were little more than guesses based on a rather optimistic forecast of the future liberalization of government foreign trade policy. Since the Ghanaian government has, on the contrary, actually tightened its controls in the past several years, the SEDES predictions are not very useful. Instead, we have made alternative projections based on two extreme assumptions. The first is that per capita beef consumption in urban and rural areas will remain at their current artificially low levels but that there will be some increase in the demand for beef as a result of population growth and continued urbanization. The second is that the government will relax all controls and eliminate all tariffs on live animals by 1980 so that per capita beef consumption will attain a level which is uninfluenced by government policy. Since per capita incomes in Ghana and the Ivory Coast were roughly similar in 1965 but since the growth of those incomes has been and is expected to continue to be much faster in the Ivory Coast than in Ghana, it is assumed that per capita beef consumption in urban and rural areas of Ghana in 1980 will be the same as they were in the Ivory Coast in 1970.

Table 9 gives alternative forecasts of the consumption of beef derived from the projections of total meat consumption found in Appendix Table A-10

TABLE 9

Projections of Beef Production, Consumption and Deficit in Ghana; 1970, 1975, and 1980 (tons of meat and offals)

	1970	1975	1980
Production of Beef	8,000	9,700	12,000
Consumption of Beef (Hypothesis No. 1)	23,500	29,200	35,200
Deficit	15,500	19,500	23,200
Consumption of Beef (Hypothesis No. 2)	23,500	58,200	117,000
Deficit	15,500	48,500	105,000
Consumption of Beef (1969 SEDES)	25,900	45,800	64,000
Deficit	17,900	36,100	52,000

Sources: Appendix Table A-10; FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest, Paris: SEDES, 1969, Part II, pp. 145, 46.

and the proportion of beef in total meat consumption which was assumed in the 1969 SEDES study.[27] The SEDES projections of consumption are also given for purposes of comparison. Production estimates are those used in the SEDES study.

Under the first hypothesis, the growth of Ghanaian imports during the 1970's would occur at an average annual rate of about four percent, whereas the combined imports of Ghana and the Ivory Coast would grow at close to 6.5 percent annually. This is probably the most accurate forecast of market conditions over the next decade, given Ghana's chronic balance-of-payments difficulties. The second hypothesis is useful, nevertheless, in indicating the magnitude of potential demand that exists should Ghana's economic situation change rather dramatically. Even though per capita beef consumption would lag the Ivory Coast under this hypothesis, the larger population and limited productive capacity of Ghana imply that its demand for beef imports would exceed that of the Ivory Coast.

The effective demand for beef imports depends not only on these basic factors of supply and demand within Ghana and the Ivory Coast but also on the effects of government policy. We have already mentioned Ghana's high taxes and exchange controls, which limit that country's demand for imports. In 1972 there was a 5.0 percent import duty on live animals, an 11.5 percent sales tax, and a 5.0 percent import surcharge.[28] More restrictive than the high tax rate, however, are the long periods before payment and difficulty of acquiring foreign exchange under a set of controls which change frequently. In 1971, moreover, the Ghanaian government began to require that all cattle be quarantined at the frontier and turned over at that point to Ghanaian importers. Because of the monopoly advantage thus given Ghanaian traders, this practice has apparently had a strongly negative effect on the number of cattle entering Ghana. In addition, the quality of animals being imported appears to be very low.

In contrast to Ghana, there are no taxes on imports of live animals from Mali into the Ivory Coast, but just fees for the use of market facilities and the abattoir. The major problem is the fixed official price of meat, which has caused financial difficulties for butchers in Abidjan. The Ivorian government, however, has by no means the same commitment to maintain this price as does the government of Mali, since there is a large annual surplus in its operating budget and some increase in government wage rates can be tolerated. In fact, the team was informed in February that the Ivorian government had just about decided to increase meat prices if a shortage should become apparent.

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[27] FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest, Part II, p.145.

[28] Mali, Ministère de la Production and FED, Projet d'Exécution pour la Création du Centre d'Embouche de Niono, Appendix VI, p. 51.

Malian Consumption, Production, and the Equilibrium of Supply and Demand

The foregoing projections of demand in the Ivory Coast and Ghana are made assuming constant relative meat prices during the 1970's. As explained earlier, however, prices have already begun to rise at a rapid rate during the past few years. Furthermore, projections of future consumption and production in Mali, when compared with anticipated increases in the demand for imports into the coastal countries, clearly indicate a growing deficit in the supply of available cattle to meet this demand.

Estimates of beef consumption in Mali for 1970 are derived separately for Bamako, other urban areas with more than 5000 people, and rural areas.[29] For Bamako these estimates are derived from figures for official slaughter at the abattoir (3,499 tons), official slaughter in peripheral areas (1,027 tons), estimated imports from the neighboring market at Kati (100 tons), and estimated clandestine slaughter (876 tons). Subtracting meat exports of 275 tons, adding 25 percent of carcass weight for offals, and subtracting 19 tons of these for export, consumption in Bamako amounted to about 6,500 tons of beef meat and offals. This was 32.8 kilograms of beef per capita as compared with a per capita consumption of all forms of meat estimated at 39.7 kilograms. Consumption in the smaller cities is estimated by adding 10 percent of official slaughter figures for clandestine and family slaughter and applying estimated average carcass weights varying from 90 to 120 kilograms, depending upon the type of cattle likely to be slaughtered in each urban center. This yields an average per capita consumption of 19.2 kilograms of beef meat and offals and a total consumption of about 6,200 tons. Finally, rural consumption is estimated by subtracting exports and consumption in other areas from the estimated tonnage of production. The difference of about 36,150 tons or 8.0 kilograms of beef per capita, can be compared with per capita consumption of all forms of meat equal to 20.3 kilograms.

Projections of Malian consumption for 1975, 1980, and 1985 are made assuming no change in per capita beef consumption within each area.[30] The main source of growth, then, is the increase in urban compared with rural population. Projections of production are founded on the 1970 base year estimate given earlier and an assumed three per cent rate of growth of taurus and two percent rate of growth of zebu cattle. Off-take rates are assumed to remain constant at 13 and 11.7 percent and average carcass weight at 78 and 112 kilograms respectively.

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[29] FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part I.

[30] Although past estimates generally indicate some decline in per capita consumption in urban areas during the last half of the 1960's, probably due to a decline of real per capita income, it is anticipated that this trend will not continue.

These projections together with projections of demand for imports by the Ivory Coast and Ghana are given in Table 10. Given the probable stag-

TABLE 10

Projections of Demand for and Supply of Exports of Beef Meat and Offals by Mali to the Ivory Coast and Ghana, 1970-1985
(tons)

	1970	1975	1980	1985
Malian Supply				
Production	84,300	94,000	104,500	116,200
Consumption	48,900	56,400	65,200	75,400
Surplus	35,400	37,600	39,300	40,800
Demand				
Ivory Coast	36,000	54,700	74,600	--
Ghana	15,500	19,500	23,200	--
Total Deficit	51,500	74,200	97,800	--

Sources: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part I, p. 341; Tables 8 and 9.

nation of exports from Mauritania and Upper Volta to these two major coastal markets, it is clear that equilibrium of demand and supply will not be achieved without a substantial rise in prices. Although available evidence on price elasticities of the demand for and supply of beef is almost non-existent, it may be useful to introduce a few hypothetical examples. We will assume that the projected supply of beef is already a maximum consistent with long term herd maintenance and an absence of public intervention into the livestock sector. Thus full adjustment to attain equilibrium has to be made on the demand side. Assuming that the true price elasticity of demand is bounded by the parameter values -0.5 and -2.0, in the former case prices would have to rise by 68 percent from 1970 to 1980 in order to equalize demand and supply, whereas in the latter case the increase would be 17 percent.[31] If economic conditions in Ghana

[31]In making these calculations it was assumed that 16,100 tons of beef continued to be exported to Ghana and the Ivory Coast by countries other than Mali and that the elasticities apply to total consumption in Mali and the coastal markets. We have also ignored the fact that substitution between Malian consumption and exports is not perfect due to differences in the quality of animals going to each of these markets. Since the export market will be growing faster, one would expect the price rise in that market to be greater than the increase in prices of animals sold for domestic consumption. In addition, there will probably be a decrease in the average quality of animals exported as traders respond to the growing price differential. The extent to which poorer quality cattle can be exported, in fact, determines the degree to which these two markets are distinct.

should improve so that the demand for cattle imports grows at a more rapid rate, the price rise will, of course, be correspondingly greater.

Thus far we have ignored two crucial factors, resulting in an underestimation of the magnitude of future price increases. First, we have neglected completely the huge and growing Nigerian market. With over 50 million inhabitants, Nigeria has a current annual demand for meat of 230,000 tons which is expected to reach 370,000 tons by 1980.[32] Although present excess demand is satisfied by importing 300,000 to 400,000 head of cattle annually from Chad and Niger, there is little prospect that these countries will be able to meet the anticipated demand for imports of about 700,000 animals per year by 1980. Consequently, cattle prices will also be rising in that part of West Africa, and it is conceivable that some Malian cattle could be diverted to Nigeria should the price rise there be more rapid than in the Ivory Coast and Ghana.

Of far greater importance, however, is the effect of the 1972-73 drought, which has seriously decimated herds throughout West Africa. Although the extent of loss is still unknown, most estimates have indicated an order of magnitude of about one-third of total herd size. In the presence of a catastrophe of this magnitude it is extremely difficult to predict how herders will react during the next few years. On one hand, their herds will be smaller, some not large enough to sustain the family in accordance with traditional consumption patterns. On the other hand, they will be faced with high and rising prices for cattle. There will thus be strong immediate pressure for herders to sell some of their cattle and use the proceeds to buy grain and other goods and services. Some, who have been most heavily affected, will probably have to increase their participation in other activities, such as farming.

Because of the great importance attached to the number of cattle owned, both for reasons of social prestige and as a hedge against risk, herders may instead ignore these economic signals and try to rebuild their herds as rapidly as possible. This will probably mean selling some males in order to obtain females and holding back from the market some marginally productive cows. In the aggregate this will have the effect of making a few younger males available during the first year or two following the drought and reducing the number of adult males available in later years. There is evidence that the sale of younger males has been increasing anyway in Mali since at least the mid-1960's.[33] As for the cows, there is likely to be a rise in their price, but the extent to which aggregate herd size can be increased in this way is slight. The necessity of paying taxes will assure that there is some flow of animals into the market. But there may be an increased effort to evade tax payments, and the anticipated rise in prices

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[32]Ankony Angus Corporation. Feasibility Study for Industrial Meat Production in Senegal, p. 209.

[33]FAC and Mali, Ministère du Développement, Exploitation du Chaptel Bovin au Mali, p. 12.

will, of course, mean that fewer animals have to be sold to pay a given level of taxes.

What is perhaps most likely is a combination of these reactions. Some herders who have been most severely affected will undoubtedly have to turn increasingly to agriculture and to sell some animals, perhaps even cows, in order to buy food. Other herders who were less affected will rebuild their herds. To the extent that males are sold earlier, traders and other speculators will be presented with the opportunity of gaining a substantial profit by holding these cattle to maturity in the face of rising prices. The overall prospect is, then, for a concentration of wealth in the hands of the larger herders and the creation of new opportunities in the commercial sector.

In any case it seems clear that price increases will be more rapid than was suggested earlier when it was assumed that the supply of beef would increase at the rate of two to three percent per year. The initial effect of the drought, which was quite apparent from data on market presentations[34] and from spot investigations in the field, was that large numbers of cattle were sold in late 1972 after the rains because it was believed they probably would not survive the dry season. By February, 1973, however, it was apparent that this flow of cattle was being substantially reduced. The decrease in herd size resulting from high losses in the 1972 calf crop and the premature slaughter or death of many young cows will, moreover, substantially lower the sustainable off-take for a number of years to come. The reaction of herders to higher prices and reduced herd size may affect the timing of this off-take, but it will only marginally influence its total size over the next three or four years. Given a reduction of total off-take of, say, one third in 1975 and assuming a price elasticity of demand equal to 0.5, the prospect is for a price increase of 126 percent over the 1970 level. Should the elasticity of demand be 2.0 prices would increase by 32 percent. Since these assumed elasticities are applied to total consumption, a large part of which is by the herders themselves and is probably not very responsive to price changes, the relevant elasticity is probably fairly low. Consequently, a doubling of prices within the next few years would not be an extreme prediction.

Ultimately, the rise in prices for livestock is limited, in the absence of government restrictions, by the supply response which is evoked and by the price of imports of meat from outside West Africa. Because of the constraints that exist to expanding production in the traditional sector, however, any supply response is likely to be slow without substantial government intervention. On the other hand, prices of local beef are less than half those of imported beef and the latter are rising all over the world. Consequently, the latitude for high cattle prices is quite great.

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[34] See Part II for some of these data.

Mali's Comparative Advantage in Livestock

Because of the growth of demand and the prices for cattle which are likely to prevail in West Africa for some time in the future, Mali is faced with a great opportunity to develop the livestock sector in which it and the rest of the Sahalian countries have a strong comparative advantage. The reason for this advantage is clear. As long as the existence of trypanosomiasis in the regions south of the 13th parallel makes it impossible to increase meat production there at anything but a small fraction of the rate necessary to supply this growing demand, the major increase in production will have to come from the areas free of the tsetse fly, which are the major centers of production today. Given the absence of other activities which could compete strongly for the use of this land, Mali's comparative advantage lies in its development for livestock.[35] This is all the more true because of the enormous skill resource contained in the knowledge of nomadic and semi-nomadic herders, who, given the harsh environmental conditions, have developed a means of exploiting the Sahalian rangeland which is more efficient than any other mode of production.[36]

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[35]This is not to say that the optimum pattern of production might not involve other activities in this zone as well as livestock. A substantial increase in cattle production appears, for example, to depend heavily on increasing agricultural output for feed and forage. The optimum combination will probably involve some degree of integration of commercial agriculture and livestock production either within the same enterprise, i.e. mixed farming, or via commercial exchange, i.e. feedlots, holding areas, etc. The basic complementarity of agriculture and livestock in this zone is illustrated already by the cultivation and sale of cotton with part of the seed being sold for cattle feed. What is unlikely, however, given the very favorable demand conditions for livestock, is that commercial agriculture would be profitably developed to the exclusion of cattle production in the tsetse fly-free zone.

[36]Experience to date with one such alternative mode, the ranch, has not been encouraging. See, for example, the discussion of the problems of the Doli Ranch in Senegal found in FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part III, pp. 193-208. In addition to the difficulties discussed in this study, the profitability of ranches has almost always been assessed without taking into account the value of the land in its alternative uses. Even supposing that water development is necessary for the creation of a ranch, once that development is made the costs of the ranch should include an implicit rental value of the land for its best alternative use, for example by nomads subject to control of water flow to prevent overgrazing. If this implicit rent were included, ranches which are marginally profitable from a private point of view would probably prove distinctly unprofitable in terms of their social opportunity cost. A thorough examination of this issue is currently being undertaken in connection with a research project assessing the comparative advantage of Ghana, Ivory Coast, Mali, and Senegal, conducted by Bela Balassa and associates at the World Bank.

The fact that both the land free of the tsetse fly and the skills of cattle raisers used to exploit that land are largely fixed in supply has an important implication for the distribution of increments of income received from higher prices and expanded production. The inelastic supply of these factors of production means that their return is an economic rent, derived as a residual after subtracting from total revenue the opportunity cost of other factor imputs, such as capital and labor, which are not fixed in supply. Since the inputs used in such activities as slaughtering, commercial operations, and transportation have, in the long run, opportunities outside the livestock sector, the returns to these inputs tend to be priced at the marginal value of those opportunities. Because those opportunity costs are to a large extent unaffected by the total magnitude of cattle production and commercialization, the marginal returns per unit of input are unlikely to increase very much as prices rise. As a result, most of the increase in cattle prices will be passed back to the producers, who effectively possess both the land and the skills required to exploit the land.

The major exception to this is the expertise of traders and butchers specialized in the commercialization of cattle and meat. Although these people may receive some short term economic rents, in the long run the entrepreneurial perception of merchants not specialized in the cattle trade is sufficiently keen that they are likely to quickly seize profitable opportunities and reduce inflated profit margins to a competitive level. Indeed, the expansion of cattle trade may result in important increases in competition, especially in the smaller markets, and in economies of scale at many levels of distribution. The net result will be high incomes for producers.[37]

The Government in Relation to the Livestock Sector

The potential is great to increase meat production in Mali. Its realization, however, will require a series of actions modifying production patterns (increasing specialization in the Sahalian zone for breeding young stock, expansion of sedentary husbandry, introduction of forage cultivation, greater utilization of agricultural by-products) and a variety of public policy decisions to increase the incentive for change. The near total absence of infrastructure for modern production may make necessary large public capital investments. There are also cash costs associated with feeding cattle, providing sanitary protection, controlling quality, protecting against cyclical weather conditions, and organizing transport, which will necessitate expanded current government expenditures as well as the provision of credit.

One of the major problems posed by the expansion of the total value of commercialized cattle, however, is the limited ability of the Government to siphon off part of this expansion in the form of taxes. In the past, for example, high rates of export taxation resulted in avoidance of tax payment on up to 80 percent of cattle exported. Even today, with all taxes and charges on exports amounting to over 5000 Malian francs per head, only about one half of total cattle exports are controlled. As a result, the government

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[37]See Part II of this report for a more detailed analysis and some empirical evidence.

does not see the livestock sector as a major source of public revenue and has, in the past, been unwilling to invest a great deal in its development.[38] As prices rise, however, there will be an increased opportunity to appropriate for public purposes at least part of the economic rent which is created. Furthermore, as is seen in Part II of this report, an important part of Malian taxes on the livestock sector is passed forward onto higher-income consumers in other countries. Consequently, it is imperative that efficient modes of taxation be developed.

From an economic point of view, a usually desirable form of taxation would be a tax on the implicit rental value of land used by the nomads and farmers in the tsetse-free zone. As the value of this land increases with rising cattle prices, increased tax payments would stimulate improved use of that land through timely marketing of cattle. This is in contrast to a tax on exports or on domestic sales, which tends to discourage commercialization. Unfortunately, given present land use practices and the enormous administrative cost of collecting such a tax, the imposition of a comprehensive land tax in this area is not possible.

A second-best alternative is the direct cattle tax of 400 Malian francs per head. This is assessed on wealth but not income and thus encourages the sale of cattle. As prices rise, this tax should probably be increased in order that the government might share in the windfall gain that results. Furthermore, an increase in cattle prices without an increase in the tax rate may result in the sale of fewer cattle, since the effective tax burden, one of the incentives for the sale of cattle, will have been lightened. Higher cattle taxes, however, will undoubtedly meet with strong resistence. At present less than half the total herd is taxed, and that percentage would probably rise if the tax rate were increased. Part of the problem appears to be the lack of a link between the payment of taxes and the receipt of government services. There may, therefore, be the possibility of charging modest fees as a means of helping to finance expanded services.[39]

The alternative of increasing slaughter and commercial taxes has the twin disadvantages of discouraging commercialization and increasing tax

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[38] In Mali, as in a number of other West African countries, the government livestock service has suffered a decline in its operating budget in recent years. Taxes on the livestock sector contributed about 7 percent of total government revenues in 1970. The livestock service, in return, received only part of the 5.4 percent of the total operating budget for that year allocated to agriculture and related services. FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part III, p. 25.

[39] Slight charges are apparently already being made by vaccinators as a form of supplementary income, and herdsmen, appreciating the value of the service, have been willing to pay.

evasion. A slaughter tax, in addition, tends to penalize domestic consumers and divert cattle toward the export market. Export taxes, on the other hand, tend to aid domestic consumers in purchasing meat at low prices. They have the further advantage, from the Malian point of view, of being partially passed on to consumers outside of Mali. The problem of tax evasion, however, remains. The incidence of export taxes and public policy options concerning the commercial sector are discussed further in Part II.

One other aspect of government policy which has helped to divert meat from the domestic market is the EXIC procedure. In order to receive import licenses, small private traders, who handle about one third of total declared imports, must show that they have exported products valued at 75 percent of the value of imports for which the license is to be obtained. Since most of Mali's exports, such as cotton and peanuts, are handled by state enterprises, traditional traders obtain their import licenses by financing the export of cattle. In effect, the implicit premium attached to obtaining an import license results in these traders granting more favorable terms for the export of cattle than would otherwise be the case.

The expansion of demand in the coastal countries, especially in the Ivory Coast, and the resultant rise in cattle prices in recent years has had a pronounced effect on the cost and availability of beef in the domestic Malian market. Since most Malians have experienced constant, or declining real income over the past decade, they have been increasingly unable to compete for the best quality meat. In effect, there has been a redistribution of income from domestic meat consumers, especially the civil servants who have probably had the greatest decline in real income, toward meat producers, who have benefitted from the rise in prices.

The problem is compounded, moreover, by the fixed price of meat established and regulated by the government. As of February, 1973 official prices in Bamako were the following: fillet 400 MF, boneless meat 350 MF, meat with bones and meat by the heap (including bones, offals, etc.) 275 MF. The last two catagories are by for the most important in terms of quantities purchased and consumed. Compared with these official prices, the average prices of live animals per kilogram of carcass weight were the following in Bamako during the period July, 1971 to June, 1972: First quality steers (150 kg) 280 MF/kg, average quality steers and sterile cows (120 kg) 250 MF/kg, old cows (100 kg) 240 MF/kg, young bulls (75 kg) 250 MF/kg.[40] Clearly, the margin available for the cost of slaughter and distribution is very slight.[41]

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[40]See Appendix Table A-11 for corresponding prices in a number of different Malian urban centers. The extent to which actual observed prices shown in this table are higher than official prices indicates a lack of substantial enforcement in many areas outside of Bamako.

[41]In recognition of this, the government, in May, 1969, eliminated the turnover tax on meat and reduced the fee for slaughtering done for private butchers at the Bamako slaughterhouse.

These averages, however, disguise the substantial variation which occurs seasonally. Toward the end of the dry season, when cattle are generally in poor condition, their high price per kilogram of carcass weight together with the fixed official price of meat puts a great deal of pressure on the butchers. In response there is some selling at higher than the official price. A sample of beef prices in Bamako, for instance, averaged 270 MF/kilogram for meat with bones in December, 1971, whereas a similar sample in April and May, 1972, revealed an average price of 284 MF/kilogram.[42] More important, the average quality deteriorated markedly, as the average percentage of bones, offals, and waste included with the meat rose from 26 percent to 36 percent.[43] Another way in which quality deteriorates, as is shown in Appendix Table A-12, is the somewhat greater percentage of cull cows which are normally slaughtered during the late spring and early summer. It is clear, therefore, that government price regulation is not fully effective because of its failure to stipulate the quality of meat sold. The deterioration of quality is necessary, moreover, because the price of a whole carcass may easily rise from an average of about 250 MF/kilogram to 285 or 290 MF/kilogram by late spring, and even this implies a constriction of the profit margins of wholesale butchers.[44]

Another way in which butchers have tried to avoid the cost squeeze during the dry season, which has become increasingly severe in recent years, is by avoiding the use of the abattoir. As calculated from Appendix Table A-12, the ratio of controlled slaughtering in the Bamako area during May, June and July of 1970-72 to that during September, October, and November was .85 in 1970, .78 in 1971, and .60 in 1972. Aside from the number of animals slaughtered, there is also a decline in average carcass weight during the late spring and

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[42]FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, p. 161.

[43]Calculated from Appendix Table A-11.

[44]Mali, OMBEVI, Premier Essai d'Analyse de la Politique des Prix de la Vente, Bamako: April 1972, p. 5. These prices may be compared with information gathered by Vincent Olivier to the effect that seasonal price variations in the Bamako market is on the order of 5 to 7000 MF for an animal of 210 kilograms live weight (August to March, 25-27,000 MF; April to July, 32,000 MF) and may rise to 20,000 MF for an animal of 400 to 450 kilograms. Vincent Olivier, Etude de Marché de la Viande (Essentiellement Bovine) dans l'Agglomération de Bamako (Ville et Périphérie), SEDES, August 1972. See Appendix Table A-13 for Olivier's detailed price observations. These together with our own observations and those made by SEDES for the FAC and OMVS study indicate that the seasonal variation in cattle prices per unit of carcass weight is actually substantially greater than the 14 to 16 percent variation in wholesale prices noted here. We were informed by several of the larger butchers, in fact, that sales are frequently made to retailers at higher than official prices.

early summer as is also shown in Appendix Table A-12. Part of this decrease probably reflects a cutback in butcher activity as a result of the cost squeeze, and part of it is an indication of the diversion of slaughter to peripheral areas in order to avoid the slaughter tax of 2685 MF per head. One of the main disadvantages of this reduction of activity is that it lowers the utilization of the abattoir, which is now operating at well below 50 percent of capacity.[45] Another problem is the lack of control over health standards which results. Finally, there is the problem that butchers are prevented from accumulating the capital necessary to develop a viable wholesale sector.[46]

The obvious solution of allowing meat prices to rise, especially during the dry season, is made difficult by the precarious budget situation. The government fears that any increase in the official price of meat would be difficult to sustain without increasing the prices of other basic commodities. This would result in pressure to raise the salaries of civil servant, and that, in turn, would cause a greater operating budget deficit. Consequently, the government has resorted to other measures such as eliminating peripheral slaughter operations, restricting the use of the abattoir to the 20 largest butchers, and asking A.I.D. for the establishment of a revolving credit fund for these butchers in order to encourage and develop wholesale trade and bring the abattoir closer to full utilization.

Public Policy Implications

An important task in determining the implications for public policy of the preceding analysis is to judge what are the basic objectives of the government of Mali and of A.I.D. in giving aid to Mali and the extent to which these objectives are congruent of divergent. The problem is parti-

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[45]That capacity was estimated at 66,000 head or 8,580 tons of beef carcass per year by FAC and Mali, Ministère du Développement, Exploitation du Cheptel Bovin au Mali, pp. 159 and 60. Appendix Table A-14 gives the number and average carcass weight of cattle slaughtered since 1965.

[46]For detailed calculations of the profits and losses sustained by butchers, see Mali, OMBEVI, Premier Essai d'Analyse de la Politique des Prix de la Vente and FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, pp. 165-70. In general, these estimates indicate very low profits even in the best season and a zero profit or a loss in the late spring. That profits are frequently low or negative at official prices is also indicated by the recent response of private butchers and SOMREPEC, the Mali state corporation which sells meat, hides and skins, to an invitation to submit bids for a year-round contract to supply government institutions such as hospitals, schools, prisons, military installations, etc. Despite the advantage of a bulk contract at a constant price, all offers received were considerably above the official price of meat.

cularly difficult because the presence of balance of payments and budgetary constraints implies that longer run objectives may differ quite markedly from immediate needs.

The 1970-72 Plan lists the following basic objectives:[47]

1) Priority development of agriculture and livestock in order to increase exports and permit the importation of capital goods,
2) Develop the transportation infrastructure,
3) Diversify the economy in order to develop local production and reduce imports,
4) Increase geological research in order to develop mining as the basis of industrialization,
5) Extend control by Malians to all key sectors
6) Develop economic, commercial, and monetary ties with other African states.

In addition, there is clearly indicated an effort to increase the rate of economic growth, to control inflation, to limit increases of government salaries, to modernize the fiscal system, and to slow down the rate of rural-urban migration.

In general, there would appear to be no conflict between these objectives and those of A.I.D., which presumably include the growth of per capita income, a reasonably equal distribution of income, full employment, diversification of the economy to reduce risk, monetary and fiscal responsibility, and the progressive extension of Malian control of the economy. The emphasis placed by the Malians on rural development would also appear to be compatible with (1) Mali's comparative advantage, (2) some redistribution of income towards the rural population, and (3) a decrease in rural underemployment and slowdown of the flow of people into the cities where many of them are likely to remain unemployed.

With respect to the livestock sector, the rapid growth of export demand for cattle and the comparative advantage of Mali in production would appear to present the Malian government with a unique opportunity to fulfill many of its objectives. Since most of the increased value of production resulting from price increases and expanded output are likely to be passed back to the producer, there will be growth of per capita income. Even to the extent that gains are realized by the commercial sector, most of these merchants are Malians. Because herders and the smaller traders have relatively low incomes today, future distribution of income will be in a more equal direction. To the extent that expanded output comes from labor-intensive fattening operations by herders or farmers, greater employment in rural areas will result, especially during the slack agricultural season. Finally, the expansion of exports will help to alleviate the shortage of foreign exchange and bring the balance of payments into equilibrium.

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[47]Mali, Direction Générale du Plan et de la Statistique, Programme Triennal de Redressement Economique et Financier, 1970-72, Bamako: June, 1970, p.3. The 1973-77 plan was in the course of elaboration at the time of the team's visit to Mali. There is no indication that its basic objectives will differ markedly from those of the 1970-72 plan.

From the point of view of the Malian government, however, the expansion of export demand has posed the critical problem of supplying the Bamako market with meat without relaxing the strict price and public sector wage controls imposed for purposes of containing the size of the budget deficit and controlling inflation. One solution to this problem is to expand the production of beef for commercial markets of all sorts. This will help to solve the problem of supplying the domestic market for two reasons. First, because Mali is the major exporter to the Ivory Coast, an important increase in production and export will help to hold down Ivorian price increases and will thus lessen the difference between these and the fixed domestic price. Second, since not all cattle are suitable for export, an increase in total production will increase the number of animals available for domestic consumption.

The specific problem of supplying the Bamako market with beef at reasonable cost can also be addressed by careful selection of the areas in which production is to be increased. Since the major movement of cattle during the dry season is eastward and southward towards the Interior Delta and export markets, any program or policy which acts to increase the production of cattle in the region of Ségou and Bamako, especially towards the end of the dry season, will result in a greater availability of cattle to the domestic consumers in that area. Because the gap between the growth of demand and the time required to increase production at a rate sufficient to satisfy that demand, however, this will only be a partial solution for many years to come, especially in view of the effects of the recent drought.

Another long run solution to the problem of both expanding exports and providing meat for the domestic market depends on the government developing the ability to effectively tax cattle producers so as to participate in the growth of the livestock sector. Part of the increased revenue could be reinvested in the sector to expand production. Another portion could be used to cover part of the operating budget deficit. Finally, it might become possible at some point to allow prices to rise and to raise government salaries proportionately. This would lessen the redistribution of real income which is currently taking place between civil servants and those in the livestock sector. Although a more equal distribution of income is a long term objective, there are important political constraints limiting the rate at which this can be achieved. It would be much easier, for example, if a better distribution could result from having increases in income accrue to the rural sector while, at the same time, avoiding any decline in the incomes of others.

Given the long term nature of these solutions, the Malian government is justifiably very concerned to find actions which can be taken today to solve the problem. One desired effect of the current effort to develop wholesale trade is a reduction in the cost of slaughter and distribution through fuller and more efficient use of the abattoir and distribution network. The provision of credit to the wholesale butchers, moreover, would eliminate their dependence upon very costly credit granted them by cattle merchants and thus reduce their costs.[48] Another proposal has been to develop one or more holding

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[48] Where butchers have to buy on credit they pay 3000 to 5000 MF per head for a period of up to 30 days. This amounts to an annual rate of interest well in excess of 100 percent. Part II of this report discusses the commercial credit system in greater detail.

areas near Bamako, where cattle can recover from their trek and be held for slaughter toward the end of the dry season when prices are high. The possibility is also envisioned of the wholesale butchers eventually buying directly from interior markets and avoiding some of the commercial costs between these and the Bamako abattoir.

The major problem is that most of these efforts are likely to prove ineffective in solving the basic problem: ensuring an adequate supply of meat to the domestic market at a time when external demand is growing at a more rapid rate than supply. Given the tight constraint placed on butchers by the low official price, it will be difficult to design a profitable system for the slaughter of cattle and distribution of meat. Despite some advantages related to better sanitary conditions, the methods used at the Bamako abattoir are expensive because of their highly intensive use of capital and other costly inputs and because they suffer from poor maintenance of mechanical equipment.[49] Even if capacity utilization can be increased and operating and maintenance personnel better trained, it is doubtful, given the structure of costs, if the operations of the abattoir can be made less costly than traditional methods of slaughter and distribution. As for the high price of butcher credit, much of this is undoubtedly due to the risk associated with financing butchers who are in a precarious financial position. In addition, the trader takes any risk associated with the possibility of seizure resulting from the health inspection.

To the extent that a limited number of the largest wholesale butchers can be isolated, costs of acquiring information concerning their financial standing should be reduced, and credit at lower rates of interest might be available from the private sector. In fact, four or five of the largest butchers already have access to commercial bank credit, though not during the last part of the dry season when even their position is relatively precarious. Clearly, then, any program for the provision of credit to these wholesale butchers must be accompanied by some increase in the official price of meat in order that loans may be repaid out of profits throughout the year.[50]

The establishment of holding areas near Bamako in which cattle could regain weight after their trek and be held seasonally as a reserve for the Bamako market might fulfill a need not currently being met by the private sector. The same is not true, however, of the proposal to buy cattle in

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[49]Mali, Bamako Abattoir Frigorifique, Rapport Mensuel, various issues.

[50]The butchers themselves, in agreeing to mutually guarantee loans to each individual, have made it clear that they will do so only if there is some increase in the prices they receive. Olivier, Etude du Marché de la Viande (Essentiellement Bovine) dans l'Agglomération de Bamako (Ville et Périphérie), p. 36. It is interesting that in Sierra Leone and Liberia, where meat prices are set sufficiently high so as to permit a reasonable profit to be made, professional organization of butchers is much better developed than in the French-speaking countries, where official prices are usually set at lower levels. FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, p. 171.

the interior markets and to bring them to the holding areas in order to reduce commercial costs. As will be demonstrated later in Part II, the existing commercial sector is quite competitive and efficient and commercial margins reflect real costs of collection and transport and not excessive profits. It is highly doubtful, therefore, whether butchers, who are not specialized in this form of trade, can organize this activity any better than it is presently organized.

In the meantime there is one policy action which could be implemented relatively quickly at little or no cost. That is the elimination of the 75 percent export requirement for obtaining an import license. With the demand for exports of cattle growing rapidly and with a major concern of the government to provide meat for the domestic market, there is little justification for a policy which offers, in essence, a subsidy to cattle exporters.

A policy question of considerable importance relates to actions to promote the export of meat rather than live cattle. Although the Malian government is quite interested in increasing the utilization of its modern slaughterhouse at Bamako and exporting meat abroad, there are a number of reasons why it is probably not desirable to commit themselves too strongly to policies or programs oriented in this direction. First, there are problems of finding markets for meat, especially when local butchers in other countries are firmly entrenched behind tariff barriers. The recent acceptance of Mali into the Entente Livestock Community and the forthcoming realization of the West Africa Economic Community may be signs for encouragement, but negotiations concerning these matters have been slow and delicate.[51] Secondly, the costs of transporting meat by air or by truck are quite high unless there is sufficient backhaul traffic. In the case of truck transportation, there is the additional problem that standards of maintenance of refrigeration equipment are not very good and there is the resulting risk of loss due to spoilage en route, though this risk might be reduced by the use of insulated containers. Thirdly, there is a high degree of organization and marketing skill required for the development of a sizeable and growing export market, as well as a high cost of quality control and supervision. Consequently, although in the future meat exports by Mali may assume far greater importance than now, it would seem preferable for current planning to assume that the export of live animals will predominate for some time.

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[51] To be noted is the decision in March, 1973 to drop the tariff barrier on meat imported into the Ivory Coast from Senegal.

II. THE CATTLE DISTRIBUTION SYSTEM

The Commercial Network

The commercial chain which starts with the herder or farmer and ends with the consumer is, in West Africa, highly complex, but efficient. It is capable of gathering cattle in small lots over a vast area and moving them hundreds of kilometers to the urban centers of consumption. As will be seen in the next section, this is accomplished at very low cost.

As shown on Map A, the principal commercial circuits are aligned in a north-south direction since the major producing areas are in the north and the major consuming areas are in the south.[52] Aside from very small markets where the exchange of less than 2000 head per year takes place, primarily between herders or between herders and local butchers, the first markets of any importance in the chain are the marchés de collect, handling 5000 to 20,000 head a year.[53] Most of these markets are located in the pastoral zone and are controlled by the government. Exchange may be between herders, between herders and traders, or between traders. Local butchers are also present. The most important markets, however, are the marchés de regroupement, which handle almost solely animals to be slaughtered, most of which are exported. The largest of these markets, Kati, handles over 100,000 head a year.[54] The markets are usually held weekly so that traders can frequent different markets on successive days. Exchange is generally between traders, with intermediaries usually playing a role.

Recent surveys conducted in a number of these markets indicate that about 70 percent of the animals presented are males and that about two-thirds of these are castrated. The age composition of marketed cattle is

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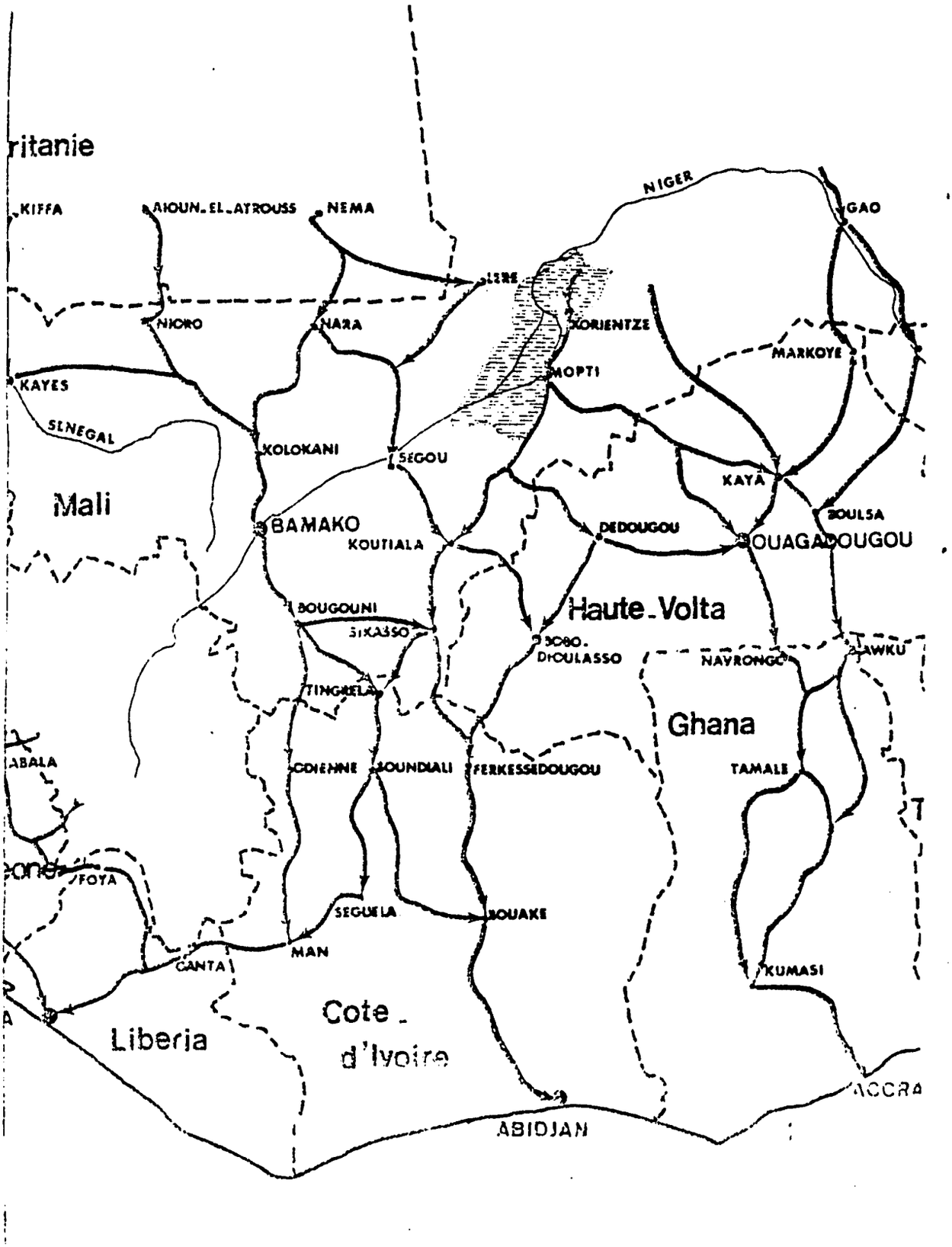
[52]Except where otherwise indicated this description of the commercial system is taken from FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Parts I and II.

[53]Among the more important of these markets are Nioro, Kayes, Nara, Didiéni, Léré, Nampala, Sokolo, Tenenkou, Gathi-Loumo, Toguere-Koumbe, Bambara Maoundé, Korientzé, Douentza, Dialassagou, Madiakoye, Gao, and Menaka.

[54]Others are Niono, Ansongo, N'Gouma, Kona, and Fatoma. See Appendix Table A-15 for the number of cattle presented in each of these markets from 1967 to 1970.

MAP A

Principal Cattle Routes to Coastal Markets



shown in Table 11 where it is compared with that of total herd off-take.

TABLE 11
Age and Sex Composition of Cattle Presented in the Major Malian Markets Compared with Herd Off-take
(%)

	Presented in Markets	Herd Off-take
Males		
Less Than 3 years	76.4	77
Over 3 years	23.6	23
Total	100.0	100
Females		
Less than 3 years	43	--
3 to 10 years	35	13
Over 10 years	22	87
Total	100	100

Source: FAO and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, p. 308

This comparison indicates that most males are sold for export or for domestic slaughter, whereas most young and adult females are exchanged between herders, and many old cows are consumed by the herders without entering the market

There is substantial seasonal variation of activity in these markets.[55] In general, activity is greatest after the end of the rainy season, when the animals are in their best condition, and least during the rainy season itself, when the herds are taken on the transhumance to pastures frequently far from the major markets. This seasonal variation in activity is influenced, however, by specific patterns of migration. The Mopti markets, for instance, experience their greatest levels of activity at the end of the dry season, when cattle and their owners are concentrated in the bourgou of the Interior Delta.[56] Selling at the end of the rainy season is apt to be particularly great if rain and pasture have been deficient, as was the case at the end of 1972, since herders are anxious to get rid of those animals in poor condition which are unlikely to survive the dry season.

The principal cattle trade routes within and adjacent to Mali are indicated on Map B. To the west, most of the cattle from Mauritania are moved south towards the Kati market, where some are sold for slaughter in Bamako

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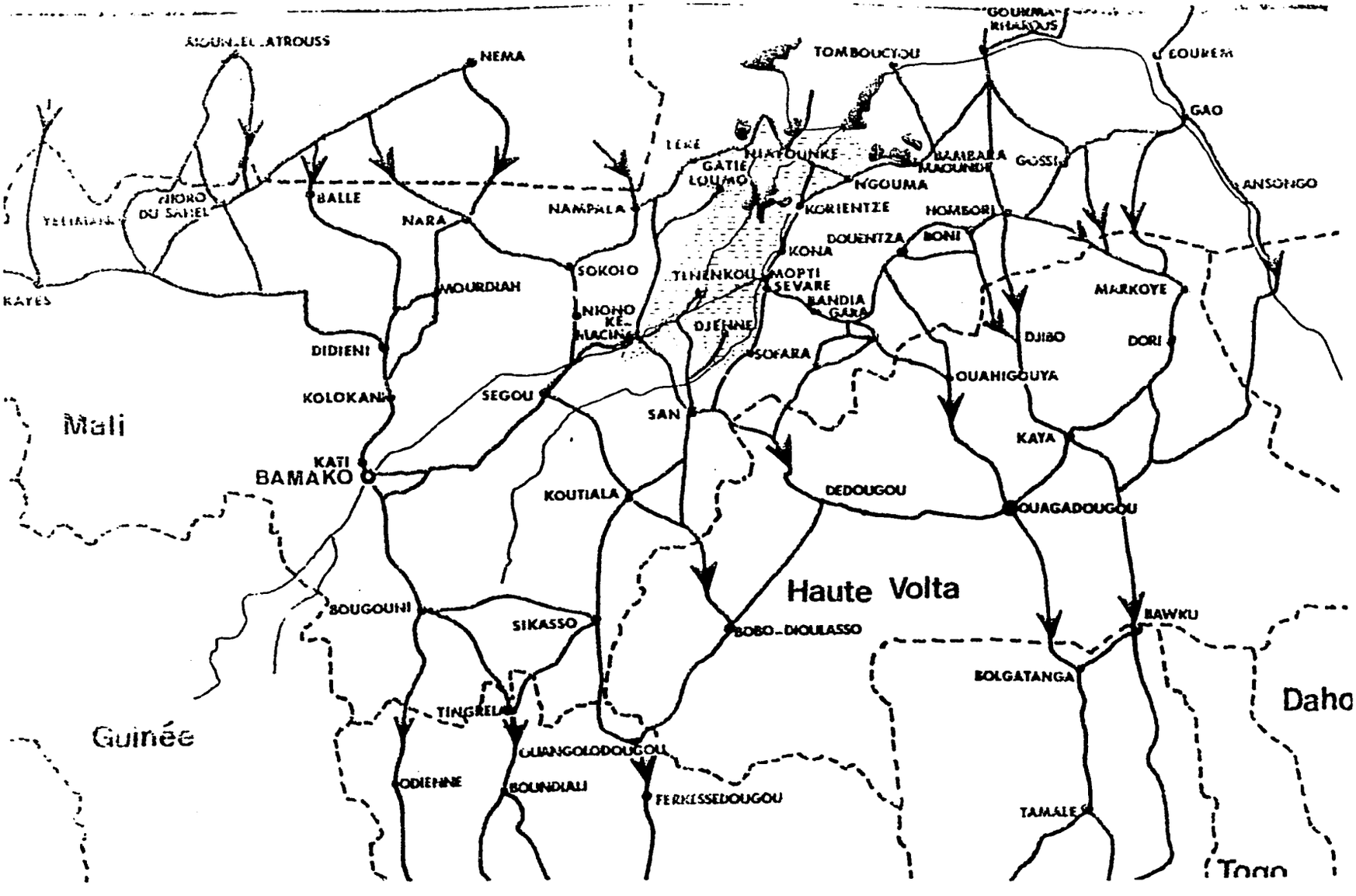
[55]See Appendix Table A-16 for data on monthly presentations and sales in some of the largest markets in 1971 and 1972.

[56]The fact that cattle and their owners are together is probably an important reason for the high level of sales in the Delta region at this time of year. During much of the rest of the year, the cattle are likely to be put in the charge of herders far from the pastoralists' villages. Jean Gallais, Le Delta Intérieur du Niger; Etude de Géographie Régionale, Dakar: IFAN, 1967, Vol. II, pp. 385-90.

MAP B

Principal Cattle Routes within Mali



and others continue on to the coastal countries. A second important route is that which starts in the extreme eastern part of Mauritania or in Mali to the northeast of the Delta. Cattle are moved from there via the Niono or Ke-Macina markets either to Bamako or, in greater numbers, to the Ivory Coast. Those going to the Ivory Coast are usually trekked to the railway at Bobo-Dioulasso or Ouangolodougou, from which they are shipped by train to the consumption centers further south. To the east of the Delta, cattle are formed into convoys at N'Gouma, Kona, and Fatoma (near Mopti) for their trek to Upper Volta, from which they either continue towards Ghana or are shipped by rail to the Ivory Coast. Finally, cattle to the northeast of the Delta are either trekked in relatively small numbers via Ansongo to Niger, and probably ultimately to Nigeria, or go in larger numbers to Upper Volta and on to Ghana.

The relative importance of these routes can be estimated by considering the number of cattle officially presented in all the markets of each region. These figures are given for 1967 through 1970 in Appendix Table A-15. On average there were about 150,000 head per year presented in the Bamako region, 35,000 head in the Ségou region, 200,000 head in the Mopti region, and 60,000 head in the Gao region. Although many of these animals were not sold and some may have been sold more than once, we still have a rough idea of the relative level of activity in each region. From these data and from the less complete figures on official movements, it is possible to estimate very roughly the number of head passing along each major export route. The estimates are given in Table 12.

TABLE 12

Estimated Number of Cattle Exported per Year by Origin, Principal Route, and Destination (head)

Origin	Principal Route	Destination	Number
Mauritania	Bamako	Ivory Coast	15,000
Mauritania	Ségou	Ivory Coast	10,000
Mauritania	Bamako	Liberia	1,500
Mali	Kayes	Senegal	2,000
Mali	Bamako	Liberia	8,000
Mali	Bamako, Sikasso-Tingrela	Ivory Coast	20-25,000
Mali	Sikasso-Ferkessedougou	Ivory Coast	50,000
Mali	Bamako-Odienné	Ivory Coast	5,000
Mali	Mopti, Koutiala-Bobo Dioulasso	Ivory Coast	30-35,000
Mali	Gourma, Gao, Mopti-Markoye, Puytenga	Ghana	30,000
Mali	Gourma, Gao, Mopti	Upper Volta	20,000
Mali	Gao	Niger(Nigeria?)	15,000

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, pp. 45-46.

Although not indicated in the table, one of the most important changes which has occurred in recent years has been the shift of cattle away from

the routes passing through Upper Volta and toward especially the route through Sikasso and Ferkessedougou.[57] One reason has been the decline in relative importance of the Ghanaian market. Another has been the transit tax of 1520 Malian francs per head imposed by Upper Volta, as well as long delays in waiting for railcars for shipment to the Ivory Coast.

The number of cattle collected by a single trader, primarily in the marchés de regroupement, for the trek south will depend on the amount of capital he has available. Several traders may place their herds together, however, in a single convoy of 50 to 150 head, depending on the length of the trek and on the size of the market of destination. The time required to form a convoy varies, but it may easily take up to a month.[58] Six year old steers are preferred for these convoys since they are better able to withstand the long journey to market than are younger animals and cull cows, which are more frequently purchased for local slaughter. Payment to the seller, who is usually another trader who has purchased the cattle in a marché de collect or smaller marché d'elevage, is usually made in cash, as were payments made earlier to the herder. Frequently, transactions are effected via an intermediary, who is a witness to the legitimacy of the sale and testifies that the animals are neither stolen nor diseased and that the price is reasonable. In addition to finding a buyer, this broker may also house and feed the seller while the transaction is being completed. For these services the broker receives a commission of from 200 to 1000 Malian francs. In all, there may be five or six traders and intermediaries involved between the initial purchase from the herder and the time when the convoy is ready to proceed southward.

Once formed up into convoys the cattle begin their trek to market. During this trek they average from 25 to 30 kilometers per day. There is weight loss, related both to the length of the trek and to the climatic conditions en route. This is due both to inadequate pasture and water and to the incidence of trypanosomiasis once the convoy enters the tsetse fly zone. There is little information, however, on the extent of this loss. The team was informed by traders in Ségou that with good herders who know the route cattle may arrive at the railway station in Bouaké in as good condition as when they left Mali. Others have estimated the loss at about 10 percent. In addition, there may be losses due to the death or forced sale of weaker animals, though these are generally thought to be only about 0.5 percent.

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[57] It has been estimated that in 1967 there were about 50,000 head of Malian cattle which passed through Upper Volta on their way to the Ivory Coast. This contrasts with the 30-35,000 head shown in Table 12. FAO and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest.

[58] Dwight R. Bishop, Livestock and Meat Marketing Patterns and Costs in the Entente and Adjoining Countries, Final Report, Economic Community for Livestock and Meat, Council of the Entente, Ouagadougou: September, 1972, p. 15.

Because of this weight loss, which is especially severe from trypanosomiasis once the cattle enter the forest zone in the south, many cattle are not trekked all the way to Abidjan but rather are shipped by rail from various points in Upper Volta or the northern Ivory Coast. The two major loading points for Malian cattle, Bobo Dioulasso and Ouangolodougou, handle annually about 10,000 and 20,000 head respectively. Other cattle are loaded at Bouaké for shipment to Abidjan. There are frequent complaints concerning the inefficiency of the railway in handling cattle and the delays of 15 to 30 days waiting for cars to be available. Because cattle receive no food or water while loaded, moreover, the increase in the average time required to move a cattle car from Ouagadougou to Abidjan of from two days in 1967 to four days today has resulted in substantial losses. There is some indication, as a result, that traffic has declined in recent years.[59]

In 1967, it was estimated that seven percent of the cattle going from Mali to the Ivory Coast were transported by truck.[60] There is some indication that this proportion is increasing rather rapidly, especially during the dry season when prices are higher, weight loss is more critical and roads are in better condition. Because of its relatively high cost, however, truck transport appears to be confined at present to higher quality animals. Most cattle are hauled in general purpose trucks which hold about 10 to 15 head apiece. There may be considerable bruising en route. There are also long delays at the frontier for sanitary inspection and the payment of customs duties as well as delays in various towns for the payment of unofficial charges.

The principal terminal markets are Abidjan and Bouaké in the Ivory Coast and Accra and Kumasi in Ghana. Transactions are effected via an intermediary and frequently on credit. Delays in receiving payment may be considerable because many of the smaller butchers do not have sufficient operating capital.[61] As in Bamako, the wholesale sector is not well developed.

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* [59]Bishop, Livestock and Meat Marketing Patterns and Costs in the Entente and Adjoining Countries, pp. 10, 11. It is estimated that perhaps as many as 4 out of 27 head per car may die en route in addition to the weight loss of those which survive the trip.

[60]FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest.

[61]It has been claimed by Bishop, Livestock and Meat Marketing Patterns and Costs in the Entente and Adjoining Countries, p. 17, that cattle merchants in Abidjan must "...wait several months before receiving payment..." This may be an exaggeration. Traders in Ségou informed the team that the period required for repayment in Abidjan was 10 to 40 days.

Regional Price Variation and Distribution Costs

In order to evaluate the state of efficiency of the distribution network, it is necessary to have some information concerning regional variation in prices. For its study of the OMVS countries, SEDES conducted surveys and estimated average prices for different categories of cattle in numerous markets. These estimates are presented in Appendix Table A-17 for 19 Malian markets as averages during the period July, 1971 to June, 1972. By converting these estimates to prices per unit of carcass weight and by utilizing similar data for other West African countries, it is possible to establish roughly a series of isoprice lines for each category of animal. Map C shows these lines for a steer of 150 kilograms, where prices are averages over the year and are measured in terms of CFA francs per kilogram of carcass weight.

As can be seen from the map and from an examination of the table, there is a reasonably orderly upward progression of prices from north to south. There is also a tendency for prices in Bamako to be somewhat higher than would be expected from its latitude, but this is due to its importance as a consuming center. In general, the price per head of a first quality steer varies from about 32,000 Malian francs in the north to about 44,000 francs at the Ivory Coast frontier. The same steer will, in turn, sell in Abidjan for about 60,000 francs.[62]

Seasonal price variation throughout West Africa is due more to changing supply conditions than to fluctuations in demand. In general, prices per unit of carcass weight, which may vary in Mali by as much as 30 to 40 percent over the year, are lowest from October to March and rise to a peak in July and August. This is due to the weight loss towards the end of the dry season and to the migration of herds away from markets during the transhumance. Price fluctuations in the coastal countries are less severe, perhaps 15 to 20 percent, probably because of some absorption by cattle merchants of Malian price fluctuations in their profit margins.

Data on the cost of transporting cattle on the hoof or by other means from the producing areas to the centers of consumption are fairly fragmentary but have been brought together in the SEDES study for OMVS. In addition, there are scattered data from other sources, as well as some information gathered by the team. Nevertheless, there remain a number of questions which should be the subject of a further study.

Aside from the actual purchase price, other collection costs include a market tax of 100 to 200 francs and a broker's commission of perhaps 400 francs. In some cases the merchant will have someone else collect the cattle in his absence, and for this service he might pay 1000 MF per head. Direct transport costs include the herders' wages of about 200 francs each per day as well as the cost of their food and return trip. The number of herders required varies with the type of transport used and the breed of cattle. The relatively docile zebu require two herders for over 30 and up to 100 head when walking. The 10 to 15 head on a truck, however, will by themselves require one herder, as will the 20 to 27 head loaded on a railroad car. Taurus cattle in general require more herders. In addition, there are esti-

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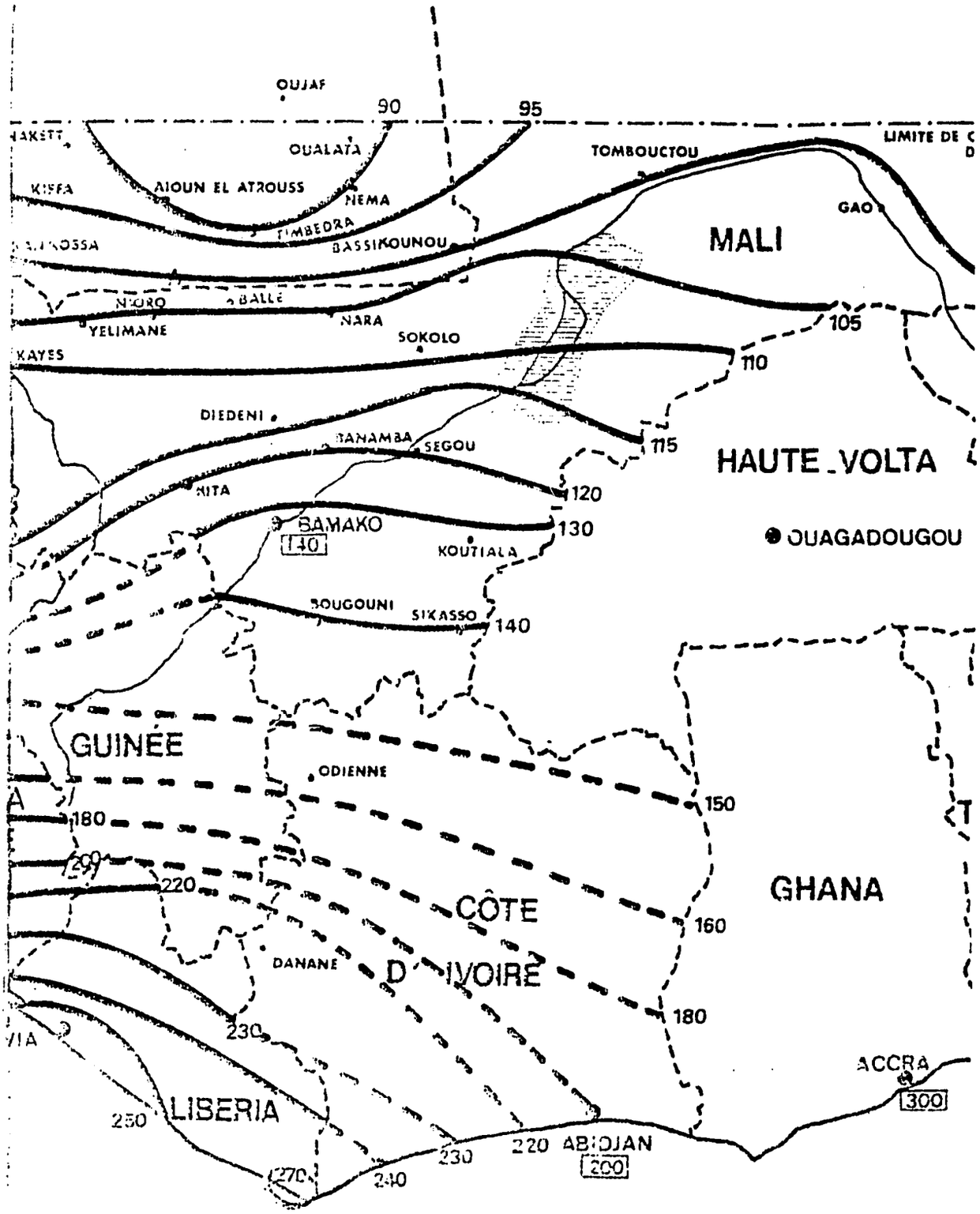
[62] The price of 300 CFA francs per kilogram of carcass weight indicated on Map C for Accra, which is equivalent to 90,000 Malian francs per head, is due to the very high taxes imposed in Ghana.

MAP C

Isoprice Curves of First Quality Steers, 1971-72



mated losses and forced sales of 0.5 percent as well as weight losses which vary with the means of transport. These have been estimated very approximately at about 10 percent, the precise figure depending on the distance traveled. Miscellaneous amounts are also paid for crop damage and various minor charges assessed along the route. Finally, at the market of destination there is a broker's commission and subsistence for the herders to be paid as well.

There are also numerous taxes on the movement of cattle.[63] There are, for example, several taxes on cattle imports into Mali, which differ according to the region of origin. Since nearly all imported cattle originate in Mauritania and since that country has joined in an accord with Mali eliminating all taxes on cattle imports, this source of taxation is negligible. Furthermore, there is no transit tax on Mauritanian cattle moving towards the coastal markets, though in order to benefit from this provision the Mauritanian export tax of 1000 MF must have been paid. Certificates of health must also be obtained and a processing fee of 150 MF is assessed.

The export tax rate on live animals has changed frequently in the past. In February, 1973 it was 3500 MF per head. There is also a statistics tax of 2 percent, or 800 MF for an animal valued at 40,000 MF, a sanitary tax of 300 MF, and a tax of 100 MF which helps to pay for the operations of OMBEVI, the agency charged with central coordination of the livestock industry. In addition, the exporter must obtain an export license as well as have a trading license. The latter costs a minimum of 30,000 MF per year, and can cost much more. The precise type of trading license required and the license fees and direct taxes which are required to be paid are ambiguously defined and need to be investigated further if the profitability of the commercial sector is to be adequately assessed. As noted earlier, however, one aspect of the existing laws and rules which seems clear is that net profits are gained not only from the cattle trade directly, but also from the import licenses acquired by virtue of the EXIC procedure.

Other costs are those of the cattle merchant himself, who must travel to various markets and pay for his food and lodging. In addition, there is the cost of the capital tied up between the time of purchase and that of sale. The opportunity cost of this capital has been estimated at an annual rate of 20 percent. This may be either an implicit rate earned on the trader's own capital or an estimated cost of capital borrowed elsewhere. In addition, there is the cost of capital resulting from the delay in payment after the sale has been concluded.

Detailed estimates of the cost of transporting catttle within Mali and from Mali to the coastal markets are given in Appendix Table 18. Summary data from that table are presented in Table 13. The relative

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[63]The description given here is summary in nature. For a more complete discussion see FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, pp. 206-16.

TABLE 13

Relative Shares of the Final Sales Value
of Cattle in Various Markets
(%)

Market Route	Relative Shares		
	Purchase Price	Commerical Cost	Commercial Profit
Adel Bagrou-Segou-Ferkessedougou-Abidjan	60.0	27.5	12.5
Adel Bagrou-Bamako-Abidjan	58.5	32.7	8.8
Niono-Bamako	88.5	11.3	0.2
Nara-Kati	87.1	12.1	0.9
Sevare-Sikasso-Abidjan	59.4	35.1	5.5
Niono-Ouangologougou-Abidjan	61.3	35.3	3.4
Mopti- Bobo-Dioulasso	75.9	31.4	-7.2
Mopti-Paga	68.1	35.2	-3.3
Gao-Bawku	62.2	36.7	1.1

Source: Appendix Table 18.

importance of value added in the commercial sector varies with the distance of movement, but is generally less than 40 percent of the value of final sale. The actual cost per ton of carcass and offals transported per kilometer is relatively constant, varying only between 52 and 78 Malian francs.

The most important differences between routes are related to the levels of government taxation. This level is very low for cattle from Mauritania. It is somewhat higher for cattle transported internally within Mali because of the trading license required and, for the largest merchants, because of the tax on profits. Cattle transported from Mali to the Ivory Coast have a very much higher level of taxation imposed on them because of the taxes and license fees required for export, amounting to about 40 percent of value added in the commercial sector. Even higher taxes are assessed on cattle going to Upper Volta because of the health tax, import duty, and transit tax of that country. Finally, the taxes assessed on cattle imported into Ghana are such that they constitute over 60 percent of value added in the commercial sector.

The chief effect of these differences in the rate of taxation is to cause important price variations in the different areas of consumption. The most notable instance is in Accra where the price of cattle is 50 percent greater than it is in Abidjan, which has no import tax on live animals. From this observation and from the fact that the level of commercial profit varies much less than does the level of taxation, it is concluded that the various taxes are passed forward to the consumer or backward to the producer and do not come primarily out of the profits of cattle merchants. This is consistent with the existence of a high degree of competition within the commercial sector. The competitiveness of this sector is also indicated by the very low level of profit which appears to exist in the sector, though this

level of profit may be artificially low in the case of Malian cattle due to the offsetting advantages gained in obtaining import licenses through use of the EXIC procedure.

The extent to which taxes are passed forward to the consumer, on one hand, or passed backward to the producer, on the other, is difficult to evaluate in the absence of any estimates of the relevant demand and supply functions. Insofar as the supply of cattle is relatively inelastic because a large part of sales are made for purposes of paying taxes, a bride price, or some other specific target and, at the same time, the demand for beef is very elastic, most of the burden of taxation would be passed back to the herder. There is considerable evidence, however, that this is not the case. First, herders appear to respond positively to price changes.[64] Second, since there are several countries which purchase cattle from Mali, the supply curve facing each is more elastic than the supply function for Mali as a whole. At the same time, since Mali is the dominant supplier in the region, the demand curve facing Mali is less elastic than if there were several other major suppliers. Thus at least part of the taxes assessed by Mali must be passed forward onto the consuming countries. At the same time each consuming country acting individually is unlikely to change the prices paid for Malian cattle very much and, consequently, its consumers must absorb the largest part of the taxes which it assesses, as is clearly indicated in the case of Ghana.[65] In summary, then, although we do not have the data necessary to make a definitive statement, there is a strong expectation that the incidence of taxes assessed by Maliand by the consuming countries on Malian cattle is more likely to favor Mali than those countries.

This expectation is supported, furthermore, by other evidence. In the instance of one alternative supplier, Mauritania, the much lower taxes assessed by that country on its own cattle exports result in higher profits than those earned from the sale of Malian cattle. This has led to a rapid increase in Mauritanian exports and to the fraudulent marketing of Malian cattle as if they came from Mauritania. The increase in exports to Mali's chief markets is likely to be limited, however, by the smaller size of the Mauritanian herd and by the growth of its alternative market in Senegal. Consequently, the diversion to alternative sources of supply resulting from the relatively high rate of export taxation in Mali is likely to be short-lived. At the same time, the very low or negative profits on the transport of cattle to Upper Volta and Ghana are causing the diversion of cattle from these markets to the Ivory Coast despite the much higher prices which exist in Ghana. This indicates the existence of a relatively high elasticity of supply of Malian cattle to these markets.

That Malian taxes on cattle exports are partially passed forward to the consumer is also probable because of the relatively low profitability of selling to the domestic market in Bamako or Kati. This low profit level

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[64] Gallais, Le Delta Intérieur du Niger, Vol. II, p. 411.

[65] This would be less true for the Ivory Coast because of its relative importance as Mali's major customer. As noted earlier, however, the Ivory Coast imposes no import duty on live animals from Mali.

is also due to the officially regulated price for meat, of course, but, as we have seen, ways have been found to effectively charge higher prices. Given the sizeable advantage that export taxes and license fees appear to offer the domestic market, the comparatively favorable profit opportunities which persist in the export trade to the Ivory Coast are an indication that these costs are passed on to the consumer.

With respect to the relative costs of transportation by trek, truck, or train, shown in Table 14, there are several observations which might be made. First, the actual transport coast of walking cattle are rela-

TABLE 14

Costs of Alternative Means of Transporting Live Cattle
(MF per ton of carcass and offals per kilometer)

Transportation Mode	Cost of Transport	General Cost	Cost due to Weight Loss	Total Cost
Trek	12-20	20-38	18-38	50-96
Truck	40-74	10-24	10-20	60-118
Railroad	20-26	16-34	10-20	46-80

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, p. 146.

tively low, but the cost when this method is used of tied-up capital and of lost weight are high in relation to transportation by truck or railroad. Secondly, although the cost of truck transport is relatively high, it is also quite variable and can be fairly low when trucks are available and cattle can be used as return freight. Finally, transportation by railroad is relatively inexpensive, but there is some weight loss, cattle must be walked long distances to the railroad, and delays may outweigh other advantages.

Most cattle are transported today by a combination of trek and the railroad, truck transportation being used primarily for the heavier animals. There has been an increase in the use of trucks in recent years, however, especially when demand in Abidjan is relatively great and during the dry season when grazing along the trek routes is relatively poor. As roads improve and traffic increases, moreover, it is likely that trucking costs will decrease. In addition, an important part of the cost of trucking cattle is the delays and requirements to pay unofficial charges along the route.[66] If these could be eliminated, trucking could become more profitable. Finally, trucks have a distinct advantage over the railroad in their greater flexibility with respect both to timing and location. As cattle prices continue to increase and the commercial sector becomes more

[66]The team was told by cattle merchants in Ségou that these charges amount to 25,000 to 30,000 MF per truck. This may be compared with actual freight rates of 30,000 to 75,000 per truck.

thoroughly developed and integrated, it is expected that the more skillful cattle merchants will be able to use this flexibility and speed to take increasing advantage of profitable opportunities.

Evaluation of the Efficiency of the Commerical Sector

It is important to evaluate the relative efficiency of the existing commercial sector in order to decide whether it can be expected to respond reasonably well to increases in cattle prices and the potential for increased production or whether important government interventions are required. In the extreme case wherein the traditional commercial sector is judged to be totally inefficient, monopolistic and unresponsive, the government might consider promoting the development of a wholly new distribution network. The experience of Mali in this direction in the past has not been favorable, however, and the current thinking is that the government should try to regulate and to determine the general direction of growth of the commercial sector but not compete with it.[67] This still leaves the question, however, of the extent of need for influence and control.

One of the things to consider is the question of whether there are too many or too few traders in the sector and the degree of concentration which exists. Frequently it is said that distribution is inefficient because of the large number of times that an animal changes hands, with a markup being applied in each case. On the other hand, some people claim that there is a substantial degree of monopoly power concentrated in too few hands. While we have no data on the actual degree of concentration which exists and little information on the number of times an animal is bought and sold, there is a substantial amount of indirect evidence which supports the view that the sector is quite efficient and without substantial monopoly power.

First, while there is a certain degree of concentration of activity in the hands of the larger cattle merchants in the major markets and along the major routes, the size of these markets and movements is such that the total numbers of merchants must be relatively large. The very multiplicity of routes and markets, then, implies a considerable degree of competition even if each market were to be totally monopolized by a small group of traders. In order to form some estimate of the number of traders moving cattle south, we assume that each herd is comprised of 100 head and that the average length of time required to complete the trip and turn over capital is at least two months. This is a conservative estimate which supposes that collection is left to intermediaries and that the delay in payment is not more than thirty days. Under these conditions a trader could export a maximum of six herds or 600 head per year. With about 190,000 head being exported in total, this implies that there are over 300 such merchants. In fact, the number must be much greater since few can turn over their capital that rapidly and most send smaller herds south. A figure of 1000 merchants engaged in exporting cattle is probably not far from the truth, though there would undoubtedly be some concentration in the scale of operations among these.

[67]This is a fundamental departure from the policy of the previous administration, which, through the state corporation SONEA, sought to manage directly the slaughter and distribution of meat. The successor to SONEA, SOMBEPEC, has a very modest role and an uncertain future, except perhaps in developing an export industry for high quality refrigerated meat.

The fact that there are at least several hundred cattle merchants transporting cattle outside Mali implies that there is probably not much monopoly power at this stage of the distribution network, but it says nothing about other stages. In particular, there are two points at which a relatively high degree of monopoly power might be exercised. One is in the initial purchase of cattle from the herder in relatively small markets which are isolated by distance and poor communications. The other is in the provision of capital to the cattle merchant.

With respect to the smaller markets there is little reliable evidence concerning the number of traders to whom the herder has access or the degree of knowledge of prices and other market conditions on the part of the herder. It has been pointed out, however, that transactions are frequently conducted via a broker in whom the herder has confidence and who has access to much better information than does the herder himself. In talking with cattle-owning farmers near Segou, moreover, the team was informed that it is possible to deal with several traders at a time, even though there is no true local cattle market, in order to ensure that a just price is received. The very infrequency of visits by specific traders to each small market, moreover, seems to preclude effective collusion among them.

It appears that a degree of monopoly power may more likely be exercised in the larger markets. In the Kati market, for example, there frequently are no more than 10 merchants conducting trade at a time. The team was told, in fact, that traders coming from the north frequently sell their cattle before arriving at Kati in order to avoid the monopoly practices there. The very capability of doing this, however, must act as a powerful constraint on the use of that power. The absence of important physical infrastructure in the market acts, it seems, to limit the degree to which collusion can be effective since traders can always conduct their business elsewhere.[68] In fact, the main reason why large markets develop in fixed locations is that this promotes the spread of information concerning the prices, quality, and quantity of cattle being sold and helps to lower transactions costs. Both of these will not occur if there are strong monopoly elements present.

With respect to the provision of capital, the degree of concentration and monopoly power may be greater. Although the system of informal credit which exists in Mali is not well understood, it is clear that there are large merchants not specialized in the cattle trade who provide official documents and credit to the smaller traders engaged in the export of cattle which enable the latter to pay cash for their purchased cattle. These large merchants, acting as bankers to the system, gain not only the interest on their capital but also access to import licenses under the EXIC system. It may in fact be the need to finance exports in order to acquire these licenses, rather than the return on their capital invested in cattle, which is more important. In any event, we have no information on the numbers

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[68]This was the case during the 1960's when severe government controls were placed on existing market activity, and merchants responded simply by shifting the location of the markets.

of merchants involved, the rates of interest charged, or the profits resulting from the acquisition of import licenses, so it is presently impossible to assess directly the degree of monopoly power practiced. The one thing that can be said is that whatever degree of monopoly exists is strengthened by the very severe credit restrictions imposed on the private sector by the government.

There is, however, information concerning the charge for credit made by cattle traders to butchers. Substantial agreement exists that in order to buy on credit for a period of up to 30 days in Mali, the butcher must pay 3000 to 5000 Malian francs for an animal costing 25,000 to 45,000 francs. This amounts to an annual rate of interest of well over 100 percent. There are, however, substantial risks involved. First, there is the risk of default owing to the butcher's precarious financial position. Since the very largest butchers usually pay cash and since the profession is otherwise generally characterized by a large number of butchers each operating on a small scale, this risk is considerable. Secondly, there is the risk of loss due to the seizure of animals for health reasons, a risk born entirely by the trader. Finally, there are relatively high transactions costs associated with the financial arrangements made for small numbers of cattle and the cost of collecting debts. Whether, in the absence of monopoly power, all of these factors would justify the high rate of interest charged cannot be determined definitely without further study.

The evidence that we do have, however, indicates that this rate of interest is not inappropriate in a competitive market. In Appendix Table A-18 the value estimated for butcher credit is between 400 and 1600 Malian francs, corresponding to between roughly a 30 to 50 percent rate of interest. This is well below the rate of interest noted here and, given the risks of default and seizure as well as transactions costs, is probably an under-estimate of the opportunity cost of capital.[69] Yet the commercial profit per head of cattle transported after deduction for these interest charges, varies between only + 7000 and -3000 francs. Given the risks associated not only with the granting of credit to butchers but also with all other aspects of the operation, this would appear to be a small premium indeed, and the monopoly profit, if it exists, cannot be very great.

Consequently, it appears that the commercial sector is not characterized by a significant degree of concentration or of monopoly power. On the contrary, it appears to be so highly competitive that net profits are hardly sufficient to compensate for the substantial risks of price fluctuations, exchange controls, weight loss, forced sale of animals, seizure by health authorities, etc. This raises the question, then, of whether there are not

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[69]One reason why this may be an underestimate is that interest charges are frequently absorbed in the sale price and are not explicitly differentiated. The team was informed by traders in Segou, for example, that they receive in Abidjan the same price for their cattle whether payment is in cash or on credit but that cash is always paid when cattle are in short supply and credit is granted when there is a temporary glut on the market. The presence or absence of credit, in this case, is thus a substitute for short term price fluctuations.

too many small cattle merchants and whether profits are not low because cattle change hands too frequently.

Although there may be 5 or 6 traders and intermediaries between the herder and the merchant who moves the cattle south to the coastal countries, once the convoy is formed, it remains in the same hands until it arrives at its destination and is sold. Consequently, the profit shown in Table 13 and Appendix Table A-18 is that resulting from the operation of a single trader or group of traders banded together in a convoy. The only others who may play a commercial role are the intermediaries and traders who may be charged with collecting cattle in the exporter's absence. In each case, however, these individuals fulfill important roles. That of the intermediary has already been discussed. He is a vitally important witness and collector of information in markets which may be frequented by each merchant only several times a year. This is not sufficiently often to know the reputation of other traders or butchers with whom they must negotiate or the prices of various categories of cattle which change markedly over the year. In addition, it appears that herders, merchants, and butchers are free to deal directly with one another if they have sufficient market information that they wish to do so. In the Kati market, this was true, for example, of a merchant who exported by truck and thus had a relatively short turn-around time and of a large butcher who bought in the market weekly from traders traveling less than 400 kilometers and whom he knew personally.[70] The same freedom of choice exists with respect to where cattle are purchased. Both butchers and exporters indicated frequently that they were reluctant to go directly to the primary markets because it was too time-consuming or too much trouble.

In summary, there is little evidence that there are too many traders and intermediaries operating in the commercial sector. On the contrary, whenever a particular trader or butcher was asked why he did not bypass one of the stages of the commercial system, he usually cited the importance of the function fulfilled by someone at that stage.

There are a relatively large number of people involved in moving each animal from herder to consumer because of two major factors. First, the commercial network covers a huge, sparsely populated area, which, together with a poorly developed communication and transportation infrastructure, impedes the dissemination of market information and requires that cattle merchants spend a considerable portion of their time traveling between markets. Second, there are advantages in the division of labor and differences in the opportunity cost of the time of various merchants and intermediaries. As a result of these conditions, an exporting cattle merchant, for example, is likely to specialize in acquiring a knowledge of price differentials in coastal and interior markets, the relative costs of different modes of transportation at different times of the year, official and unofficial procedures he must follow en route, etc. He can

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[70]On the other hand, the largest butcher in Bamako, who was thinking of buying directly in some interior markets which he did not know well, said he would do so only via an intermediary.

hardly at the same time maintain an intimate knowledge of local price conditions in each market or the credit worthiness of several hundred butchers in Abidjan. Nor will it likely pay him to spend days on the road travelling between small primary markets collecting a herd large enough to export.

In the past, the commercial system has shown itself to be remarkably adaptable. In May, 1971, for example, foreign merchants were restricted from selling their cattle in the interior of Ghana but were able to shift quickly to the Ivory Coast market. The system is able to grade and sort animals and to make rapid adjustments in the quality of cattle sent to various markets. It has been observed, for instance, that the main problem for the Bamako consumer in the face of a fixed official price for meat which does not rise with the price of cattle at the end of the dry season is not one of absolute shortages but of a deterioration in the quality of animals slaughtered. Finally, the commercial sector has responded to rapidly rising prices in recent years by passing all of those increases back to the herder. Such evidence as exists indicates that there has been no change in the absolute size of commercial margins from 1967 to 1972 despite the increase in prices and almost certainly in costs as well.[71]

In view of the apparent efficiency of this sector and its ability to respond quickly in the past to changing conditions, it is not easy to find ways in which the government can intervene effectively to improve it. Some immediate measures are, of course, obvious. Transportation costs could be lowered, for example, if customs and health formalities were simplified and if informal restrictions and assessments were eliminated. The Entente Livestock Community, of which Mali became an Associate Member in November, 1972, will hopefully make some progress in this direction. In addition, the paving of major roads from the producing areas to the coastal markets will cut some of the costs of truck transportation. This is going forward and should be completed, at least between Mali and the Ivory Coast, within a few years. Finally, any increase in the official price of meat which might be made in either the Ivory Coast or in Mali will facilitate the development of wholesale trade, permit butchers to accumulate capital, and substantially decrease the cost and delays involved in credit transactions.

Beyond this there are a host of suggestions to provide more market infrastructure, improve stock routes, provide price information and quality standardization services, organize meat trade associations and official meat markets, improve the collection of statistics and taxes, provide better control of health conditions, etc. These projects are likely to result in improvement where a specific need has been clearly identified after careful study. At the same time, however, there is the danger that excessive efforts to control and organize the commercial sector will actually inhibit its development by diverting cattle from existing markets, and thus be self-defeating.

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[71] FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Part II, p. 113.

Nevertheless, in the long run the participation of the rest of the Malian economy in the development of its livestock sector probably demands a greater role of government in the distribution network. If the government is to finance public investment and increase its operating expenditures in this sector, then it clearly will want to effectively tax the sector as well. In most countries with rapidly expanding exports of primary products, the government has based its development program primarily on the resources acquired from the export sector. The Ivory Coast is an excellent case in point. The most obvious way of doing this in Mali is via its export tax, part of which is not even effectively paid by Malians but is passed on to the consuming countries. The disincentive effect which this tax has on commercial activity is probably not great because of the highly competitive nature of the commercial sector and of the relatively price-elastic supply of inputs into that sector. There may be some incentive created by the export tax for the herder to avoid marketing his cattle, but we know very little about this. Undoubtedly, there is also a decrease in the quantity of meat consumed because of the tax, but if the price elasticity of demand is less than unity, prices will have increased to such an extent due to the tax that the value of sales is greater with than without the tax. Even if demand is elastic, there is a gain to Mali from the export tax resulting from higher prices in the consuming countries.[72]

The major problem with the export tax, as note in Part I of this report, is that of evasion. Only about one half the number of cattle actually exported are currently taxed In order to decrease this rate of evasion, the government will have to have better information and control of cattle movements. One possibility being discussed within the Entente Livestock Community is the use of a passport system for cattle traded between countries. This would require the cooperation of consuming countries, and for that they will probably want the export tax rate reduced. Nevertheless, there may still be a gain for Mali if more cattle can be taxed. In any event, the long-term benefit from greater government control of the distribution network is likely to be a greater willingness on its part to invest in the development of the livestock sector.

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[72]The only instance in which there would be no gain to Mali is if demand for its cattle exports were perfectly elastic with respect to price. This is clearly not the case. There is some tax rate, however, at which Mali's gain is a maximum, and this depends, among other things, on the elasticity of demand for its exports. Beyound that rate the gain will be less as the tax rate is increased.

APPENDIX TABLES

TABLE A-1

Cattle Population Estimates of Service de l'Elevage, 1954-1971

(000,000 head)

Year	Population	Year	Population
1954	3.076	1963	4.262
1955	3.337	1964	4.640
1956	3.258	1965	4.594
1957	3.260	1966	4.773
1958	3.362	1967	5.213
1959	3.314	1968	5.350
1960	3.513	1969	5.350
1961	3.862	1970	5.350
1962	3.923	1971	4.707

Sources: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, p. 347; Mali, Service de l'Elevage, Rapport Annuel, 1971.

TABLE A-2

Alternative Estimates of Malian Zebu Herd Composition

(percentage)

	1965 Study[a]	Interior Delta[b]	Other Regions[c]
Females			
Cows	38.2	36.1	36.0
1 to 2 Year Old Heifers	23.2[d]	15.7	18.4
Calves	9.5	10.2	10.6
Total	70.9	62.0	65.0
Males			
Oxen/Bulls	6.0	15.6	11.8
1 to 2 Year Old Males	13.7[d]	12.5	12.7
Calves	9.5	9.9	10.5
Total	29.2	38.0	35.0

Notes:

[a] Estimates of Lacrouts, Sarniguet, and Tyc based on a theoretical model assuming the following parameter values:

Cow's age at first calving: 4 years; fecundity rate: 65%. Mortality of calves during first year: 30%; of heifers and young males during second year: 5 to 10%; of adults: 2% per generation.

TABLE A-2 Continued

Sales of males during second year: 10%; during third year: 30%; during third through eighth year: 50% per generation; after eighth year; all remaining.
Sales of cows: 2% of each generation sold as sterile; all remaining sold after 10 years.

This model was consistent both with an observed 3% rate of growth and with the age and sex composition of most Malian herds to the extent to which these could be estimated.

[b] Estimates derived from survey of 26,000 animals by Dr. Coulomb in the Mopti region, slightly modified to conform to a theoretical model with the following parameters:

Cow's age at first calving: 3-4 years; fecundity rate: 65%

Mortality rates:	Males	Females
0-1 years	32%	27%
1-2 years	5%	5%
2-3 years	2%	2%
over 3 years	2%	2%

Sales of each male age group after first year: 10%; after seventh year: higher rates.
Sales of cows after third year: 2% of each age group; after ninth year: higher rates.

This model yields a growth rate of herd size of 3%.

[c] Estimates derived from a theoretical model which yields a growth rate of 2% and assumes that the off-take rate is somewhat higher than in the Interior Delta.

[d] Includes three year olds.

Sources: FAC and Mali, Ministère du Développement, Exploitation du Cheptel Bovin au Mali, Paris: 1965; FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I.

TABLE A-3

Estimation of Beef Production from Zebu Cattle in 1970

	Unit	Bulls/Oxen	Young Bulls	Sterile Cows	Old Cows	Total
Mopti Region						
Off-take Rate	%	4.7	1.4	0.7	4.7	11.5
Number Animals		70,500	21,000	10,500	70,500	172,500
Avg Carcass Wt	Kg	148	65	120	90	112.5
Carcass Meat	T	10,434	1,365	1,260	6,345	19,404
Offals	T	2,609	341	315	1,586	4,851
Total Production	T	13,043	1,706	1,575	7,931	24,255
Other Regions						
Off-take Rate	%	4.5	1.7	1.4	4.1	11.7
Number Animals		135,000	51,000	42,000	123,000	351,000
Avg Carcass Wt	Kg	148	65	120	90	112.3
Carcass Meat	T	19,980	3,315	5,040	11,070	39,405
Offals	T	4,995	829	1,260	2,767	9,851
Total Production	T	24,975	4,144	6,300	13,837	49,256
All Regions						
Carcass Meat	T	30,414	4,680	6,300	17,415	58,809
Offals	T	7,604	1,170	1,575	4,353	14,702
Total Production	T	38,018	5,850	7,875	21,768	73,511

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, pp. 266-70.

TABLE A-4

Estimation of the Value of Production of Beef and Milk

	Produccion (head, liters)	Price[a] (FM/head,/liter)	Value of Production (000,000 FM)
Meat			
For export	190,000[b]	35,000	6,650
For local butchers	89,000[c]	25,000	2,220
Autoconsumption	355,000[d]	20,000	7.100
Herd growth	136,450[e]	20,000	2,729
Total	770,450	—	18,699
Milk[f]	230,000,000	15	3,450
Total	—	—	22,149

Notes:

[a] Prices are the same as those used in national accounts estimates.

[b] This estimate of the number of Malian cattle exported is the same as that used in the national accounts. It is, in turn, derived from FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest, Paris: SEDES, 1969.

[c] Obtained by adding estimates of FAC and OMVS, 1973 of all cattle slaughtered in Bamako and in the other towns of more than 5000 inhabitants.

[d] Obtained as a residual after subtracting the number of animals for export and for local butchers from the total off-take of zebu and taurus cattle. This figure also contains any net increase in the total number of animals used in agriculture (numbers purchased as work aniamls minus those slaughtered at the end of their working life).

TABLE A-4 Continued

[e] This was calculated consistent with the rates of growth assumed in estimating herd composition and off-take rates, i.e., 3% for the Interior Delta, 2% for other zebu, and 3.7% for taurus and mixed breeds.

[f] Milk production is taken from FAC and OMVS, 1973, where it was derived as follows:

	Zebu	Taurus & Mixed
Number of Cows in 1970	1,620,000	365,500
Fecundity Rate	65%	75%
Number of Lactating Cows	1,053,000	274,125
Average Production of Milk	180 liters	150 liters
Total Production	189,540,000 liters	41,118,750 liters

Sources: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I; Mali, Service de la Statistique Générale, de la Compatabilité Nationale, et de la Mécanographie, Comptes Economiques du Mali, 1970, Bamako: 1972.

TABLE A-5

Imports, Exports, and Transits of Cattle, 1952-1971

(head)

Year	Imports		Exports		Transits[a]
	Controlled	Estimated[b]	Controlled	Estimated[b]	Controlled
1952	7,066	n.a.	39,202	n.a.	n.a.
1953	6,444	9,000	46,216	66,200	n.a.
1954	8,262	19,000	51,149	75,500	n.a.
1955	9,368	16,000	34,752	63,300	n.a.
1956	17,109	n.a.	30,134	n.a.	n.a.
1957	24,009	n.a.	42,195	n.a.	n.a.
1958	3,426	16,000	44,431	n.a.	n.a.
1959	3,930	n.a.	40,229	88,800	n.a.
1960	n.a.	n.a.	38,237	n.a.	n.a.
1961	3,895	6,000	47,923	104.898	n.a.
1962	3,317	3,500	47,144	82,470	n.a.
1963	3,889	n.a.	64,604	117,074	n.a.
1964	3,200	25,000[c]	80,914	167,000[e]	n.a.
1965	n.a.	n.a.	60,601	120,500	n.a.
1966	14,745	28,000[d]	32,448	156,000[f]	n.a.
1967	6,124	n.a.	43,125	n.a.	21,470
1968	1,516	n.a.	37,393	160,000[g]	22,916
1969	1,840	n.a.	76,453	170,000[h]	29,929
1970	2,630	n.a.	81,718	190,000[h]	27,161
1971	2,064	n.a.	83,384	n.a.	35,924

n.a. not available

TABLE A-5 Continued

Notes:

[a] Until 1967 transits were not distinguished from imports.

[b] Estimates of the Service de l'Elevage.

[c] Of which 10,000 were estimated to be in transit by Lacrouts, Sarniguet, and Tyc.

[d] Of which 8,000 were estimated to be in transit in FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest, Paris: SEDES, 1969.

[e] Estimate of Lacrouts, Sarniguet, and Tyc.

[f] Estimate of FAC and Conseil de l'Entente, 1969.

[g] National accounts estimate for the fiscal year 1967-68.

[h] National accounts estimate for the calendar years 1969 and 1970.

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, pp. 349, 50, and 57.

TABLE A-6

Controlled Slaughter of Cattle and Number of Cattle Presented on the Markets, 1952-1971

(head)

Year	Slaughter Bamako	Slaughter All Mali	Presented All Mali
1952	16,124	35,629	108,222
1953	17,779	40,861	n.a.
1954	18,371	44,211	131,853
1955	19,531	48,538	132,258
1956	21,007	n.a.	142,430
1957	21,666	56,182	209,132
1958	21,134	54,090	223,018
1959	23,345	56,965	n.a.
1960	n.a.	n.a.	n.a.
1961	27,991	65,678	n.a.
1962	n.a.	65,536	n.a.
1963	31,602	72,519	n.a.
1964	35,520	n.a.	n.a.
1965	34,851	n.a.	n.a.
1966	32,868	67,737	n.a.
1967	25,500	59,947	456,755
1968	24,208	63,355	338,647
1969	28,803	79,619	502,801
1970	37,103	78,332	418,147
1971	31,341	73,779	442,080

n.a. not available

Note: Figures for Bamako include those of peripheral markets around that city after 1968.

TABLE A-6 Continued

Sources: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, p. 363, 65; Mali, Service de l'Elevage, Rapport Annuel, 1971.

TABLE A-7

Controlled Exports of Cattle by Country of Destination, 1952-55, 1960-71

Year	Destination							
	Ivory Coast	Ghana	Upper Volta	Senegal	Niger	Liberia	Other	Total
1952	26,207	10,170	n.a.	1,309	--	--	1,516	39,202
1953	27,516	13,430	448	1,879	1,537	--	1,405	46,215
1954	30,140	14,339	960	4,160	--	--	1,550	51,149
1955	18,735	10,613	776	2,994	--	--	1,634	34,752
1960	19,596	10,801	1,346	243	3,463	301	2,487	38,237
1961	24,840	12,221	5,549	--	2,041	2,517	755	47,923
1962	21,985	14,889	3,399	--	1,411	5,400	60	47,144
1963	32,180	21,731	3,075	124	2,740	4,694	60	64,604
1964	54,452	17,964	888	--	1,199	3,658	741	78,902
1965	29,711	24,815	2,220	30	824	2,048	96	59,744
1966	8,063	22,355	466	193	451	866	44	32,448
1967	17,240	23,057	1,305	--	683	840	--	43,125
1968	17,848	18,952	6	192	5	390	--	37,393
1969	30,787	43,853	361	629	133	690	24	76,453
1970	49,561	30,023	37	444	387	1,189	78	81,718
1971	48,725	26,119	n.a.	n.a.	n.a.	n.a.	n.a.	83,384

n.a. not available

TABLE A-7 Continued

Note: 1971 figures are provisional.

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, p. 355.

TABLE A-8

Evolution of Total Imports of Cattle into Ghana and the Ivory Coast, 1961-1970

(head)

Year	Ghana	Ivory Coast
1961	110,400	71,921
1962	96,543	75,858
1963	88,815	79,817
1964	71,890	107,474
1965	61,926	103,198
1966	60,666	101,622
1967	58,325	119,643
1968	46,658	164,758
1969	70,504	172,064
1970	60,735	198,400

Sources: Ghana, Economic Survey, various years; Ivory Coast, Direction de la Statistique, Situation Economique de la Côte d'Ivoire, various years, for Ivory Coast data through 1968; Mali, Ministère de la Production and FED, Projet d'Execution pour la Creation du Centre d'Embouche de Niono, Paris: SEDES, 1972, Appendix VI, p. 6, for Ivory Coast Data for 1969 and 1970.

TABLE A-9

Origin of Imports of Cattle into Ghana and the Ivory Coast, 1965-70

(head)

	Country of Origin					
Ghana	Mali	Upper Volta	Niger	Nigeria	Mauritania	Total
1965	27,320	22,746	4,027	2,125	--	56,218
1966	24,832	25,964	8,527	2,277	--	61,600
1967	22,115	29,292	8,352	2,395	--	62,154
1968	23,944	15,474	5,882	2,109	--	47,409
1969	37,620	18,328	9,684	1,109	--	66,741
1970	20,873	9,333	4,511	117	--	34,834
Ivory Coast:						
1965	34,446	64,828	10	--	1,914	103,198
1966	19,996	44,273	119	--	37,234	101,622
1967	46,063	56,123	718	--	16,739	119,643
1968	67,836	80,566	n.a.	--	16,356	164,758
1969	115,773	49,085	n.a.	--	44,289	209,147
1970	117,624	51,199	n.a.	--	62,286	231,109

n.a. not available

Sources: Mali, Ministère de la Production and FED Projet d'Exécution pour la Création du Centre d'Embouche de Niono, Paris: SEDES, 1972, Appendix VI, p. 86; Ivory Coast, Direction de la Statistique, Situation Economique de la Côte d'Ivoire, various years.

TABLE A-10

Estimation of Projected Demand for Meat

Ivory Coast	1965	1970	1975	1980
Rural				
Population (000)[a]	3,350	3,665	3,960	4,300
Per capita cash consumption (000 CFAF/person)[a]	9.8	12.8	16.7	21.9
Total non-cash consumption (000,000 CFAF)[b]	38,537	40,405	42,018	44,820
Per capita non-cash consumption (000 CFAF/person)	11.5	11.0	10.7	10.4
Per capita total consumption (000 CFAF/person)	21.3	23.8	27.4	32.3
Per capita meat consumption (kg/person)[c]	8.0	8.9	10.3	12.1
Total meat consumption (000 tons)	26.8	32.7	40.8	52.0
Urban				
Population (000)[a]	950	1,435	2,040	2,760
Per capita total consumption (000 CFAF/person)[a]	85.2	99.0	106.9	120.4
Per capita meat consumption (kg/person)[c]	25.0	27.8	29.5	30.0
Total meat consumption (000 tons)	23.8	39.9	60.2	83.8
Total Meat Consumption (000 tons)	50.6	72.6	101.0	135.8

Ghana	1966	1970	1975	1980
Hypothesis No. 1				
Rural				
Population (000)[d]	5,800	6,300	6,800	7,300
Per capita meat consumption (kg/person)[e]	2.6	2.6	2.6	2.6
Total meat consumption (000 tons)	15.1	16.4	17.7	19.0
Urban				
Population (000)[d]	2,150	2,600	3,300	4.200
Per capita meat consumption (kg/person)[e]	8.5	8.5	8.5	8.5
Total meat consumption (000 tons)	18.3	22.1	28.0	35.7
Total Meat Consumption (000 tons)	33.4	38.5	45.7	54.7
Hypothesis No. 2				
Rural				
Population (000)[d]	5,800	6,300	6,800	7,300
Per capita meat consumption (kg/person)[f]	2.6	2.6	5.8	8.9
Total meat consumption (000 tons)	15.1	16.4	39.4	65.0
Urban				
Population (000)[d]	2,150	2,600	3,300	4,200
Per capita meat comsumption (kg/person)[f]	8.5	8.5	18.1	27.8
Total meat consumption (000 tons)	18.3	22.1	59.7	116.7
Total Meat Consumption	33.4	38.5	99.1	181.7

TABLE A-10 continued

Notes:

a
Estimates from Ivory Coast, Ministère du Plan, Plan Quinquennal de Développement Economique, Social et Culturel, 1971-1975, Abidjan: 1971, pp. 79 and 82. Rural per capita cash consumption for 1965 was estimated by extrapolation of 1970-1980 projections.

b
Estimates from 1971-1975 Plan and from national accounts.

c
Base year estimates of per capita meat consumption of 8 kilograms in rural areas and 25 kilograms in urban areas were obtained from M. Lacrouts, Les Problems Généraux Posés par l'Approvisionnement en Viandes de la Côte d'Ivoire, Abidjan: 1966. Projections for 1970, 1975, and 1980 were then based on estimated growth of per capita total consumption and assumed expenditure elasticities of demand for meat of 1.0 in rural areas and .7 in urban centers. These elasticities are close to those obtained from extensive surveys conducted in the Ivory Coast in 1962-1964 and from some Nigerian surveys as well. In line with the results of the household survey conducted in Abidjan, it was assumed that per capita meat consumption in 1980 will not rise above 30 kilograms.

d
Estimates taken from FAC and Conseil de l'Entente, Approvisionnement en Viandes de l'Afrique Centre Ouest, Paris: SEDES, 1969, Part II, p. 144. These are confirmed quite well by the results of the 1970 census.

e
Estimate for 1966 from FAC and Conseil de l'Entente, Part II, p. 144, applied to all years.

f
The estimate for 1966 was applied as well to 1970; the estimate for 1980 is the same as the estimate for the Ivory Coast for 1970; the estimate for 1975 is an interpolation of the estimates for 1970 and 1980.

Sources: See Notes.

TABLE A-11

Average Price per Unit of Carcass Weight of Different Classes of Live Cattle, Official and Observed Prices of Meat with Bones
June, 1971 to July, 1972
(MF/kilogram)

	City							
	Bamako	Nara	Kayes	Nioro	Sikasso	Ségou	Mopti	Gao
Live Animals								
Export Grade (180 kg)	n.a.	220	230	220	290	270	250	220
First Quality (150 kg)	280	210	220	210	280	240	220	200
Average Quality (120 kg)	250	200	200	200	240	220	200	180
Old Cows (100 kg)	240	160	180	160	230	190	130	170
Young Bulls (75 kg)	250	n.a.	200	180	250	210	200	170
Poor Quality (80 kg)	n.a.	n.a.	n.a.	190	n.a.	180	n.a.	160
Average	250	160	180	160	230	190	200	180
Official Price of Meat with Bones	275	120	175	175	150	200	175	200
Observed Price of Meat with Bones								
December, 1971								
Gross	270	182	174	164	206	n.a.	n.a.	186
Net of bones, etc.	366	296	254	252	272	n.a.	n.a.	230
April and May, 1972								
Gross	284	198	n.a.	168	242	198	200	n.a.
Net of bones, etc.	434	306	n.a.	308	366	268	222	n.a.

n.a. not available

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part II.

TABLE A-12

Monthly Controlled Slaughter in Bamako and its Suburbs, 1970-1972
(head)

Year		Number of Animals Slaughtered					Avg Carcass Wgt. (kg/head)[a]
		Young Bulls	Steers	Cows	Calves	Total	
1970	Jan.	257	2,547	326	40	3,170	132
	Feb.	224	2,208	356	21	2,809	n.a.
	Mar.	243	2,501	311	31	3,086	129
	Apr.	341	2,174	312	133	2,960	n.a.
	May	206	1,721	197	56	2,180	124
	Jun.	279	1,649	290	108	2,326	123.5
	Jul.	236	1,702	401	133	2,472	119
	Aug.	358	1,601	512	43	2,514	117
	Sep.	253	1,785	487	37	2,562	125
	Oct.	234	1,919	599	19	2,771	127
	Nov.	229	2,109	494	9	2,841	138
	Dec.	246	1,176	464	19	1,905	132
1971	Jan.	221	1,562	217	17	2,017	125
	Feb.	189	924	122	9	1,244	124
	Mar.	289	761	332	41	1,423	127
	Apr.	266	1,245	476	82	2,069	124
	May	308	2,517	1,530	32	4,387	113
	Jun.	377	641	169	288	1,475	116
	Jul.	345	1,125	414	112	1,996	111
	Aug.	406	1,499	623	117	2,645	123
	Sep.	1,106	2,585	766	---	4,457	122
	Oct.	549	1,818	630	78	3,075	125
	Nov.	453	1,620	442	20	2,535	130
	Dec.	477	1,231	496	34	2,238	124
1972	Jan.	196	1,124	1,051	17	2,388	124
	Feb.	359	1,142	287	27	1,815	128
	Mar.	328	624	378	129	1,459	128
	Apr.	153	1,143	463	51	1,810	133
	May	515	1,177	426	55	2,173	126
	Jun.	494	1,818	806	78	3,196	124
	Jul.	426	1,020	575	54	2,075	126
	Aug.	575	1,163	306	96	2,140	122
	Sep.	1,310	2,001	1,118	155	4,584	127
	Oct.	971	1,535	1,155	210	3,871	132
	Nov.	1,045	1,694	1,031	207	3,977	132
	Dec.	1,618	2,121	1,310	210	6,259	119

n.a. not available

TABLE A-12 continued

Note:

[a] Applies only to Bamako abattoir.

Source: Monthly reports of the Service de l'Elevage.

TABLE A-13

Cattle Prices Observed in the Bamako and Kati-Kambila Markets
(MF/kilogram of carcass weight)

Category	Date				
	Dec. 1971	Apr. 1972	May 1972	July 1972	% Change Jul/Dec
Exceptional Grade (220 kg)	250	n.a.	n.a.	n.a.	--
Export Grade (170-200 kg)	240	265-70	300	320	33
First Quality (150 kg)	230	265	300	310	34
Average Quality (110-120 kg)	220	255	250-75	280	27
Old Cows (100 kg)	180	215-220	250	260	44
Poor Quality	n.a.	210	220	240	--

n.a. not available

Source: Olivier, Vincent, Etudes de Marché de la Viande (Essentiellement Bovine) dans l'Agglomération de Bamako (Ville et Périphérie), SEDES, August, 1972, p. 21.

TABLE A-14

Slaughter of Cattle at the Bamako Abattoir , 1965-1972
(head, kilogram per head)

Year	Head	Avg. Wt. (kg/head)
1965	34,815	110
1966	32,868	100
1967	25,500	100
1968	24,208	128
1969	24,096[a]	128
1970	27,560	125
1971	23,013	122
1972	27,321	n.a.

n.a. not available

Notes:

[a] An alternative figure of 23,721 is also given.

Source: Olivier, Vincent, Etude de Marché de la Viande (Essentiellement Bovine) dans l'Agglomération de Bamako (Ville et Périphérie), SEDES, August 1972, p. 7; monthly reports of the Service de l'Elevage.

TABLE A-15

Number of Cattle Presented in Markets by Region, 1967-1970
(head)

Region	Year			
	1967	1968	1969	1970
Kayes	5,700	6,100	8,800	6,300
Bamako	178,800	66,000	127,800	133,900
of which Kati market	169,000	55,000	115,000	102,000
Sikasso	2,600	5,500	5,700	4,300
Ségou	31,500	31,200	40,000	32,400
of which Niono market	24,300	23,700	31,000	29,000
Mopti	197,700	176,300	242,700	180,800
of which Fatoma market	11,000	14,500	22,100	24,500
of which Kona market	59,000	37,900	67,000	34,100
of which N'Gouma market	---------- estimated 30,000 ----------			
Gao	40,300	53,600	77,900	60,600
of which Ansongo market	6,900	7,100	18,800	10,600
Total	456,800	338,600	502,800	418,100

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part I, pp. 305,06, and 63.

TABLE A-16

Monthly Presentations and Sales, Selected Markets, 1971 and 1972
(head)

		Niono		Douentza		Mopti[a]	
		Presented	Sold	Presented	Sold	Presented	Sold
1971	Jan.	1,731	1,275	6,422	3,211	6,081	4,795
	Feb.	1,464	1,343	4,924	2,461	3,380	2,360
	Mar.	2,857	1,587	8,787	4,393	5,487	4,369
	Apr.	2,447	2,170	8,322	4,160	8,458	6,290
	May	2.107	1,968	9,238	4,619	7,445	5,613
	Jun.	2,293	2,087	6,411	3,205	6,733	4,821
	Jul.	2,978	2,515	5,486	2,742	6,310	4,088
	Aug.	n.a.	n.a.	5,936	2,967	6,989	5,244
	Sep.	5,807	3,604	7,999	3,999	3,945	2,577
	Oct.	3,283	2,731	10,707	5,353	3,218	2,864
	Nov.	4,102	2,570	9,198	4,598	4,632	1,639
	Dec.	4,748	3,435	11,460	5,730	5,070	3,399
1972	Jan.	2,897	1,393	6,586	3,293	3,518	2,278
	Feb.	4,502	2,830	5,112	2,555	4,802	3,001
	Mar.	3,694	2,217	3,419	1,709	6,379	4,565
	Apr.	3,644	2,383	4,059	2,029	6,982	4,700
	May	4,529	3,650	3,531	1,765	17,475	12,289
	Jun.	2,447	2,112	2,941	1,970	21,931	11,750
	Jul.	1,399	1,183	3,439	1,719	8,824	4,908
	Aug.	2,969	1,807	3,435	1,717	7,163	5,990
	Sep.	1,703	931	4,524	2,262	13,268	7,992
	Oct.	3,270	1,670	4,454	2,226	13,131	6,580
	Nov.	3,566	3,253	8,433	1,216	9,820	4,790
	Dec.	6,031	4,384	9,939	4,969	4,975	2,957

n.a. not available

Note:

[a] Includes Fatoma and Kona

Source: Monthly reports of the Service de l'Elevage.

TABLE A-17

Average Cattle Price in the Principal Malian Markets, July 1971 to June 1972
(MF/head)

Market	Category						
	Exceptional Grade (220 kg)	Export Grade (180 kg)	First Quality (150 kg)	Average Quality (120 kg)	Old Cows (100 kg)	Young Bulls (75 kg)	Poor Quality (80 kg)
Kayes	52,800	41,400	33,000	24,000	18,000	15,000	n.a.
Nara	52,800	39,600	31,500	24,000	16,000	n.a.	n.a.
Nioro	52,800	39,600	31,500	24,000	16,000	13,500	13,600
Kolokani	n.a.	45,000	36,000	n.a.	n.a.	n.a.	n.a.
Kati	66,000	48,300	39,000	27,600	22,000	17,250	n.a.
Bamako	n.a.	n.a.	42,000	30,000	24,000	18,750	n.a.
Sikasso	n.a.	52,200	42,000	28,800	23,000	18,750	n.a.
Bougouni	n.a.	n.a.	42,000	30,000	23,000	n.a.	17,600
Ségou	n.a.	48,600	36,000	26,400	19,000	15,750	14,400
Niono	61,600	46,800	34,500	26,400	14,000	15,750	16,000
Tenenkou	n.a.	n.a.	33,000	25,200	12,000	15,750	n.a.
Léré	57,200	45,000	31,500	24,000	12,000	15,000	12,800
Fatoma (Mopti)	57,200	45,000	33,000	24,000	13,000	15,000	n.a.
Korientze	n.a.	45,000	31,500	24,000	10,000	n.a.	n.a.
N'Gouma	n.a.	39,600	31,500	24,000	12,000	n.a.	14,400
Douentza	n.a.	46,800	31,500	24,000	13,000	13,500	13,600
Timbuctu	n.a.	39,600	30,000	22,800	n.a.	12,000	n.a.
Gao	52,800	39,600	30,000	21,600	17,000	12,750	12,800
Ansongo	55,000	41,400	30,000	22,800	17,000	13,500	n.a.

n.a. not available

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part II, p. 69.

TABLE A-18

Cost of Moving Live Cattle between Major West African Markets

	Abel Bagrou-Segou-Ferkessedougou-Abidjan		Abel Bagrou-Bamako-Abidjan		Niono-Bamako		Nara-Kati		Sevare-Sikasso-Abidjan	
	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)
Time Required for (days)	100-110		60-90		50		20-40		60-100	
Collection	30-40		15-21		30		15-30		20-30	
Transport	45		17		12		12		10-15	
Sale	30		30		7		7		30	
Distance Traveled (km)	1,600		1,500		300		370		1,250	
Average Carcass Wgt (kg)	160		180		140		140		160	
Size of Herd (head)	80		40		50		50		50	
Cost of Purchase	33,600	2,688	39,600	1,584	32,200	1,610	29,400	1,470	36,800	1,840
Cost of Collection	500	40	500	20	600	30	400	20	400	20
Cost of Transport	6,440	515.2	14,370	574.8	980	49	1,040	52	7,920	396
Wages of herders	1,000	80	1,300	52	360	18	400	20	800	40
Food for herders	600	48	600	24	200	10	200	10	300	15
Losses, forced sales	840	67.2	720	28.8	360	18	340	17	320	16
Miscellaneous	800	64	500	20	60	3	100	5	400	20
Ferry	--	--	--	--	--	--	--	--	--	--
Railroad	3,000	240	--	--	--	--	--	--	--	--
Truck	--	--	11,000	440	--	--	--	--	5,800	290
Return Trip	200	16	250	10	--	--	--	--	300	15
General Costs	6,250	500	5,050	202	1,940	97	2,020	101	11,240	562
Health tax	1,000	80	1,000	40	--	--	--	--	300	15
Customs duties	150	12	150	6	--	--	--	--	4,500	225
Licenses	--	--	--	--	600	30	600	30	3,000	150
Financial costs (1)	4,000	320	2,800	112	1,000	50	1,000	50	3,200	160
Wage of head of convoy (2)	600	48	600	24	240	12	300	15	--	--
Travel of merchant	500	40	500	20	100	5	120	6	240	12
Cost of Sale	2,200	176	2,200	88	600	30	600	30	2,200	110
Broker	200	16	200	8	60	3	60	3	200	10
Food for herders	400	32	400	16	140	7	140	7	400	20
Credit (3)	1,600	128	1,600	64	400	20	400	20	1,600	80
Total Distribution Cost	15,390	1,231.2	22,120	884.8	4,120	206	4,060	203	21,760	1,088
Value of Sale at average carcass wgt of (kg)	56,000	4,480	67,650	2,706	37,800	1,890	33,750	1,687.5	62,000	3,100
	140		165		135		135		155	
Commercial Profit (4)	7,010	560.8	5,930	237.2	1,480	74	290	14.5	3,440	172
Commercial Profit plus Implicit Return to Capital, Trader's Labor, etc. (1) + (2) + (3) + (4)	12,610	1,008.8	10,330	413.2	3,120	156	1,990	99.5	8,240	412
Value Added by Commerce										
Per head of cattle	22,400	--	28,050	--	4,200	--	4,350	--	25,200	--
Per kg of carcass wgt	160	--	170	--	32.4	--	32.2	--	162.6	--

TABLE A-18 continued

	Niono-Ouangolodougou-Abidjan		Mopti-Bobodioulasso		Mopti-Paga		Gao-Bawku	
	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)	Cost/Head (MF)	Total Cost (000 MF)
Time Required for (days)	90-100		70-80		60-70		60-75	
Collection	30		20-30		20-30		20-30	
Transport	40-45		15		25		28	
Sale	15		30		10-15		10-15	
Distance Traveled (km)	1,250		450		600		700	
Average Carcass Wgt (kg)	160		150		160		160	
Size of Herd (head)	50		50		50		50	
Cost of Purchase	36,800	1,840	33,000	1,650	36,800	1,840	33,600	1,680
Cost of Collection	1,000	50	600	30	400	20	600	30
Cost of Transport	5,240	262	1,200	60	1,600	80	2,100	105
Wages of herders	800	40	400	20	600	30	800	40
Food for herders	300	15	200	10	300	15	400	20
Losses, forced sales	640	32	400	20	200	10	400	20
Miscellaneous	200	10	200	10	300	15	200	10
Ferry	—	—	—	—	—	—	100	5
Railroad	3,000	150	—	—	—	—	—	—
Truck	—	—	—	—	—	—	—	—
Return Trip	300	15	—	—	200	10	200	10
General Costs	12,700	635	10,230	511.5	15,900	795	16,000	800
Health tax	300	15	600	30	600	30	600	30
Customs duties	4,500	225	4,980	249	9,300	465	9,300	465
Licenses	3,000	150	3,000	150	3,000	150	3,000	150
Financial costs (1)	4,000	200	1,200	60	2,600	130	2,600	130
Wage of head of convoy (2)	400	20	300	15	400	20	500	25
Travel of merchant	500	25	150	7.5	—	—	—	—
Cost of Sale	2,200	110	1,600	80	1,100	55	1,100	55
Broker	200	10	200	10	100	5	100	5
Food for herders	400	20	400	20	200	10	200	10
Credit (3)	1,600	80	1,000	50	800	40	800	40
Total Distribution Cost	21,140	1,057	13,630	681.5	19,000	950	19,800	990
Value of Sale at	60,000	3,000	43,500	2,175	54,000	2,700	54,000	2,700
average carcass wgt of (kg)	150		145		150		150	
Commercial profit (4)	2,060	103	-3,130	-156.5	-1,800	-90	600	30
Commercial Profit plus Implicit Return to Capital, Trader's Labor, etc. (1) + (2) + (3) + (4)	7,660	383	-630	-31.5	1,600	80	4,000	200
Value Added by Commerce								
Per head of cattle	23,200	—	10,500	—	17,200	—	20,400	—
Per kg of carcass wgt	154.6	—	72.4	—	114.6	—	136	—

Source: FAC and OMVS, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: SEDES, 1973, Part II, pp. 127-35.