This is to certify that the

dissertation entitled

AN EVALUATION OF THE PERFORMANCE OF THE MARKETING SYSTEMS FOR FED CATTLE, RANGE CATTLE, AND BEEF IN MALI

presented by

Cheick Abagouro Bocoum

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Animal Science

Major professor

Date Feb 20, 1990

AN EVALUATION OF THE PERFORMANCE OF THE MARKETING SYSTEMS FOR FED CATTLE, RANGE CATTLE, AND BEEF IN MALI

by

Cheick Abagouro Bocoum

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

1990

ABSTRACT

AN EVALUATION OF THE PERFORMANCE OF THE MARKETING SYSTEMS FOR FED CATTLE, RANGE CATTLE, AND BEEF IN MALI

By

Cheick Abagouro Bocoum

The Government of Mali is increasingly concerned with the improvement of the performance of cattle and beef marketing systems.

Up to now, the lack of baseline data has prevented the full understanding of the current marketing systems. This dissertation's basic objective is to develop critical information for policy discussions concerning the structure, conduct and performance of the market for fed and range cattle and for beef in Mali.

The dissertation findings show that overall the cattle markets and the beef market were effectively competitive. It rejects the alleged redundancy of cattle traders in the market of Bamako. Furthermore, exploitation of farmers by traders was found to be unlikely.

The study found no evidence of traders or butchers engaging in prior consultations or entering into agreements with rivals. Prices in cattle markets were set in market places through open bargaining between buyers and sellers.

Beef prices were fixed by city authorities and they were generally respected by butchers at least in nominal terms. However, the real price of high quality beef exceeded the nominal prices, while the real price of low quality beef was inferior to nominal prices.

Empirical findings on market performance suggest that both the cattle and beef markets are operationally efficient, and available

evidence indicates that price premia exist for fed cattle and high quality beef carcasses.

Net capital losses have been found seasonally for butchers of low quality beef, suggesting the existence in the Bamako beef market of allocative inefficiencies.

Policy recommendations stemming from this research are:

1. Policies should be aimed at eliminating constraints to better performance (capital among others).

2. Better access to capital by traders and butchers requires the design of a sound and comprehensive financing policy.

3. Beef price controls should be removed to allow the necessary beef price adjustments, and to enable the market to coordinate resource allocation;

4. Weights of marketed cattle should be determined by direct measurements to avoid mistakes in the determination of live animal carcass yield and value.

To My Children

Kalidou
Anta
Takel
Coumba
Mama
Oumou

ACKNOWLEDGEMENTS

The author wishes to express his special gratitude to his wife and children for their sacrifice and support.

The author is very appreciative to his Graduate Committee Members Dr. Robert J. Deans, Dr. Harold Riley, Dr. John Staatz, Dr. David Campbell, and Dr. Allan Rahn for their guidance, their interest and critical reviews of several drafts of this dissertation. He is also very grateful for the very useful inputs they provided to improve this study.

The author wishes to thank sincerely the Malian Ministry of Environment and Livestock and all Malian Livestock Officials, the USAID Mission in Mali, and the Livestock Sector Project Authorities for the opportunity given to him to undertake this training in the United States of America. He hopes that this investment will be profitable to the Republic of Mali and to cooperation between the United States and Mali.

The author wishes to extend his gratitude to all his friends for their constant support, to the enumerators who helped him during the field surveys, and to the many cattle traders, butchers and farmers who largely contributed to the achievement of this study.

TABLE OF CONTENTS

Page

List of Tables viii

List of Figures x

Chapter One--Introduction 1
- Previous Studies of Livestock Marketing in Mali and West Africa 5
- Objectives of the Dissertation 14
- Conduct of the Field Research 14
- The Study Theoretical Framework 17
- The Dissertation Research Approach 27
- Organization of the Dissertation 30

Chapter Two--Cattle and Beef Market Structure 33
- Cattle and Beef Subsector Organization in Mali 33
- Range Cattle System 35
  - Cattle Marketing Infrastructure 37
  - Government Interventions 40
  - Beef Marketing Infrastructure 41
  - Financing Systems 42
  - Fed Cattle System 44
- Bamako Market for Beef 50
  - Demand Factors 50
  - Per Capita Beef Consumption in Bamako 55
  - Slaughter Facilities in Bamako 57
  - Recorded Slaughter and Seasonal Variations 59
  - Sources of Cattle Supply in Bamako and Kati Markets 65
- Cattle Sales in the Markets of Kati and Bamako 70
  - Year to Year Variations 70
  - Seasonal Variations 72
- Cattle and Beef Market Structure 78
  - Cattle and Beef Market Concentration: Sellers . . . 78
  - Cattle and Beef Market Concentration: Buyers 82
  - Product Differentiation 87
  - Barriers to Entry 88
- Conclusion 99

Chapter Three--Cattle and Beef Market Conduct 102
Fed Cattle Producer (Seller) Market Behavior 104
Traders' Market Conduct 107
Kati-Bamako Traders 110
Kati-Bamako Intermediaries 114
Butchers' Market Conduct 116
Cattle Procurement 116
Beef Sales 119
Collusion 128
Conclusion 129

Chapter Four--Cattle and Beef Market Performance . . . 131
Operational Efficiency 131
Traders' and Butchers' Marketing Costs 132
The Alleged Redundancy of Middlemen in the Bamako and Kati Cattle Markets 139
Allocative Efficiency (Pricing Efficiency) 147
Comparative Carcass Yield of Embouche and Range Cattle 153
Producer Profit Margins 157
Producers' Exploitation 160
Traders' Profit Margins 162
Butchers' Profit Margins 165
Conclusion 166

Chapter Five--General Conclusions and Policy Recommendations 168
Market Structure 168
Market Conduct 168
Market Performance 169
Policy Recommendations 170
Market Competitiveness and Large Numbers of Traders 170
Capital Constraint 173
Beef Price Control 176
Selling Cattle on a Weight Basis 179
Study Limitations and Research Needs 181

Bibliography 186

Appendix Section 191

Appendix A
Conduct of Field Research Surveys 192
Appendix Tables B and C 201

LIST OF TABLES

Table		Page
2.1a	Official Estimates of Cattle Population by Region (1977-1987)	36
2.1b	ECIBEV Estimates of Emboucheurs and Fed Cattle in Banamba Zone (1975-1986)	47
2.2	Population Growth in Bamako (1980-1987)	52
2.3	Official Prices of Beef and Substitute Meats in Bamako (1980-1987)	54
2.4	Annual Beef Consumption Per Capita in Bamako (1980-1987)	56
2.5	Comparative Beef and Mutton Consumption in Bamako (1980-1987)	58
2.6	Annual Cattle Slaughter in Bamako (1980-1987)	61
2.7	Official Recorded Cattle Exports From Bamako (1980-1987)	69
2.8	Cattle Monthly Sale Variation Index in the Market of Kati (1980-1987)	74
2.9	Cattle Monthly Sale Variation Index in the Market of Bamako (1980-1987)	75
2.10	Producers', Traders', Intermediaries' and Butchers' Socioeconomic Characteristics	79
2.11	Cattle Presented Monthly in Banamba (May-July, 1986)	81
3.1	Producers', Traders', and Butchers' Market Conduct (March-July, 1986)	105
3.2	Services Provided by Intermediaries	115
3.3	Weight, Per Kg Price and Composition of Different Price Tas in Bamako, (March-July, 1988)	121

Table		Page
3.4	Real Weight, Real Price, and Composition of a Kg of High and Low Quality Beef with Bones, in Bamako (March-July, 1988)	124
3.5	Real Weight, Real Price and Composition of a Kg of High and Low Quality Boneless Beef in Bamako (March-July, 1988)	126
4.1	Operating Costs per Head for Market Participants Buying in Bamako and Selling in Bamako (March-July, 1988)	134
4.2	Operating Costs per Head for Market Participants Buying in Kati and Selling in Bamako, (March-July, 1988)	135
4.3	Operating Costs per Head for Market Participants Buying in Long Distance Markets and Selling in Bamako (March-July, 1988)	136
4.4	Operating Costs per Carcass for Butchers In Bamako, (March-July, 1988)	137
4.5	Employment Generated in Cattle Marketing In Kati and Bamako (March-July,1988)	146
4.6	Banamba Zone and Bamako Emboucheurs Costs and Profit Margins (March-July,1988)	149
4.7	Fed and Range Cattle Traders' Profit Margins per Kg and per Head (March-July, 1988) . . .	150
4.8	High and Low Quality Beef Carcass Costs and Profit Margins (March-July, 1988)	152
4.9	Fed and Range Cattle Dressing Percentages and Carcass Composition (March-July,1988)	156
4.10	Costs of Credit Default Risks	164
5.1	Per Kilogram Net Margin Distribution Between High and Low Quality Beef Butchers in Bamako (March-July 1987)	172

LIST OF FIGURES

Figure		Page
1.1	Subsector Structure, Conduct, and Performance Paradigm	28
2.1	Annual Cattle Slaughter in Bamako (1980-1987)	60
2.2	Index of Monthly Cattle Slaughter Variations in Bamako (1980-1987)	64
2.3	Principal Cattle Flows in Mali	66
2.4	Monthly Indices of Variations of Cattle Offered For Sale in Bamako and Kati Markets (1980-1987)	67
2.5	Annual Cattle Sales in Kati and Bamako Markets (1980-1987)	71
2.6	Cattle Sale Monthly Index of Variations in Kati and Bamako (1980-1987)	73

CHAPTER ONE

INTRODUCTION

The importance of the livestock sector in Mali stems from the fact that livestock is one of the most important components in the country's economy. In 1987, the total cattle population in Mali was estimated at 4,583,000. In 1982, the total cattle population in Mali was about 6,663,000, the second largest cattle population within West Africa behind Nigeria. The total livestock sector in the Malian economy accounted for about 20 percent of total GNP in 1987 according to the Malian National Statistics Office Report[1] (1989). Moreover, the national livestock herd provides most of the animal protein consumed in the country and a large part of the meat consumption of several West African countries, of which Côte d'Ivoire is the most important client. According to OMBEVI[2], the official estimate of Malian beef production was about 75,000 tons in 1987.

Livestock is Mali's first or second major export item, depending on the level of cotton exports. In 1987, livestock accounted for 29.2 percent of total exports according to the 1989 National Statistics

---

[1] Compte Economique du Mali 1987. Résultats préliminaires (1989)

[2] Office Malien du Bétail et de la Viande.

Office. At the same time cotton accounted for 40 percent of total exports estimated at 167 billion F CFA ($ 564 million).

Besides being an important source of protein and foreign exchange, the livestock sector is also an important source of revenue to the national budget through local and export taxes and the licensing of livestock marketing agents. In 1987, the total government receipts from all livestock sector taxes were estimated at 2 billion F CFA (about $ 6.7 million). The value of livestock exports for 1987 was 48.8 billion F CFA ($ 16 million) according to the 1989 National Statistic Office Report. Moreover, thousands of people in Mali, including herdsmen, drovers, traders, intermediaries, butchers and apprentice butchers, processors, truck and taxi drivers, vendors of food and drinks, etc., are employed by the livestock subsector and earn part or all of their total income from their livestock activities.

Obviously, Mali has a strong interest in the performance of the livestock sector. In order to achieve good performance, not only will the production have to increase, but the marketing system will also have to be improved. Yet in Mali, as in many developing countries, there is a tendency to allocate public resources to promote animal production and animal health and to neglect investment in promoting efficient marketing.

According to an OECD[3] report (1986), more than 80 percent of the total investment in the livestock sector was allocated to livestock production and animal health during the 1976-80 and the 1981-85 Malian

---

[3] OECD: Rapport sur l'Analyse de la Situation de l'Elevage Malien.

economic development plans, while only 5 percent was allocated to livestock marketing.

The discrepancy between these two levels of investment calls into question the appropriateness of the current Malian livestock marketing policies.

In a country such as Mali, where marketing livestock is one of the most important economic activities, it is important that the marketing system be given more attention. Furthermore, among the four policy objectives defined by the government of Mali for the livestock sector during the 1976-80 and 1981-85 plans, the first three objectives were particularly relevant to marketing systems. These objectives still remain unchanged in 1989. They are: 1. to increase cattle exports; 2. to satisfy domestic protein needs; 3. to secure higher income for livestock producers; 4. to reconstitute the national livestock herd devastated by the 1972-1973 and 1981-1984 droughts.

To achieve these objectives, government policies obviously play a critical role in creating the decision-making environment for producers, consumers, and marketing agents.

To what extent government policy can deal successfully with marketing issues is very important for the growth and development of the livestock subsector. Attention has frequently been focused on some shortcomings in the marketing system in Mali as important hindrances to the subsector development. The alleged shortcomings are numerous, and the most important are:

1. There is an excessive number of middlemen in the cattle marketing chain, which increases distribution costs;

2. Merchants exploit cattle producers (chiefly emboucheurs[4]) because of the merchants' superior market knowledge or skills;

3. The price control policy has a disruptive effect on beef markets due to the lack of a price premium for high quality (fat) meat;

4. There is a limited demand for high quality beef to justify the continuation and the development of the cattle feeding program.

Yet, very little research has been conducted to corroborate or refute these claims. However it would be as great a mistake to assume that all the above alleged shortcomings are false as it would be to assume that they all are true. The difficulty is to distinguish the false from the true. To the extent that they are true, they have important policy implications; to the extent that they are false, policies based on them are likely to be ineffectual, if not harmful. Apparently many of the Malian governmental interventions in livestock marketing have been based more on preconceived ideas about the nature of marketing systems and their constraints than on factual information and analysis. This may explain the failure of several livestock marketing projects such as SONEA,[5] SOMBEPEC,[6] and recently ECIBEV.[7]

The scarcity of reliable information likely will continue to severely constrain the design of any new policies to improve the

---

[4] Emboucheurs are farmers who feed a small number of cattle (2-4 on average) during the off-cropping season, usually between January (or February) and March (or April).

[5] SONEA: Société Nationale d'Exploitation des Abattoirs.

[6] SOMBEPEC: Société Malienne du Bétail des Peaux et Cuirs.

[7] ECIBEV: Etablissement de Crédit et d'Investissement Bétail-Viande.

performance of the marketing system if action is not taken to provide the necessary knowledge on the marketing systems. This knowledge includes how markets perform and why these markets perform as they do. To answer these questions it is necessary to identify the determinants of market performance, especially the characteristics of market structure, market conduct, and the policy environment. Therefore, research is required to contribute to the design of a marketing policy and implementation by providing a sound understanding of the current cattle and beef marketing system organization, operation, and performance, and by identifying marketing constraints to secure more satisfying performance.

Before dealing in depth with those issues, it is important to review the most important livestock and meat marketing studies conducted in Mali and in West African countries.

Previous Studies of Livestock Marketing in Mali and West Africa

While several aspects of livestock and meat marketing have been studied in West Africa, very little research has been done in Mali. Three studies are relevant to the subject of this study and deserve special attention: "The Marketing of Malian Cattle," by J. Stryker (1973), "Livestock and Meat Production, Marketing, and Exports in Mali," by Delgado (1980), and "Economic analysis of the Livestock Sector in the Republic of Mali" by Robert R. Nathan Associates, Inc. (1988).

Stryker, using the perfect competition model as a standard of performance, evaluated the efficiency of cattle marketing in Mali. He found the cattle marketing system competitive, with a very large number of cattle traders at each stage. The market concentration was low in

general and there was no evidence of collusion among traders. However, he suspected (without evidence) that in larger markets like Kati, there may be some form of collusion among the relatively low number of traders ("no more than 10 merchants"). He found that prices within different markets were closely related to one another. The system appeared remarkably adaptable and responsive to changing needs. Profits were found to be small, except possibly in some of the larger markets. In his overall evaluation, Stryker found the cattle marketing system in Mali "quite efficient and generally free of monopoly practices."

Nevertheless, he suggested a set of recommendations including the improvement of credit access for cattle traders, the provision of additional markets and a transportation infrastructure, the improvement of stock routes, the provision of price information and quality standardization services, and the organization of meat trade associations.

The study made by Delgado was aimed at assessing the constraints to and potential for the expansion of Malian livestock and meat exports to central coastal states of West Africa. Nevertheless, he also discussed other issues, including trends in domestic production and consumption in order to estimate the amount of cattle "left over" for exports. The conclusions he reached during his five-week trip in Mali in the fall of 1978 were essentially based on the conversations he had with Malian officials in charge of the livestock sector and on the existing literature concerning Malian livestock.

In his conclusion on cattle marketing, Delgado mentioned that fed cattle exports were not profitable but range cattle exports were

profitable. However, he cautioned that Malian livestock traders could not count on institutional barriers or lack of experience to prevent competition from non-Sahelian sources in coastal markets. Therefore, he suggested that action be taken to cut marginal and average costs of trading for individuals in the traditional sector. To achieve these cost reductions he made three specific recommendations:

1. The donor policy should be strongly oriented toward supporting and increasing the level of competition in the Malian livestock market, contrary to the limitations on the proliferation of cattle traders and the limitations of individuals to specific aspects of trade that OMBEVI was calling for.

2. Malian export formalities should be simplified as a means to promote livestock exports.

3. Cattle trails should be established and equipped in order to avoid crop damage in the south and live weight loss in the north.

The Robert R. Nathan Associates, Inc. study was conducted in January-February, 1988. Its objective was to evaluate selective issues concerning development of the livestock sector in Mali.

The findings and conclusions of the study relevant to the topic of this dissertation showed that for the next five years, Malian cattle producers would face favorable demand prospects. This would be due mainly to increased demand for beef from export markets, especially Côte d'Ivoire, unless EEC[8] beef surpluses were to be sold to coastal markets at give-away prices. By using a computerized trading simulation model the study estimated that a 10,000 ton EEC export would reduce prices in Bamako by about 18 percent. It pointed out that imports of 20,000 tons

---

[8] European Economic Community

of beef by Côte d'Ivoire from the EEC in 1987 had a devastating effect on prices received by Malian producers.

As a consequence, the study recommended that controls on the volume of EEC exports to coastal countries should be sought. Moreover, the simulation program based on the effect of investments in Malian cattle health showed that Malian cattle producers would benefit from a slight revenue increase due to an expected higher production despite price drops, but the main beneficiaries would be consumers in Bamako and other importing countries. In Bamako, the price per kilogram of carcass was expected to drop by 8.3 percent following a Malian beef production increase of 10 percent. This negative price impact from increment in total Malian beef production has been largely influenced by the export market, because the beef supply increase is expected to be directed partly to domestic markets and partly to export markets where prices are expected to decline less than in the domestic market. The price elasticity of demand for Malian beef for the combined export and domestic markets was estimated between -1.03 and -1.05 while the price elasticity for the Bamako market alone was estimated at -0.6. However, because of the quality of data available such precision in elasticity figures is questionable. In addition to the above findings, the Robert R. Nathan Associates, Inc. report discussed also the beef consumption and the income distribution patterns in Bamako. The analysis on these sections was made based exclusively on data from a report on food prices and food consumption in urban Mali by Beatrice L. Rogers and Melanee L. Lowdermilk.

The Rogers and Lowdermilk report presents the results of a study conducted from May 1985 to May 1986 by the Malian National Statistics Office and Tufts University. The study was based on data from household expenditure, food price, and food consumption surveys in Bamako and the seven regional capital cities of Mali. According to the conclusions of the study, cereals dominated the food consumption pattern in every city and in every expenditure class. Cereals accounted for between 61 and 84 percent of total calories consumed. The percentage of total food expenditures spent on the purchase of cereal varied from 28 to 44 percent. Rice was the largest single item in the diet in terms of expenditures, accounting for more than half of the total cereal calories consumed in the urban areas. The coarse grains (millet, sorghum, and maize) were the next most important source of calories.

Non cereal food such as peanuts and peanut butter, meat, oil, and sugar together accounted for only about 20 percent of total dietary calories.

The study showed that despite its small caloric intake share, meat accounted for a fairly large share of food expenditures in the Bamako diet. It was estimated that the poorest consumers' group spent 11 percent of all food costs on meat while the wealthiest group spent an average of 17 percent.

The average for all four groups was estimated at 14 percent, suggesting that meat consumption increases as income rises. In absolute monetary terms, the poorest income group spent 323 F CFA[9] per capita per month on meat while the wealthiest group spent 1,627 F CFA. This

---

[9] US $1.00 = approximately 300 F CFA

showed that the upper income quartile spent five times the amount spent by the poorest group on meat. The second and third quartiles accounted respectively for 16 and 26 percent, according to the study data.

Based on these results, the researchers concluded that since the richest consume the largest share of meat in Bamako, any measure to reduce the price of meat may benefit chiefly the wealthier population. Thus official meat price control policy intended to protect the poor or encourage their consumption of meat would benefit mostly the rich.

Beside these studies on livestock marketing in Mali, OMBEVI, under the funding of the FAO and the Malian Government, has published several papers and reports which provide descriptive information on diverse segments of the marketing system.

Elsewhere in West Africa, three studies deserve special attention:

1. "The Economics of Cattle and Meat Marketing in the Ivory Coast," by John Staatz;

2. "The Livestock and Meat Marketing system in Upper Volta," by Larry Herman;

3. "A social-Economic Analysis of Stall-Fed Cattle Production and Marketing in the Mandara Mountains of Cameroon," by John Holtzman.

In his monograph on Ivory Coast cattle and meat marketing, Staatz, using a structure-conduct-performance (SCP) paradigm, concluded that:

1. Evidence available on market structure indicated a large number of intermediaries and a limited scope for collusion among merchants, intermediaries, and butchers in Abidjan and Bouaké. Moreover, concentration ratios indicated a moderate degree of concentration among intermediaries in Bouaké and a low degree in Abidjan. Therefore, any attempt to make collusive agreement among intermediaries would be inherently unstable. He found the wholesale and retail butchers' trades in Bouaké and Abidjan even less concentrated than the intermediaries trade, thus indicating little scope for collusive behavior.

2. Evidence on market conduct suggests that there was no collusion among intermediaries to restrict the volume of cattle sold in order to force up prices, nor among butchers to restrict the volume of meat sold.

3. The profit margins of merchants typically were modest. The rate of return to capital was contained within the range of the accepted opportunity cost of capital in West Africa. Similarly, he found the profit margins of traditional butchers fairly low, accounting for between 8 and 12 percent of the retail price of beef. This indicated little evidence of monopoly profits in either cattle or meat markets.

In his overall assessment, Staatz found the subsector competitive and efficient given the transportation and infrastructure constraints under which the market participants operate. Accordingly, he recommended: 1. not to proceed in an extensive reorganization of the marketing system, 2. to improve the physical infrastructure of the trade including the improvement of the abattoirs in Abidjan and Bouaké, and to move the Abidjan cattle market-abattoir complex to an area where adequate grazing and water were available. He also suggested that in the long run, the government-owned railroad consider replacing some of the poorly ventilated rail cars and the possibility of feeding and watering cattle en route in the rail shipment.

Larry Herman also used a SCP approach in his study in Upper Volta (now Burkina Faso). He found in all the four markets under study that the number of cattle sellers and buyers was large, suggesting a high degree of competition. However, he mentioned that some seasonal market power might exist in the northern markets for cull cows and during the rainy season for all cattle.

Except in Kaya, where the beef market was dominated by two butchers, Herman found in beef markets low concentration ratios and little market domination. There was no evidence of collusive behavior

by cattle market professionals to raise prices for sellers or to lower prices for buyers. In the beef market also there was no evidence of butcher agreements to raise the price of beef or lower the prices of cattle.

The evidence Herman found on traders' net margins suggested that they represented a modest element of gross margins. The net margins of butchers supplying high quality meat markets were significantly higher than those of the majority of butchers who sold lower quality meat on the popular market, because of some contract arrangements between wholesalers and client institutions.

In his conclusion, Herman mentioned that cattle marketing was generally competitive and fairly efficient with no redundant and unproductive middlemen. He found that herdsmen and marketing participants already seem to have good access to market information through traditional sources, protecting the producers from abuses and exploitation by cattle buyers. He found also that the creation of cattle trails was not likely to lower costs or increase trade but they might lessen conflicts with agriculturalists. Trucking would gain acceptance as roads were paved and trucking costs decreased. The most serious problems of transport were found in rail transport, resulting from seasonal constraints in rail car availability, excessive duration of shipments, and mechanical problems for refrigerated meat exports. In his recommendations Herman stated that improvement in marketing efficiency can best be brought about by fostering healthy competition and providing necessary and appropriate infrastructure. A general reorganization of trade was not necessary, he said.

The Holtzman dissertation is one of the most comprehensive studies on intensive dry-season feeding in Africa, although several experiments have been conducted in Mali, Niger, Nigeria and Senegal. The general objective of this study was to analyze the economic viability of the production and marketing of stall-fed cattle in the Mandara Mountains and to find out the potential for the improvement of the performance of input and product markets. The findings of the study indicate that returns to the existing traditional stall-feeding enterprises were quite low. The study also indicated that retail price controls had the adverse effect of restricting the slaughter of stall-fed cattle in urban areas. Moreover, in examining the macroeconomic effects of expanding stall-feeding on the supply and demand for factors of production, Holtzman concluded that the prices of feeder calves could increase and there would be great pressures on demand for inputs such as forages, water, labor, and agro-industrial byproducts.

In order to improve the long-run economic viability of stall-feeding in the Mandara Mountains, Holtzman recommended the removal of beef retail price controls and the restriction on cattle exports.

As one can observe from the above review, the information about the performance of the Malian livestock marketing system is modest. For its part, the Government of Mali (GRM) is increasingly concerned with the improvement of the efficiency of the current cattle and beef marketing system (particularly in the capital city ceinture de viande or beef belt). To this end, reorganization of the cattle and beef marketing systems is under consideration. Thus, sound information on

the cattle and beef marketing systems is badly needed prior to any decision making.

Objectives of the Dissertation

One of the basic objectives of this study is to contribute to the improvement of the understanding of the current cattle and beef marketing systems in Mali. The overall objective of this study is to provide an in-depth understanding of these systems' organization, operation, and performance which can inform policy discussions concerning the design and implementation of future marketing policies.

The specific objectives are:

1. to describe the organization and operation of cattle marketing systems in the embouche zone of Banamba, in the cities of Banamba, Kati, and Bamako, and in the beef market of Bamako;

2. to assess operational efficiency as measured by the per-unit operational cost; pricing efficiency as measured by profit margins; and competitiveness in the beef and cattle markets;

3. to estimate the differences between fed and range cattle carcass composition in order to determine the net yield of feeding programs and to relate them to pricing efficiency;

4. to identify the constraints to workable competition and subsector performance; and

5. to recommend alternative policies to remove the identified constraints.

Conduct of the Field Research

The field research was conducted in two phases. The first phase took place in 1986. It was conducted by the author helped by six enumerators during the five months from March to July 1986, the time period necessary to feed and market cattle in the cattle feeding zone.

The 1985-86 feeding operations campaign started in February-March, and the sales began in May and lasted until July. The pre-marketing

period (March-April) was used for the enumerators' training, the design and pre-testing of questionnaires, and the selection of sample villages and sample farmers. In addition to the above activities, the period before marketing was used to review background information, previous marketing studies in Mali, and to conduct discussions with Malian officials in charge of marketing policies and with USAID experts on research matters in order to initiate collaboration.

Several reconnaissance field visits were made to Banamba embouche paysanne areas and to Kati, Banamba and Bamako cattle markets to obtain basic information on the number of active butchers, traders, and intermediaries, particularly their business size and experience. This information served as the basis of selecting stratified samples for each category of market participants.

Finally, an operational plan of work was elaborated during the same pre-marketing period. The plan comprised the planning of field surveys, detailed timetables and the research budget.

The active field data collection started May 1 and ended July 31, 1986. During the three-month research period, seven different types of surveys were conducted by the author, helped by the six enumerators. The surveys were:

1. Traders surveys.
2. Butchers surveys.
3. Intermediaries surveys.
4. Fed Cattle Producers surveys.
5. Abattoir Surveys.
6. Beef Composition Surveys.

7. Market surveys.

In addition to the field data collection, secondary time-series data relating to the Kati and Bamako market cattle presentations, sales, and prices, Bamako abattoir slaughter figures, cattle exports from Bamako, and total Malian cattle population were also collected. These data are generally from OMBEVI, National Livestock Directorate ("DNE"), and the Bamako Abattoir ("AFB"), which keep track of relevant livestock bio-economic parameters. Official statistics, however, are available up to 1987 only.

During the three months of the field surveys, the six enumerators assigned in the three markets (Banamba=2; Kati=2; Bamako=2) collected only quantitative data on the number of cattle (fed and range) offered for sale, the number of cattle sold and their average sale prices per weekly market day, and retail beef composition surveys. In Bamako, where the cattle market is held daily, Sunday was chosen as the survey day in order to coincide with the arrival of cattle (including the arrival of sampled fed cattle) from the Kati market, which is held one day before. The enumerators were visited once every two weekly market days by the researcher for a review of the data collected and discussion of problems encountered. The researcher personally conducted all of the interviews with market participants. Data collected during the first phase were chiefly information on market structure and conduct.

The second phase took place in 1988 and was essentially devoted to supplementing the study with the missing and/or inadequate data of the first phase. The field research was conducted by the author assisted by

two hired enumerators. It took place from March to July 1988. During the five months the following surveys were conducted:

1. sale prices of fed and range cattle per kilo and per head in the market of Bamako;

2. traders' purchase prices per kg and per head and marketing costs in the markets of Bamako and Kati;

3. butchers' purchase prices and costs per kg and per head in Bamako and Kati for fed and range cattle;

4. fed and range cattle live weights in Bamako;

5. fed and range cattle meat and fat yields in Bamako;

6. proportions of retail cuts sold boneless, with bones, and per tas in traditional butchering for fed and range cattle and the aggregate beef sale revenues in Bamako.

Information obtained during the second phase was used essentially to evaluate performance dimensions. All the surveys' methods (for both phases) are discussed in the appendix.

The Study's Theoretical Framework

Before turning to the empirical evidence collected during the field research, we briefly discuss in this section the relevant conceptual framework from the economic theory. This provides us with a general orientation for prediction and explanation concerning the structure, conduct, and performance of the markets. This section draws largely from the works of industrial organization economists such as Bain, Scherer, Sosnick, and Brandow.

Economic theory draws distinctions among markets on the basis of sellers' or buyers' concentration. As a result, markets are classified into one of the following three categories:

1. atomistic markets, in which many sellers or buyers are in competition;

2. oligopolistic (oligopsonistic) markets, in which a few large markets, participants (sellers or buyers) are in competition;

3. monopolistic (monopsonistic) markets, in which a single buyer or seller operates.

Predictions concerning market conduct and performance for each market category are as follows:

- In atomistic markets each seller or buyer is so small that no one can perceptibly influence the commodity price, and collusive restraint of the commodity by all market participants is ruled out by their large number.

- In oligopolistic (or oligopsonistic) markets there is an interdependence between the few participants about price and commodity quantity policies. Each rival will determine his price and quantity sold or bought according to his expectations about his competitor's actions. However, it is possible that rivals act collectively (effective or tacit collusion). This can create a situation in which participants hold market power temporarily. Alternatively, they may compete in an open rivalry leading to market warfare. Consequently, the market performance which may be expected in oligopoly situation ranges from the performance of the atomistic situation discussed above to the performance attribute of a single firm situation described below.

- In the monopoly context, a single seller or buyer has complete control of the market selling or buying price. Such a market power will give him the ability to influence price, quantity and the nature of the product in the market place.

Economic theory also distinguishes markets according to the conditions of entry to them, or the presence of barriers to the entry of newcomers. As a consequence, markets can be categorized as:

1. easy entry markets, without barriers to the entry of new competitors;

2. moderately difficult entry markets, with the presence of barriers to entry but not enough to permit existing firms to

enjoy large market power or a monopoly price without attracting new entrants;

3. blockaded entry markets where barriers to entry are high enough to permit existing firms to enjoy market power and a joint monopoly price while precluding newcomers.

As one can observe, the conditions of entry or the presence of barriers may influence the conduct and the performance of a market. For example, if existing firms decide to preclude new entrants, they can succeed by limiting selling prices to the level not profitable to new competitors (this is known as "limiting pricing").

With regard to the above discussion, one may expect that an association of some forms of market structure as measured by market concentration and the condition of entry may lead to favorable patterns of market conduct and also to good market performance. Conversely, other patterns of market structure or conduct may yield poor market performance.

Further discussion in this theoretical framework entails brief definitions and discussions of some crucial notions used in this section such as market structure, conduct, performance and their determinants, and workable competition.

Market Structure

Market structure refers to the organizational characteristics of a market that influence the conduct of sellers and buyers in the market, and the nature of competition and pricing within the market. According to Marion, the salient characteristics of market structure are:

The Number and Concentration Ratio of Sellers or Buyers in a Market

The concentration ratios measure the importance of the market share (or the proportions of total market sales or purchases) of a few leading firms, particularly the four-firm concentration ratios (CR4). A large number of firms (more than 12 firms according to the Scherer's rule (p.199)) in a market may have a competitive influence even if concentration is high. The reason is that some of the small firms that operate on the fringe of the market have the ability to expand if leader firms decide to limit the commodity quantity and raise prices.

However, if the number of firms is very small, concentration ratios measure the importance of market leaders. It is suggested by some economists that a 40 percent market share in a given market is sufficient to confer leadership to a single firm.

Product Differentiation

The degree of product differentiation may be another important market structure characteristic influencing market conduct and performance. According to Bain, the degree of product differentiation refers to the difference in consumers' preferences for some products between several competing products sellers within an industry such as fed cattle and range cattle, or fat beef and lean beef. In technical terms, the degree of product differentiation measures the degree of substitutability of various products to consumers. This measurement should be normally obtained through the cross-elasticity of demand between the products. A small price decrease of one product should produce at least a perceptible reduction in demand for other close substitutes. Between distant substitutes, however, a small price change

for one product should not affect perceptibly the demand for the other products.

To give full meaning to product differentiation, however, there might exist some consumers' ranking of close substitutes based on their scale of preference. Some consumers may prefer one product and some another at comparable prices. Some may be willing to pay a price premium to get their preferred product while others would require a price concession in order to buy the same item. Moreover, the fact that one product is preferred to others may imply that the income elasticity of demand for the preferred product may be higher than that of the other products. Thus, when incomes rise consumption of the preferred product (e.g. fat beef) would increase more than the consumption of the others (e.g. lean beef) if there is no change in relative prices.

Factors of product differentiation are many and may include all causes which make consumers to prefer one competing product to another. The most accepted of these sources are: 1. differences in quality or design among products; 2. consumers' lack of knowledge about the essential of characteristics and qualities of the product they are purchasing. In this situation, buyers rely on the reputation of sellers or products; 3. persuasive sales-promotion activities of sellers and particularly by advertising; 4. name brands heavily advertised as prestige products; 5. locational differences among sellers involving significant costs in the product delivery or pick-up for sellers and buyers. The presence of several of these sources within an industry at the same time may develop an effective product differentiation.

The effects of product differentiation on the market conduct or performance depend on the degree of product differentiation. They would be found essentially on product pricing, and on the levels of market shares. If product differentiation is great, market share would be less sensitive to price determination, price competition is likely to be much less important than non price competition, and costs are expected to be adjusted relative to comparatively insensitive prices rather than prices to costs. If, on the contrary, product differentiation is relatively slight, there would be only a smaller proportionate emphasis on non-price as compared to price competition, and there would be a greater potential instability of market shares. Moreover, the character and distribution of consumers' preferences between established products and firm on the one hand, and newly introduced products and sellers on the other hand, may influence the degree of advantage that established firms may have over new entrants to create some barriers to new entry.

Barriers to Entry

These characteristics refer to anything that provides established firms an advantage over potential entrants. In economic theory there are five commonly recognized types of entry barriers:

- The absolute cost advantages of established firms over newcomers so that new entrants have higher per-unit cost;
- Scale barriers, where minimum efficient scale exists;
- Product differentiation;
- Capital barriers due to the size of required investments for efficient entry, or due to favorable access of entrants to required liquid funds;
- Strategic behavior intended to limit the possibility of entry for potential entrants.

In addition to the above barriers, other barriers such

as training barriers (where experience is required), ethnic barriers, legal barriers due to higher tax and license fees, market information constraints, and transportation barriers can be considered as disadvantages for potential firms in the context of this study (see Chapter 2).

Market Conduct

Market conduct refers to the patterns of behavior that firms follow in the markets in which they operate. As sellers, firms are chiefly engaged in profit-seeking activities. Thus, their market conduct encompasses mainly:

- Pricing and related market practices including the selling prices and quantities of the product that sellers adopt in order to satisfy individual or collective goals;
- Mechanisms of interaction of vertical coordination to link successive stages of economic activities and achieve the firms' pricing and market policy objectives.

These policies may be determined independently (in a competitive market) or interdependently (in a non-competitive market). The study conduct findings are presented in Chapter 3.

Thus, the market structure is an important determinant of the behavioral alternatives open to firms. However, market structure alone does not determine market conduct. Government regulations such as price fixing, trading licenses, and enforcement activities can also influence market conduct.

Market Performance

The examination of market performance is one of the most difficult conceptual tasks facing marketing economists because it involves many problems. The problems are mainly:

1. Establishing a set of relevant performance criteria as a standard of comparison;

2. Prioritizing performance criteria once they have been selected;

3. Measuring actual market performance with regard to the selected performance criteria;

4. Interpreting empirical measurements once they have been made.

To address the first problem, many theorists, notably Bain (1959), Sosnick (1964), Marion (1975), Shaffer (1980), and Scherer (1980) attempted to establish lists of operational performance criteria. Although the lists differ, some performance criteria reappear consistently.

These criteria are mainly: technical efficiency, economic efficiency, pricing (or allocative) efficiency, profit levels, competitiveness, progressiveness, employment, distribution of income, equity, flexibility, and adaptability. But any selection of a set of performance criteria is difficult and sometimes controversial because perceptions as to what is important differ through time, across space, and between individuals or groups.

The second problem is as difficult to solve as the first one. Since economic theory does not provide specific guidelines for selecting universal performance criteria, it also does not provide means of prioritizing among criteria once they are chosen.

Finally, once agreed performance criteria are selected and prioritized, and empirical market performance is measured, the interpretation of the findings is necessarily subjective. The attempt here is to define the concept of performance first and discuss the

criteria we deem relevant to the measurement of the subsector under study.

Market performance, according to Marion, refers to the composite end results of a subsector. These end results include several dimensions or criteria. In this study, two main dimensions will be evaluated: pricing efficiency as measured by profit margins, and operational efficiency (see Chapter 4).

Profit margins are the residual received by a firm from its sale revenues over all costs incurred. Thus, profit margins are the best judge of the relationship of selling price and costs. Profit margins for many economists refer to the normal return to investment and management. Relatively high profit margins are generally associated with market power, barriers to entry, risk premiums, and windfalls due to unanticipated changes in demand or supply conditions. A long-run normal profit (equivalent to the opportunity cost of resources' best alternative uses) is indicative of an allocative efficiency. In contrast a long-run large profit margin (higher than the opportunity cost of resources) reveals an allocative inefficiency. Similarly, a negative profit margin (compared to the opportunity cost of resources) and net losses reveal misallocation of resources. Operational efficiency is measured by how closely the firms operating in the markets approximate the lowest attainable costs. The operational efficiency is then strongly influenced by the firm's size or scale (with regard to the optimal scale). However, high operating costs or inflated costs are associated with higher assembly, transport, storage and processing

costs, high risk premiums, and other inefficiencies due to organizational slack and waste of resources in outdated technologies.

Workable Competition

To a large extent, the attainment of good market performance rests on market competitiveness. However, market competition required in such conditions is not the unattainable perfect competition discussed in economic theory, but workable or effective competition, in which some assumptions of the perfect competition standards are relaxed. Thus, here, competition is conceptually considered workable or effective whenever there is an adequate number of participants (buyers and sellers), no one of whom is precluded from entry or exit to a particular stage of a subsector, and no collusion exists among participants at any stage of a subsector. As a consequence, effective competition according to both Bain and Kohls rests on the following assumptions:

1. Large (adequate) numbers of both buyers and sellers to provide marketing alternatives, as no single participant can influence prices;

2. Free entry (or exit) into business without handicaps (measured by the absence of barriers to entry, including access to market information);

3. Absence of collusion among participants (as measured by the absence of market agreements to restrict the entry to newcomers, to limit the volume of the product on the market in order to bid down purchase prices, or to force up sale prices).

These competition indicators accept the real-life conditions in which both price and non-price competition are used and large firms will develop as they exploit the economies of scale and adopt new technologies.

Where the above conditions of effective competition are not satisfied, one should expect to find relatively few participants (holding market power), collusion among participants, and/or difficult access to market and market information.

The Dissertation Research Approach

Several approaches are used in agricultural marketing research, and the most known among them are: the institutional approach, the functional approach, the industrial organization approach, and the subsector approach. This study dealt with the subsector approach.

According to French, subsector is defined as a group of economic activities related vertically and horizontally by market relationships, that are involved in the production and distribution of a closely related set of commodities. As such, the subsector normally includes several industries.

The conceptual framework adapted by Henderson (1975) and Marion (1976) to subsector analysis is the structure-conduct-performance paradigm of industrial organization theory, and it points out that basic conditions plus subsector structure strongly influence conduct, which in turn has an important effect on subsector performance (Figure 1.1). Thus, the subsector approach is perceived as a modified industrial organization approach. However, it differs in many aspects. First, the subsector approach focuses more on the vertically linked set of participants, while industrial organization looks primarily at a horizontally linked set of similar firms. Second, the subsector is a

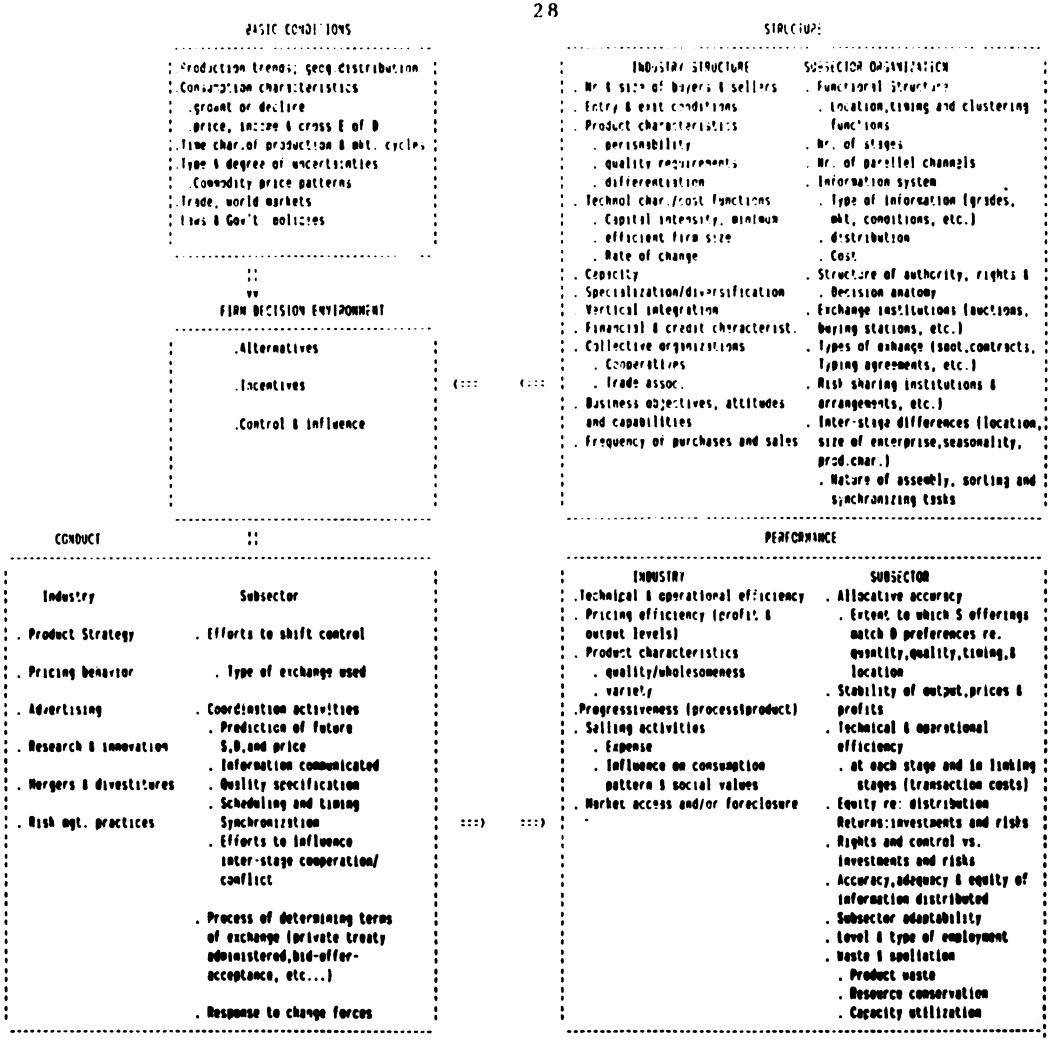


Figure 1.1. Subsector Structure, Conduct, and performance Paradigm
Adapted from Marion, 1986 P 54-55

28

dynamic approach that considers the natural and macroeconomic environment and changing conditions of supply and demand at each stage in the subsector from input supply through production, marketing, and consumption, while the industrial organization is typically a more static approach, taking an industry's structure and macro environment as given. Third, the subsector model puts emphasis on the importance of coordinating mechanisms such as bargaining associations, cooperatives, transportation systems, information systems, government programs, contracts, etc., and factors affecting the process of coordination (conduct) such as incentives, management practices, adequacy of inputs and flow of information. In general, the subsector approach is most used in the description of the organization and operation of commodity marketing systems, in the diagnosis of constraints to improve the performance, and in developing policy recommendations to remove these system constraints.

The subsector approach was pioneered during the 1960s and 1970s by a group of policy oriented agricultural economists of the North-Central Regional Research Project 117 (NC 117), led by Bruce Marion. According to Marion (1986) the major objectives of the project were:

1. To describe the structural characteristics of industries involved in the food system, identify the changes and causes of change in the structure of these industries, and determine the effects of alternative structural configurations on farm product prices and access to markets, the performance of marketing firms, consumer products and prices, local communities, and the distribution of income among participants in the system;

2. To describe the vertical organization, systems of price discovery and coordinating mechanisms of selected commodity subsectors, identify the changes and causes of change in the organization of these subsectors, and determine the effects

of alternative vertical organizations, price discovery systems, and systems of coordination;

3. To describe the legal environment of the food system, determine the effects of the law on the organization and performance of various parts of the food system, and evaluate the effects of alternative legal environments;

4. To identify and evaluate the consequences of alternative public and private actions that could be taken to alter the future organization, control and performance of the food system.

Subsector analysis is more than an analysis of the various industries that are part of a subsector, however. Although such industry analyses may be useful, the essential characteristic of subsector analysis is focusing in on the total vertical complex as a system.

For the purpose of this study, the subsector approach represents a valuable tool for the understanding of the nature and organization of the cattle and beef subsector, and the mechanisms used to coordinate the vertical system from the producer to the consumer. Within this approach, the study allows one to observe how the structural and behavioral dimensions of producers', traders', and butchers' markets are related and how they affect the cattle and beef subsector performance.

Organization of the Dissertation

This dissertation is divided into five chapters:

Chapter 1 reviews the importance of the livestock subsector in the growth and the development of the Malian economy, and justifies the relevance of the present study. It also reviews the existing studies on livestock and especially cattle marketing in Mali and West Africa, and describes the research objectives. Finally, the chapter describes the

conduct of the field research procedures, the market structure, conduct, and performance conceptual framework, and the research approach.

Chapter 2 describes the cattle and beef subsector organization in Mali including the production, marketing and marketing infrastructure. It also describes the beef system in Bamako including the movement of cattle into Bamako, the sources of cattle supply and the volume of slaughters. Finally, the chapter presents the research findings on the cattle and beef market structures, especially the degree of market concentration and the barriers to entry into the cattle and beef markets under study, and their competitiveness.

Chapter 3 presents and discusses the research findings on the market behavior of producers, traders, intermediaries, and butchers. It describes especially the market conduct in buying or selling cattle or beef including commodity price and quantity determination strategies, and the vertical coordination mechanisms used.

Chapter 4 examines the empirical findings on market performance and identifies constraints to good performance. It particularly analyzes two important performance dimensions: operational efficiency and pricing efficiency in the cattle and beef market. Finally, the chapter discusses two important marketing issues: the alleged redundancy of middlemen in the Bamako cattle market and the contention that cattle buyers exploit farmers.

Chapter 5 summarizes the study findings on market structure, conduct, and performance. The chapter also recommends alternative policies to remove the identified performance constraints and identifies research areas that merit further studies.

The Appendix section provides detailed information on field research surveys and additional tables which support the discussion presented in several chapters.

After the presentation of the study's analytical framework and its research approach, an attempt is made to relate the economic theory discussed above to the empirical evidence observed during the research.

CHAPTER TWO

CATTLE AND BEEF MARKET STRUCTURE

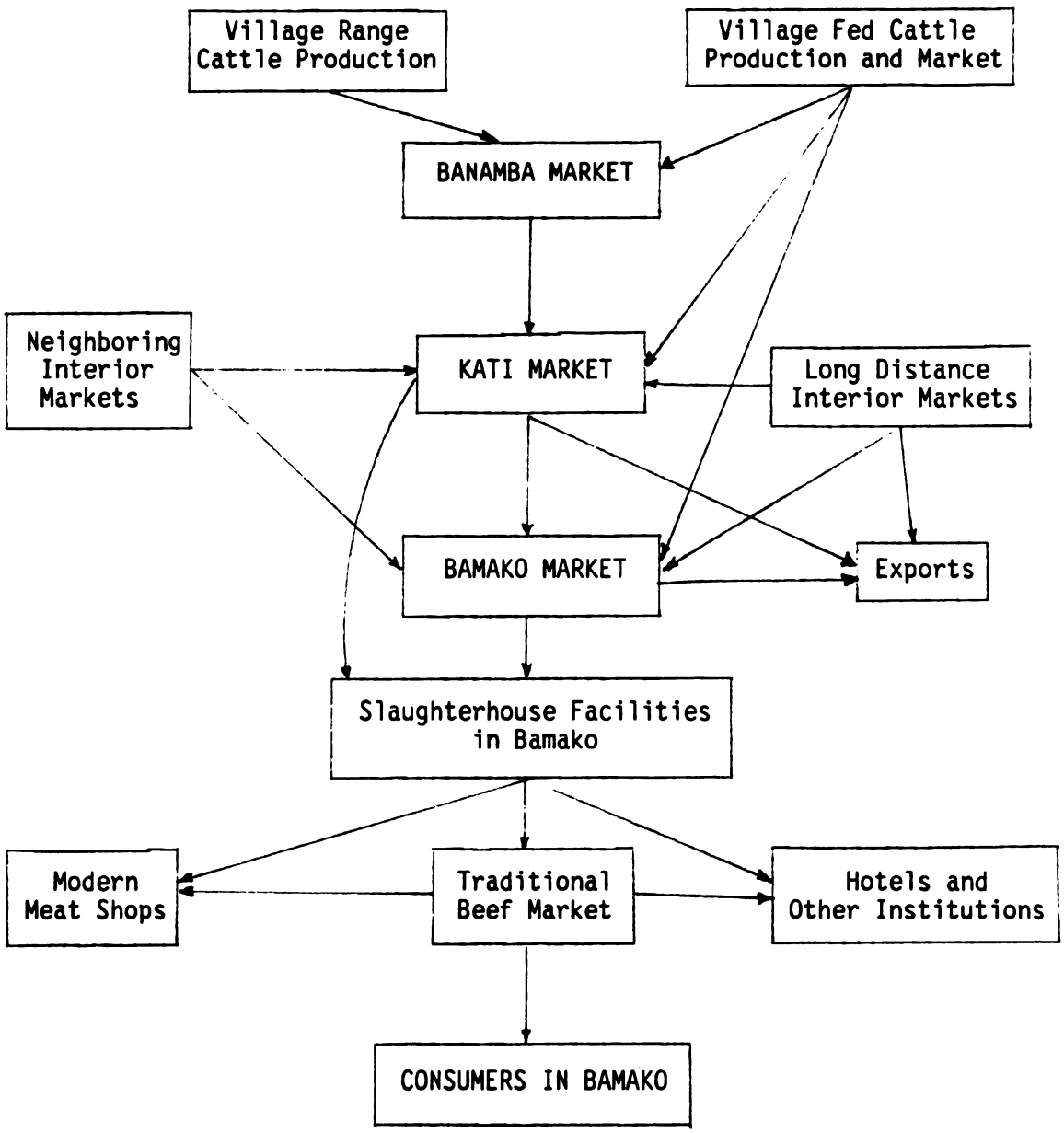
This chapter explores the Malian cattle and beef market structure, conduct and performance by surveying its main structural features. The chapter's main purpose is to present the empirical findings on market structure needed later for the evaluation of market performance in Chapter 4.

The first section of the chapter describes the cattle subsector organization in Mali including the production, the marketing, and the marketing infrastructure of range and fed cattle. The second section deals with the beef system in Bamako. The third section presents the research findings on the cattle and beef market structure including participants' socioeconomic characteristics, sellers' concentration and barriers to entry into the cattle and beef markets under study. Finally, the chapter conclusions summarize the findings and analyze their economic implications.

Cattle and Beef Subsector Organization in Mali

The cattle and beef subsector includes the production, marketing and consumption of range and fed cattle and of beef. The simplified flowchart presented in Figure 2.1a of the main stages helps track the vertical system for the subsector.

Fig. 2.1a SUBSECTOR DIAGRAM



Range Cattle System

The range cattle system is the most dominant production system in Mali. Thus, the description of the range cattle system organization in Mali provides information about the cattle system organization in the geographic areas under study and helps in the understanding of the environment in which this particular study is taking place.

The range cattle system in Mali is geographically dispersed, stretching from livestock production areas (mainly in the semi-arid zones in the fifth, sixth, and seventh regions, Niono and Macina in the fourth region, Nara in the second region, and Kayes and Nioro in the first region), to centers of high demand for beef in major Malian cities like Bamako, the capital city, and cities in coastal countries such as Abidjan and Bouake in Côte d'Ivoire, Kano and Lagos in Nigeria, Monrovia in Liberia, as many as 1,500 kilometers to the south.

Until recently, few cattle were being produced near the major consumption areas to the south of Mali because of humidity and disease problems, particularly the problem of trypanosomiasis. As a result, most of the beef consumed in Malian cities and to some extent, in Côte d'Ivoire is for a large part from the Malian Sahel zone (table 2.1a).

Because the major producing areas are in the north, and the major consuming areas are in the south, the flows of cattle and the principal commercial circuits are aligned in the north-south direction. Thus, factors that play a primary role in shaping the cattle marketing system in Mali are the distance between producers and urban consumers and the

Table 2.1$_a$: Official Estimates of Cattle population by Region (1977 - 1987)

REGIONS	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
KAYES	1,006,000	668,000	787,000	743,000	745,000	801,000	732,000	565,000	525,000	662,000	735,000
KOULIKORO	476,000	689,000	697,000	758,000	780,000	838,000	724,000	606,000	628,000	649,000	705,000
SIKASSO	635,000	1,042,000	971,000	933,000	1,092,000	1,066,000	1,059,000	1,040,000	1,101,000	1,170,000	1,228,000
SEGOU	309,000	512,000	627,000	663,000	686,000	739,000	720,000	595,000	555,000	581,000	554,000
MOPTI	1,619,000	1,080,000	1,159,000	1,699,000	1,812,000	1,974,000	1,560,000	1,447,000	1,062,000	1,031,000	1,014,000
TOMBOUCTOU	252,000	372,000	361,000	776,000	863,000	775,000	558,000	432,000	295,000	239,000	244,000
GAO	180,000	240,000	257,000	270,000	411,000	460,000	314,000	194,000	148,000	117,000	79,000
IKO DISTRICT			6,000	8,000	7,000	10,000	15,000	20,000	30,000	26,000	30,000
TOTAL MALI	4,477,000	4,603,000	4,865,000	5,850,000	6,396,000	6,663,000	5,682,000	4,899,000	4,344,000	4,475,000	4,589,000

Source : D.N.E.

degree of difficulty in linking the two groups. In such a situation the assembly of cattle and organization of their transport to consuming centers, as well as the slaughter, distribution, and sale of meat, are formidable tasks. This is especially so in the context of Mali's poorly developed communication systems. Such operations, require the involvement of several stages and many market participants, with each participant undertaking a specialized action or operation between producer and consumer. Market agents involved in selling and buying cattle in Mali include traders, intermediaries (brokers) and butchers.

Other features of the marketing system are the important phenomenon associated with the transhumance system of cattle production in the Sahelian zone and its impact on the supply of cattle to the major southern markets. With the onset of the dry season, large numbers of cattle are sold before the transhumance. The most economic arguments advanced to explain the herder's motivation to sell are for tax payment, grain supply, and purchase of household goods or to get rid of those animals in such poor condition that they are unlikely to survive the dry season. Yet, the relative importance and impact of each of these factors on the supply is not fully understood.

Cattle Marketing Infrastructures

In Mali, cattle are mostly sold in cattle market places. These markets are classified by OMBEVI into three types: collection (assembly) or country markets; distribution or intermediate markets; and terminal or consumption markets.

Collection or Country Markets

Collection markets (like those of Banamba) are located on open ground with no fixed facilities. They are generally located in producing areas where animals first enter the marketing chain and where herders sell their cattle to small traders and to other herders. Each of these country markets handles between 5,000 to 20,000 cattle per year. Calves, males of one to three years old, heifers and old cows account for most of the cattle presented for sale in country markets.

Adult males destined to slaughter or export are very few in these markets. They generally enter the marketing chain in redistribution markets.

Redistribution or Intermediate Markets

These are larger markets, where normally the wholesale assembly is made for the supply of distant terminal or consumption markets. Here primary buyers sell the cattle to long distance traders or intermediate traders who ship them to the south or sometimes to export traders. Moreover, local butchers also buy less valued animals in these markets for local consumption. A few redistribution markets are equipped with facilities and provide services such as watering points, and shelter for men and animals. Such equipped markets are owned and controlled by OMBEVI or by local governments.

A redistribution market typically handles between 20,000 and 50,000 cattle per year. In these markets, mature males and cull cows are generally dominant. However, young males are offered and may account for one-third of the total number of cattle presented. Heifers and old cows account for a small percentage.

Terminal or Consumption Markets

Terminal markets are located in big cities, and cattle in these markets are slaughtered or moved on to export markets. Participants in these markets are traders (sellers as well as buyers) and urban butchers. A terminal market usually handles more than 50,000 cattle per year. In these markets, mature males account generally for about 80 percent of the total number of cattle offered for sale. Young males of between 3 and 4 years constitute most of the remaining 20 percent. Heifers and cull cows generally represent a very small percentage in terminal markets. Among these final markets Kati and Bamako (both analyzed in this study) are the largest.

Major method of cattle transportation

The major method of cattle transportation used in Mali between these markets is trekking because, except in the region of Kayes, railways have not penetrated the major livestock producing regions. Until the recent completion of the Mopti-Gao road, motor roads had also not penetrated the producing areas. Thus, almost 100 percent of cattle are moved on foot to domestic markets and 50 percent of export cattle are also exclusively moved on foot. The remaining 50 percent of export cattle are moved by truck and trek-rail shipment.

It is alleged that trekking results in large weight losses in cattle and often deaths, particularly during the dry season and when facilities such as provision of water, organization of grazing areas, and veterinary control posts along the routes are absent. Mittendorf (1981) and Fenn (1977) estimated between 15 and 30 percent weight losses

in cattle trekking in West Africa. However, Staatz (1977) found a weight gain in cattle during the rainy season if trekked slowly.

The second major transport method is truck, but as yet it is not well organized because of lack of good roads. Trucking is being used mainly for export cattle and small ruminants from Mali to Côte d'Ivoire. A third transportation method used for export cattle is a combination of trekking from the interior of Mali to rail-head at the border in Bobo-Dioulasso in Burkina Faso or Ferkessédougou in Côte d'Ivoire, then by rail to Abidjan.

Government Interventions

Besides the internal cattle system organization, there are also some government interventions. These interventions currently are mostly indirect interventions undertaken to improve the marketing of cattle and beef (except the case of SOLIMA[10] which buys and sells livestock). They are in the form of regulatory and promotional measures. The most important of these measures are:

- Control of meat prices throughout the country for the benefit of consumers;
- Meat inspection before sale;
- Licensing requirements for traders and butchers;
- Provision of marketing facilities such as:
  - Livestock markets, totaling 144, according to the OMBEVI 1982 census, among which 5 (Nara, Nioro, Niono, Fatoma, and Kati) are equipped with watering points, shelter for men and animals and even scales and holding pens in Kati;
  - One livestock trail (from Nara to Kati) equipped with 10 watering points; and

[10] Société Lybio-Malienne pour l'Elevage et l'Agriculture

- Six modern abattoirs constructed in Bamako, Kayes, Gao, Sikasso, Segou, and Mopti.

Beef Marketing Infrastructure

The abattoirs and meat shops constitute the bulk of the beef processing and marketing infrastructure.

Among Mali's six modern abattoirs, only five were in operation in 1988. They are in Bamako, the capital city; Kayes, Mopti, Segou, and Sikasso. The Bamako slaughterhouse (AFB) was completed in 1965 and has a daily slaughter capacity of 220 head of cattle, 200 sheep and goats, and 50 hogs. These would produce 40 tons of carcass meat per day. There are holding coolers with a capacity of 48 tons or 800 beef carcasses, and refrigerated rooms for offal, mutton, and pork. The plant is very often operating at its designed capacity.

Kayes, Segou, Mopti, and Sikasso have slaughterhouses with capacities of 20 cattle and 40 sheep and goats per day. However, on average, they are operating below their designed capacities.

The construction of a modern slaughterhouse designed to handle 40 head of cattle and 120 sheep and goats per day was completed in 1964 in the producing area of Gao. Unfortunately, because of a much lower demand for meat than anticipated, this plant has never been operational.

Besides these modern slaughterhouses, there are local abattoirs in most important markets and medium-sized towns. According to the DNE figures, a total of 470,000 head of cattle and 2,406,000 head of small ruminants (both controlled and non-controlled) were slaughtered in Mali in 1984.

Very little reliable evidence exists concerning actual consumption of animal protein in general and beef in particular in Mali. DNE estimated in 1985 that about 15 Kgs of meat and offal (including beef, mutton, and goat meat) were consumed per capita in Mali.

Most of the beef sold in Malian markets is fresh and classified as boneless beef, with bone beef, or tas which is a mixture of meat, bone and offal in small and unweighted piles.

Market agents involved in the sale of beef include butchers and their apprentices.

Financing Systems

Access to credit for purchasing of animals by traders and butchers is essential to good market performance. According to the findings of this study, however, cattle and beef market participants in a large majority have no capital and no access to bank credits.

At present, the major source of capital lies within the marketing system itself. In Mali, the commercial banking system for livestock is very poorly developed. Since the failure of an earlier butchers' credit scheme implemented by ECIBEV in 1975 due to many defaults on credits, only one State Institution (BNDA) currently provides entry-level credit on a short-term (6 to 12 months) basis. Livestock traders and butchers in Mali generally receive less favorable treatment from all credit institutions than do other businessmen (this is in contrast with PRMC support of cereal merchants thanks to the PRMC[11] funds). Although the motives for such discrimination are not quite clear, they seem to derive partly from four reasons:

---

[11] PRMC: Programme de Restructuration du Marché Céréalier

1. Resource scarcities related to Mali's poor economic performance;

2. Cattle traders and butchers generally do not have collateral to guarantee the security of the loan (this reason is the one most often advanced by bankers);

3. Cattle traders and butchers usually pass all their commercial transactions outside the banking system, thus, banks cannot gauge their financial position. Bankers are more inclined to deal with those customers who pass all their transactions through their bank accounts than they are with those who do not disclose or disclose only some of their business; and

4. Cattle traders and butchers do not enjoy the political power that businessmen in manufacturing have. Thus, small traders and butchers are more often dependent on informal loans from relatives, individual lenders, or their trading partners. These sources often charge higher interest rates (as evidenced in this study) than would banks.

Before its discontinuation in 1987, ECIBEV had indirectly financed the fed cattle trading system through fed cattle producers' loans (see Chapter 3).

The agreed-upon period of repayment of credit varies from 40 days for fed cattle first handlers to one day for butchers in Bamako (see Chapter 3). The long credit delay (30-40 days) at the fed cattle primary market level is justified by the fact that first handlers need time to assemble a lot of 20-30 head and trek to Kati or Bamako for sale.

Evidence presented in this study shows that debtors generally extend the delays of repayment and even default. These abuses of credit resulted in high interest rate charges on capital in credit purchases (especially butchers' purchases) ranging from 5 to 20 percent for a credit duration of 1 to 5 days.

There may be many reasons why butchers delay repayment or default on credit. The most likely reason suggested by the study is financial

losses incurred by butchers (see Chapter 4). These losses were largely attributable to beef price control and butchers' misjudgment of animal weights.

Theoretically, when an indebted butcher does not repay his credit on time or defaults, the creditor can file a complaint and the debtor can be jailed and his belongings sold to repay the creditor. In practice, however, these actions are seldom taken. Thus, the creditor ends up as the final loser.

Although credit market ratios have not been estimated, available evidence based on informal discussions with traders indicates they are low. This, however, is what one should expect given the large number of local traders (and to a lesser extent interior traders) discussed later in this chapter who provide credits. With such a large number of participants, the credit market is expected to be competitive even if concentration ratios are high. Yet, there is a need for further research on the matter to confirm or reject the results of the primary inquiry.

Fed Cattle System

The vertical system for fed cattle is similar to the range cattle system organization except for a restricted geographical area of production, which is mainly located around the capital city. Moreover, the production system consists of three-month on-farm intensive feeding period during the dry season (January or February to March or April).

The implementation of the dry season cattle feeding program, called in French "Embouche Paysanne," began in 1975 with the creation of the US-financed project called ECIBEV. The rationale for dry season

embouche paysanne was to take advantage of the low opportunity cost of the dry season labor and seasonal increases in cattle prices, to increase cattle supply in Bamako, and increase farmers' income. One important phenomenon associated with the transhumance production system of cattle which dominates in the major producing areas (the Sahelian zones) is its impact on the supply of animals to the major southern markets, primarily Bamako.

After the rainy season, October through February, the supply of cattle to Bamako increases considerably and their prices in general drop noticeably. During the next seven months the animals are away from the owners, and/or are in poor condition, making herders reluctant to sell. Thus, the supply of cattle decreases, generating an increase in cattle prices, with a peak in July.

It was in response to these seasonal supply shortages and seasonal price variations that the Embouche Paysanne program was introduced in 1975. To achieve its stated objective, the project made possible for small farmers at the village level to buy feeders at the end of the rainy season, usually November through January, when the cattle prices are lowest. For that, ECIBEV provided cash loans to the farmer for the procurement of feeder cattle, and credit in kind in the form of supplemental feeds (cotton seeds), salt blocks, veterinary drugs and technical support in animal health and feeding methods through its field extension agents who resided in major villages. Farmers themselves were required to provide labor, water, and forage, such as peanut or cowpea hay.

The embouche program consisted of a three-month feeding period, usually from January or February to April, and allowed one or two months to sell fed cattle to traders. The daily gain was expected to be .4 or .5 kilogram.

The expected improved conditions of the animals after the feeding period, plus the normal seasonal price increase during the dry season in Bamako were expected to benefit the farmers. These incentives for producers were expected to boost the production of fed cattle at least in the short run. (But in the long run, the increased supply may result in a decreased sale price, which could create disincentives for producers particularly if the increased supply was not due to cost-reducing technological changes).

At the end of each campaign the farmers were to repay ECIBEV for the cash loans plus a fixed overhead sum called a redevance. The redevance included the cost of the veterinary products, feed, the project's operational costs (including technical assistance) on a per-head basis, a factor (premium) for default on credit, death loss insurance fees and cash loan interest rate.

Through years, the cash loan amount was increased from 27,500 F CFA per head in 1975 to 45,000 F CFA in 1986. During the same period, the redevance also increased from 5,400 F CFA per head to 17,500 F CFA in 1986. Experience to date suggests that the feeding program has been a success at least at farmer's level, as can be observed from table 2.1b. When feeding activities began in 1975-76, only 108 cattle were

Table 2.1b
ECIBEV Estimates of Embouchers
and Fed Cattle in Banamba Zone

Year	Emboucheurs (Farmers)	Cattle
1975/76	35	74
1976/77	65	113
1977/78	N/A*	267
1978/79	73	191
1979/80	64	270
1980/81	255	1034
1981/82	812	1799
1982/83	700	1200
1983/84	638	2466
1984/85	1046	3110
1985/86	465	1862

Source: ECIBEV (Annual Reports)

* Not Available

fed by 50 farmers. In 1985-1986, 4,655 were fed under the project sponsorship and 1982 farmers were involved.

Emboucheurs of the project (in Banamba and in other feeding zones) gained an average return to farmers' labor of 13,400 F CFA per head in 1985/86, and 14,200 F CFA in the 1987-1988 campaign, an equivalent of the average of monthly salary of a plant worker in Mali.

The geographic areas selected for the implementation of the cattle feeding program were located in the mid-southern zone and included the counties of Segou in the fourth region, Banamba and Koulikoro in the second region (Koulikoro), as shown in Figure 2.1b. These areas are generally populated by farmers familiar with livestock and are environmentally suitable (free from tsetse flies and having relatively few cattle health problems).

The geographical area covered by this study comprised the sole county of Banamba. This county lies in central Mali on the left side of the Niger River in the region of Koulikoro. Its climate is tropical, with two subtypes which differ from one another in their amount of rainfall per year: the Sudanian subtype, with 800 mm of annual rainfall, and the Sahelian subtype, with about 600 mm of annual rainfall. The main characteristic common to the two subtypes is the division of the year into a dry season from February to June and a rainy season from June to September. The division of the year into two main seasons has implications for human activities, which tend to be concentrated in the rainy season. During the dry season, there is a sharp decrease in the intensity of economic activities. This is due to the fact that the Saracolle and the Bambara, the two main ethnic groups

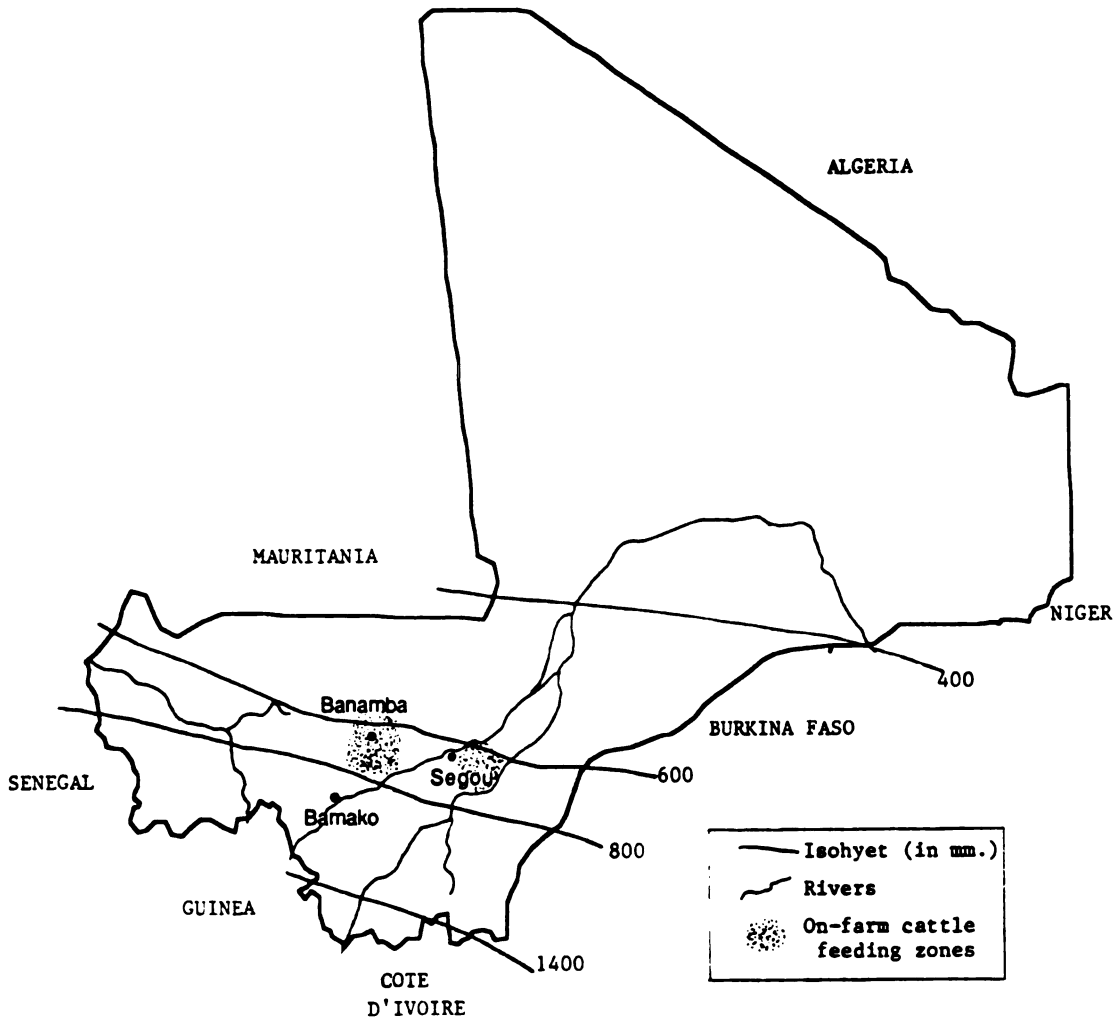


FIGURE 2.1b

On-Farm Cattle Feeding Zones in Mali

which populate the county, are essentially agriculturalists. However, the Saracolle have also interest in livestock raising, including cows, sheep, goats, horses, and donkeys. The most important crops cultivated in the area are millet, groundnuts, beans, and cowpeas.

The geographic area under study comprised 39 villages in which 465 farmers fed 1862 cattle in 1986. In 1975-76, when the feeding program began, only 35 emboucheurs were involved and 74 head were fed. Table B1 in the Appendix shows the evolution of cattle feeding in the ECIBEV feeding areas.

Unfortunately, because of the project failure to reach its goal of marketing 4,000 fed cattle per year in order to be cost-effective, it was discontinued in 1987. The financing of the embouche program was supposed to be continued by the National Bank for Agricultural Development (BNDA), which effectively financed the 1987 embouche campaign, but failed to finance the 1988 campaign because many emboucheurs did not repay part or all of their debts. At present, the Ministry for the Environment and Livestock (MEE) is looking for alternative schemes for the continuation of the feeding program.

After a brief presentation of a Malian cattle and beef subsector, the following section deals especially with the Bamako market for beef.

Bamako Market for Beef

Demand Factors

The major factors which can influence the level of demand for beef in Bamako are: the city's population growth, changes in the per capita real income, and the costs of alternative meats such as mutton, fish, and chicken.

Population Growth

During the last years for which data were available, the population of the city of Bamako has grown dramatically, increasing by a projected average of 7 percent per annum between 1980 and 1985, according to the city urban affairs project (Projet Urbain), as shown in Table 2.2. This growth is attributable essentially to a massive rural immigration to towns and cities (Bamako in particular) due to the drought and its related social effects (unemployment). This growth of the urban population tends to increase the total demand for animal protein since it is generally admitted that per capita consumption of meat is higher in the cities due to urban people's eating habits and their lesser reliance on game meat and fish. However, the influx of immigrants may result in the reduction of the average amount of meat consumed per capita by urban dwellers as a consequence of changes in the relative proportions of different income classes in the city. According to the results of a census conducted in Mali in 1987, however, the total population of Bamako was 37 percent lower than the 1986 projected population. One may explain this decline in the city population by a massive emigration to rural areas of former immigrants because of improved climatic conditions and increased agricultural production beginning in 1985. The differences may also be due to inaccurate projections of the Bamako city population growth rate or to both false projections and massive returns of peasants to their lands. The former seems to be more likely, since the 1987 census in Mali shows that the projected estimates for 1987 were overestimated by about 37 percent. Assuming that the 1980 census and the 1987 census are correct, the

Table 2-2

Population Growth in Bamako (1980-1987)

Year	Population (000)
1980	550 *
1981	588 *
1982	629 *
1983	675 *
1984	722 *
1985	773 *
1987	646**

* Source: Bamako City Project 1986

** Source: Malian National Statistic Office 1989

annual growth rate in Bamako between 1980 and 1987 would be about 2.5 percent and not 7 percent as assumed by Projet Urbain du Mali. Thus, for the 7 years the revised Bamako population estimates can be made (Table 2.4.).

Costs of Substitute Products

The major substitute products for beef in the city of Bamako are mutton and goat meat, and to a lesser extent, poultry and fish. Changes in the relative price of any substitute may have an effect upon the consumption of beef since a decrease in the price of any of them has both an income effect and a substitution effect. Currently, however, because of its relative cheapness, beef (primarily beef with bone and tas) is by far the primary source of animal protein in Bamako. Table 2.3. presents the price of beef, mutton, and goat meat in Bamako. Data on fish and poultry prices are not available.

According to OMBEVI (Paper No. 68, 1976) beef is the most consumed everyday animal protein in urban areas, with mutton second and fish a poor third. Chicken is a luxury good reserved for ceremonial occasions. This is confirmed by the 1988 Robert R. Nathan Associates, Inc. study. Although cross-price elasticities for these substitutes are not available, one may believe that a rise in the price of beef relative to mutton may be expected to have some effect on the demand for mutton and vice versa. Beatrice L. Rogers and Collegue estimate the beef price elasticity in Bamako at -.6.

Change in Real Income

Personal real income level is an important factor affecting per capita meat consumption since meat is generally considered a superior

Table 2.3: Official Prices of Beef and Substitute Meats in Bamako: (1980-1987) (CFA)

Commodity	1980	1981	1982	1983	1984	1985	1986	1987
Beef Without Bones	600	650	675	700	700	900	1000	1000
Beef With Bones	500	550	575	600	600	700	700	700
Mutton and Goat Meat	700	750	775	800	800	1.100	1.100	1.100
Ratios Mutton and Goat Price / Beef With Bone Price	1.40	1.39	1.35	1.33	1.33	1.57	1.57	1.57

Source: OMBEVI (Annual Report, 1980-1987)

(preferred) good. According to OMBEVI's survey conducted in Bamako in 1974-75, the overall urban income expenditure elasticity for red meat was estimated at 1.25. This implies that a one percent increase in urban per capita income will be translated into a 1.25 percent increase in expenditures for red meat, other things being equal. A recent meat consumption elasticity estimate made by the 1989 Robert R. Nathan study yielded a very close 1.27.

Data from the 1988 World Bank - World Development Report indicate that the real income per capita in Mali rose at an average rate of 1.1 percent per year from 1970 to 1986. The data, however, did not indicate the income distribution between rural and urban areas.

Per Capita Beef Consumption in Bamako 1980-1987

Table 2.4. presents both the projected and revised estimates of the population of Bamako city from 1980 to 1987 and the total beef quantity distributed in Bamako during the same period and recorded by the Abattoir of Bamako. However the per capita beef consumption estimate figures presented in that table may underestimate to some extent the real volume of the total beef consumed in the city because of the important quantity of clandestine beef sold throughout the city neighborhoods and also the inaccuracy of suburban slaughter recording.

In looking at the same table it appears that there was no persistent tendency in the per capita beef consumption in Bamako until 1984. Between 1980 and 1982 there was a decrease of the quantity of beef consumed by each Bamako resident. Then it increased in 1983 and 1984. Since 1984 however, there is a persistent downward tendency in the per capita beef consumption in Bamako.

Table 2-4: Annual Beef Consumption per Capita in Bamako

	Year	Estimates of the City Population (000)	Revised Estimates of the City Population (000)	Total Beef Consumption (Tons)	Per Capita ** Estimates (Kg)	Revised Per Capita ** Estimates (Kg)
***	1980	550	550	7274	13.2	
	1981	588	563	7762	13.2	13.8
	1982	629	577	7193	11.0	12.5
	1983	675	590	8727*	12.9	14.8
	1984	722	604	10798*	15.0	17.9
	1985	773	618	10609*	13.7	17.2
	1986	827	633	9492	11.5	15.0
***	1987	646	641	8369	12.9	13.0

Source: Table 3.1 and 3.4

* The increased volume of beef supplied in Bamako since 1983 may be attributable to a large extent to better recording of slaughters.

** These figures exclude clandestine slaughters

*** Census years

One may believe that these irregularities are due to the lack of accuracy of the slaughter recordings or to possible changes in the relative populations of different income classes in the city. The mutton and goat meat consumption as presented in Table 2.5. did not seem to substitute in a systematic manner for the beef. However, a smaller percentage of total slaughters of small ruminants occur in the AFB than in the case for cattle. Thus, one cannot put as much reliance on the small ruminant figures. The fall in per capita consumption may also be due to the reduction in cattle supply following the 1981-1984 drought.

Slaughter Facilities in Bamako

In addition to holding coolers, the modern slaughterhouse (AFB) in Bamako city is equipped with a live animal scale which is installed in one of the three holding pens of the slaughterhouse. There is another scale available in the carcass dressing room to weigh hot carcasses. Running water is also available for cleaning up the slaughter floor. Both working conditions and sanitation are satisfactory in the building.

There are three slaughter lines in the slaughterhouse, one for cattle, one for sheep and goats, and one for hogs. The lines are mechanized (however sheep and goats are slaughtered by the butchers or their apprentices) and operated by the abattoir personnel.

Animals are delivered to the slaughterhouse in the evening, and they are slaughtered during the night. Carcasses then are dressed, inspected by veterinary agents, weighed and put in coolers.

Carcasses are delivered to the butchers in the morning and transported to the city's numerous meat markets by the abattoir vehicles. The Bamako slaughterhouse is open seven days a week. A total

Table 2-5: Comparative Beef and Mutton Slaughter
Bamako: 1980-1987

Year	Beef		Mutton and Goat	
	Volume (Tons)	Percentage Change from Previous Year	Volume (Tons)	Percentage Change from Previous Year
1980	7,274		821	
1981	7,762	7%	927	13%
1982	7,193	- 7%	977	5%
1983	8,727	21%	1,212	24%
1984	10,798	24%	1,146	- 5%
1985	10,609	- 2%	847	-26%
1986	9453	- 11%	813	- 4%
1987	8369	- 11%	707	- 13%

Source: AFB (Annual Reports, 1980-87)

of 145 persons work in the abattoir, including slaughter line workers, administrators, and maintenance personnel. For the service it provides, the Bamako Abattoir charges 2,400 CFA per head of cattle to the butcher and 400 CFA for carcass transport to meat markets. In addition to the slaughterhouse discussed above, there are three uptown slaughter slabs where slaughter is carried out on the ground by butchers or their apprentices.

A slaughter slab is no more than a simple concrete area that serves to keep the carcasses reasonably clean during slaughter. It is covered by a steel or straw roof and is furnished with a gantry for raising carcasses for easier skinning and dressing. There is no other equipment and no running water. But carcasses are inspected by veterinary agents and taxes assessed by the same agents. The carcasses produced by uptown slaughter slabs are generally sold in suburban neighborhoods. In 1987, the volume of beef produced by the uptown slaughter slabs was estimated by the AFB at 16 percent of the total beef consumed in Bamako. It was 15 percent in 1985.

Recorded Slaughter and Seasonal Variations

Year to Year Change

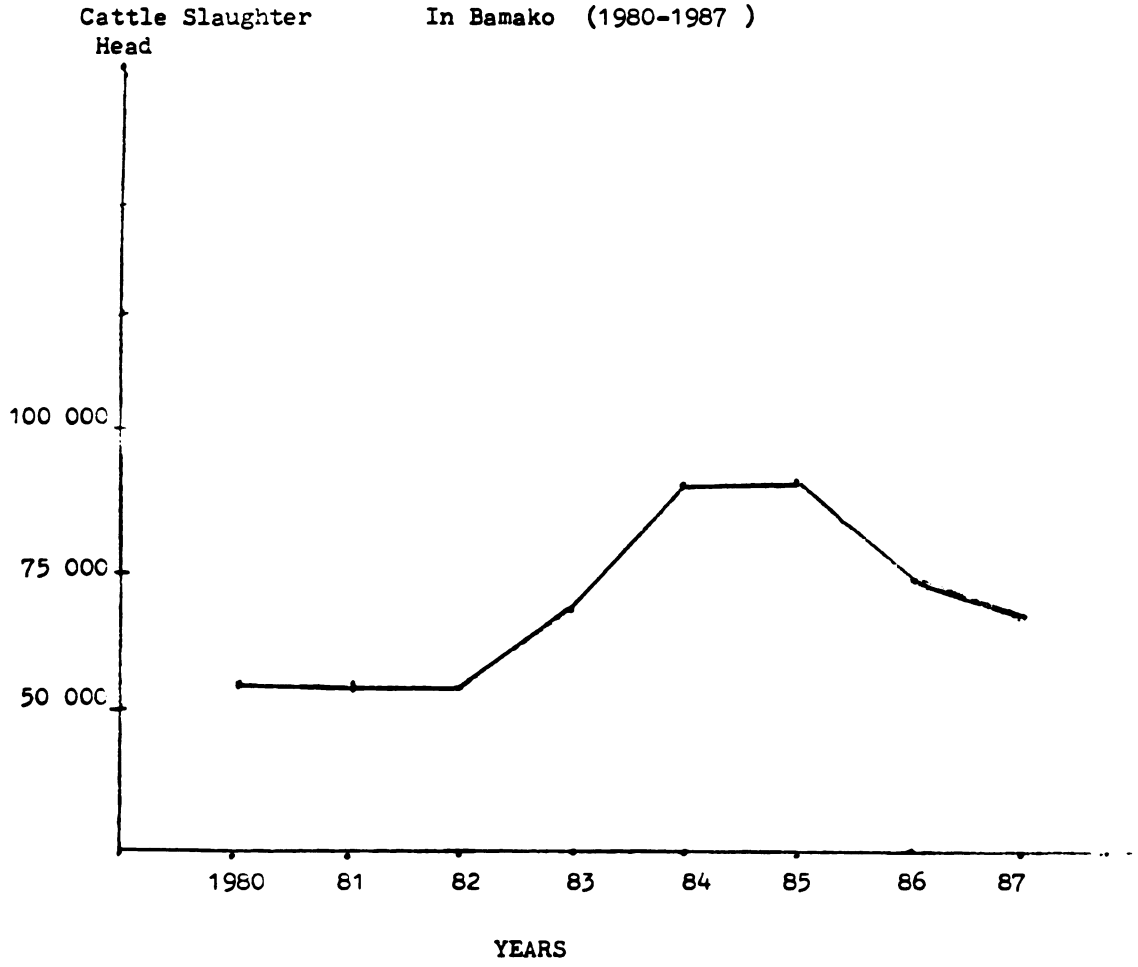
In analyzing slaughter trends it is not easy to distinguish between demand and supply factors that could explain the observed year to year changes. Moreover, due to data recording problems in Mali, one should be cautious about the accuracy of data used here. They rather should be considered as a general indication.

In looking at Figure 2.1. and cattle slaughter records in Table 2.6. in Bamako, it appears that between 1980 and 1982, the cattle

Figure 2.1

Annual Cattle Slaughter

In Bamako (1980-1987)



Source : Table 2.6

Table 2-6

Annual Cattle Slaughter in Bamako
(1980-1987)

Year	Cattle
1980	55,628
1981	55,083
1982	54,333
1983	68,733
1984	90,942
1985	91,631
1986	73,968
1987	67,173

Source: AFB (Annual Report 1980-1987)

slaughter was stable, but between 1982 and 1984, it dramatically increased. These increases, however, are likely attributable to better recording of the slaughters, especially the including of the suburban slaughter figures beginning 1983 into the Bamako Abattoir records. However, a slight increase in the cattle slaughter due to the city population growth and/or drought-induced cattle sales is likely. Since 1985, a consistent downward trend is observed in the number of cattle slaughtered and since 1984 in the quantity of beef produced. Tables 2.5 and 2.6 show a drop of about 27 percent of cattle slaughters and 22 percent of beef produced in Bamako between 1984 and 1987. Between 1984 and 1985, beef tonnage declined (Table 2.5.), while the number of cattle slaughtered increased (Table 2.6.). This could be explained by a decline in average carcass weight in the two worst years of the drought.

Although no data on changes in income in Bamako are currently available, one may explain this situation by a possible reduced beef demand (see Table 2.4 also) due to a per capita income reduction in Bamako. This income reduction was primarily due to massive state operated enterprise workers job losses as a consequence of IMF economic reform policies during the last four years. Data on mutton and goat slaughters in Table 2.5 do not support the substitution of beef by mutton and goat meat.

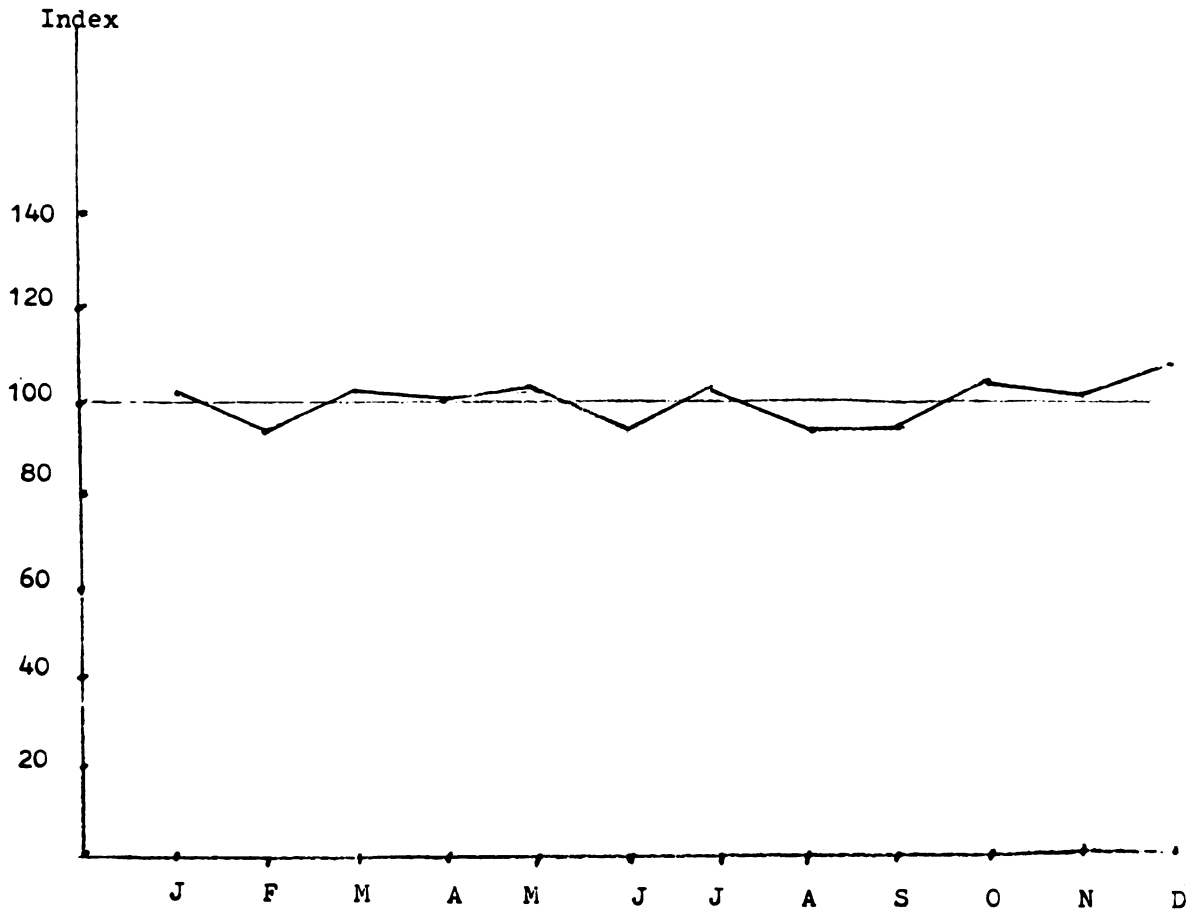
However, the drop may also be explained partly by increased clandestine cattle slaughters in Bamako in order to evade abattoir tax payment. Supply factors such as a decline of offtake (as producers rebuilt herds following the 1981-1984 drought) also could explain the downward trend observed since 1984. One should recall that Mali

experienced drought from 1981 to 1984 which forced many herders to sell off stock.

Seasonal Variations

Looking at Figure 2.2 (derived from appendix Table C2), it appears that the cattle slaughter in Bamako within the year is fairly stable and there were no important variations. The seasonal sale peak observed in December may be explained by the end of the year holidays. Indeed, although the population of Bamako is in large majority Muslim, people in many big cities in Africa celebrate the event by various social activities. Moreover, the relatively high demand in July can be explained by the series of National Youth Festivals which take place at least once every two years in the capital city. These events are usually held in July and gather nearly 5,000 young athletes and artists for two weeks. Moreover, the period between October and January coincides with the increased herders' sales period discussed in the section above on seasonal variations in cattle sales. In addition, meat demand is generally increased during this period due to the marketing of agricultural products. In contrast, during the dry season, the supply is generally reduced due to the transhumance system and animal poor conditions. The average index, however, obscures some important seasonal slaughter variations in several years (especially at the end of 1983, and in 1984-85) as shown in appendix Table C1. These variations may be explained by different conditions regarding herd liquidation caused by factors such as drought, followed by reduced offtake for herd rebuilding.

Figure 2.2
Index of Monthly Cattle
Slaughters variations
in Bamako (1980-87)



Source: Table C_2

Sources of Cattle Supply in Bamako and Kati Markets

Bamako's beef consumption needs are met by two general sources of cattle supply: the city dwellers' own fed and range cattle production and the cattle from the interior of the country including the fed cattle from the feeding programs.

In general, the major cattle flows to Bamako conform to the country's general north-south flow patterns (Figure 2.3). However, the patterns of the flows are constantly changing as traders adjust to market conditions, primarily supply and price variations. For example, the flows from Kati usually decline to about two-thirds of the December and January supplies during the rainy season because of the reduced quantity of Zebu cattle offered at that period, while the activities of Bamako's suburban cattle market of Faladié, which is generally specialized in taurine cattle trade, are increased. This is due to the fact that butchers have preference for fatter meat, and usually during the rainy season only the taurine cattle are fat. The zebu cattle are in poor condition during that period. Figure 2.4. (derived from Table C4 in the Appendix section) presents graphically the monthly indices of variations of cattle offered for sale in the Bamako and Kati cattle market from 1980 to 1987.

The Bamako city dwellers' feeding program produced about 1,000 fed cattle in 1985, and 1,900 head in 1987 through BNDA[12] financing. BNDA has for its objective to provide credit to government employees, traders, and farmers who are able to feed about 30 or more cattle per

---

[12] BNDA: Banque Nationale du Développement Agricole

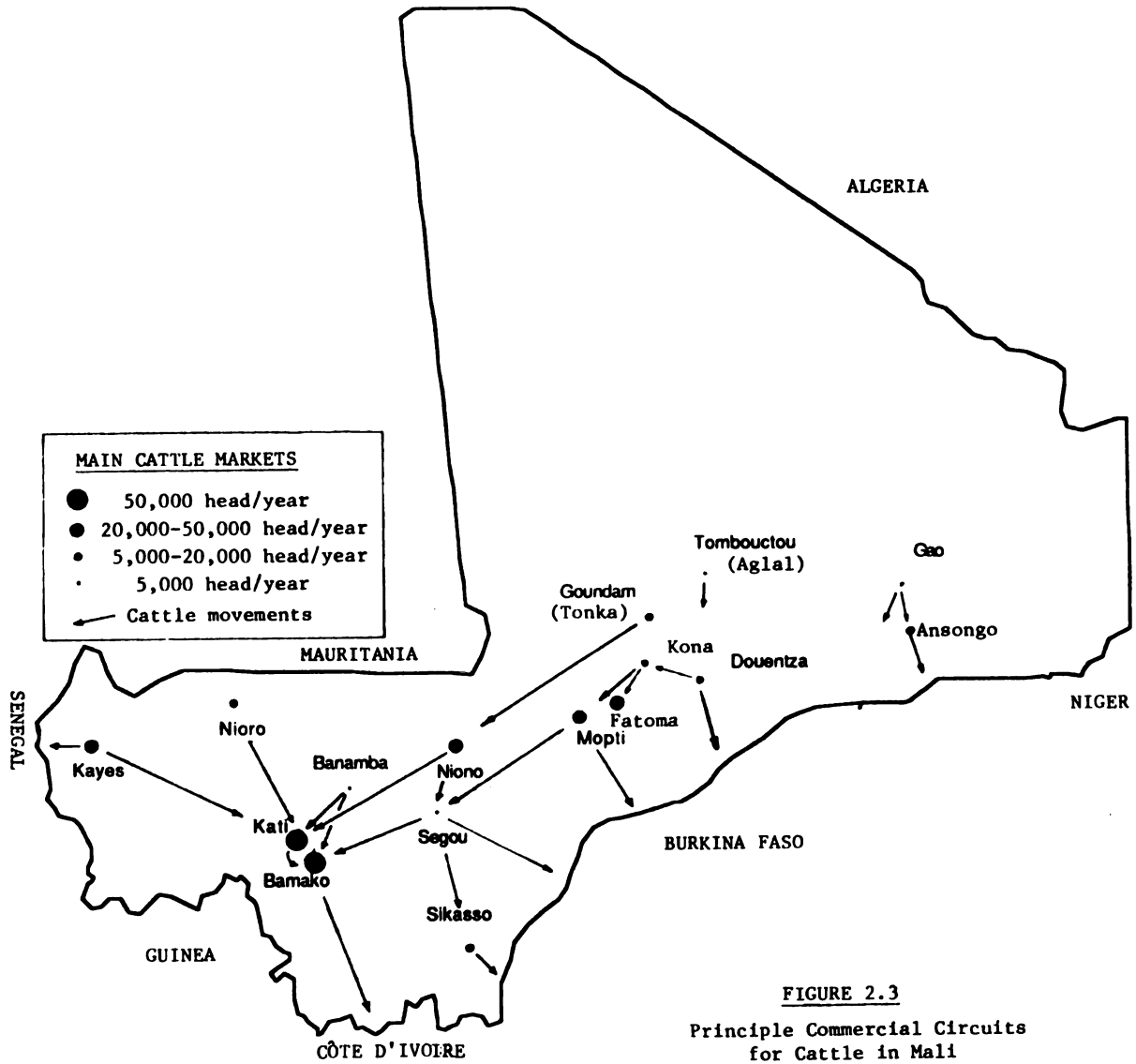


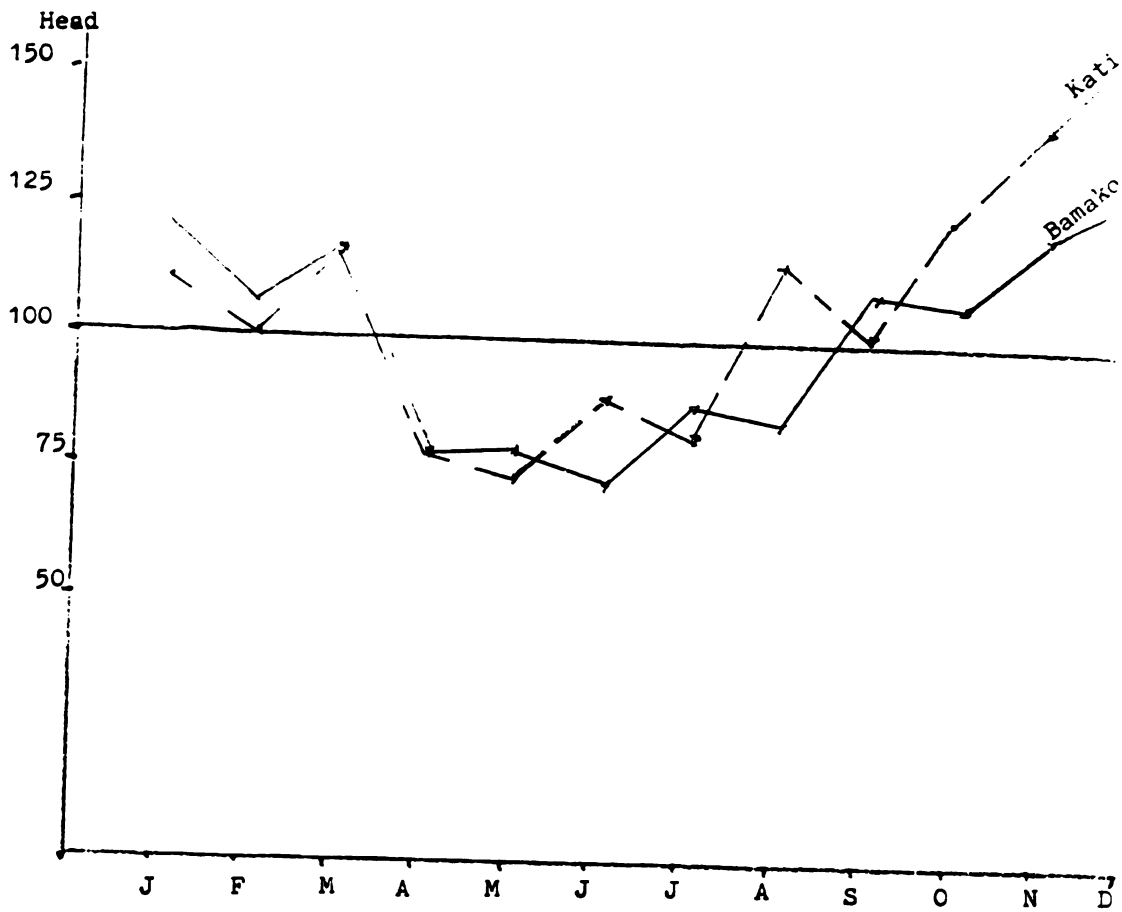
FIGURE 2.3

Principle Commercial Circuits
for Cattle in Mali

Figure 2.4

Monthly Indices of variations of Cattle offered for Sale in BAMAKO and KATI.

MARKETS (I980 - I987)



Source: Table C_4

marketing season instead of the 2 to 4 cattle per farmer contemplated by ECIBEV.

Cattle from the interior provide the bulk of Bamako's beef supply. The major markets supplying Bamako as shown in the flow's Figure 2.3. are Kati, Niono, Fatoma (Mopti), Léré (Niafounké), and Tonka (Goundam) for Zebu cattle. Léré and Tonka supply Bamako indirectly through the Niono market. For the taurine cattle supply, mostly during the rainy season, Faladié, Bougouni, Massigui, and Kati are the major markets supplying Bamako. The Kati market is one of the most important terminal markets in Mali and the most important cattle supplier to Bamako. It is supplied from the following markets: Kayes, Nioro, Nara, Banamba, and Niono for Zebu cattle. In addition to these markets, Kati receives the taurine cattle from Kita, Kolokani, and Kati county villages.

All the cattle are shipped on hoof to Bamako. However, the cattle from Kayes are shipped by train to Kati, then trekked to Bamako. According to many people including traders, butchers, and Malian officials, many of the cattle sold in Kati and Bamako are now slaughtered in Bamako and consumed within the city since the decline of the exports from Bamako, beginning with the replacement of the Malian franc currency by the CFA currency in June 1984. Table 2.7. shows the decline of officially recorded cattle exports from Bamako. Indeed, the currency change was followed by a price adjustment for almost all commodities. Many of them doubled within one week. These cattle price increases in Mali reduced the competitiveness of Malian cattle in export

Table 2.7

Offically Recorded Cattle Exports
from Bamako (1980-1987)

Year	Head
1980	13797
1981	21023
1982	26741
1983	27610
* 1984	18105
* 1985	17343
* 1986	16170
* 1987	16110

Source: DNE (Export Report, 1980-1987)

* The decline in exports beginning in 1984 can be attributed to the 1984 Malian Franc conversion to CFA Franc.

markets according to cattle traders. Moreover, according to Josserand,[13] the competitiveness of Sahelian cattle in coastal markets has been hurt by the very large subsidies on EEC beef exports to West Africa.

Cattle Sales in the Markets of Kati and Bamako

Year to Year Variations

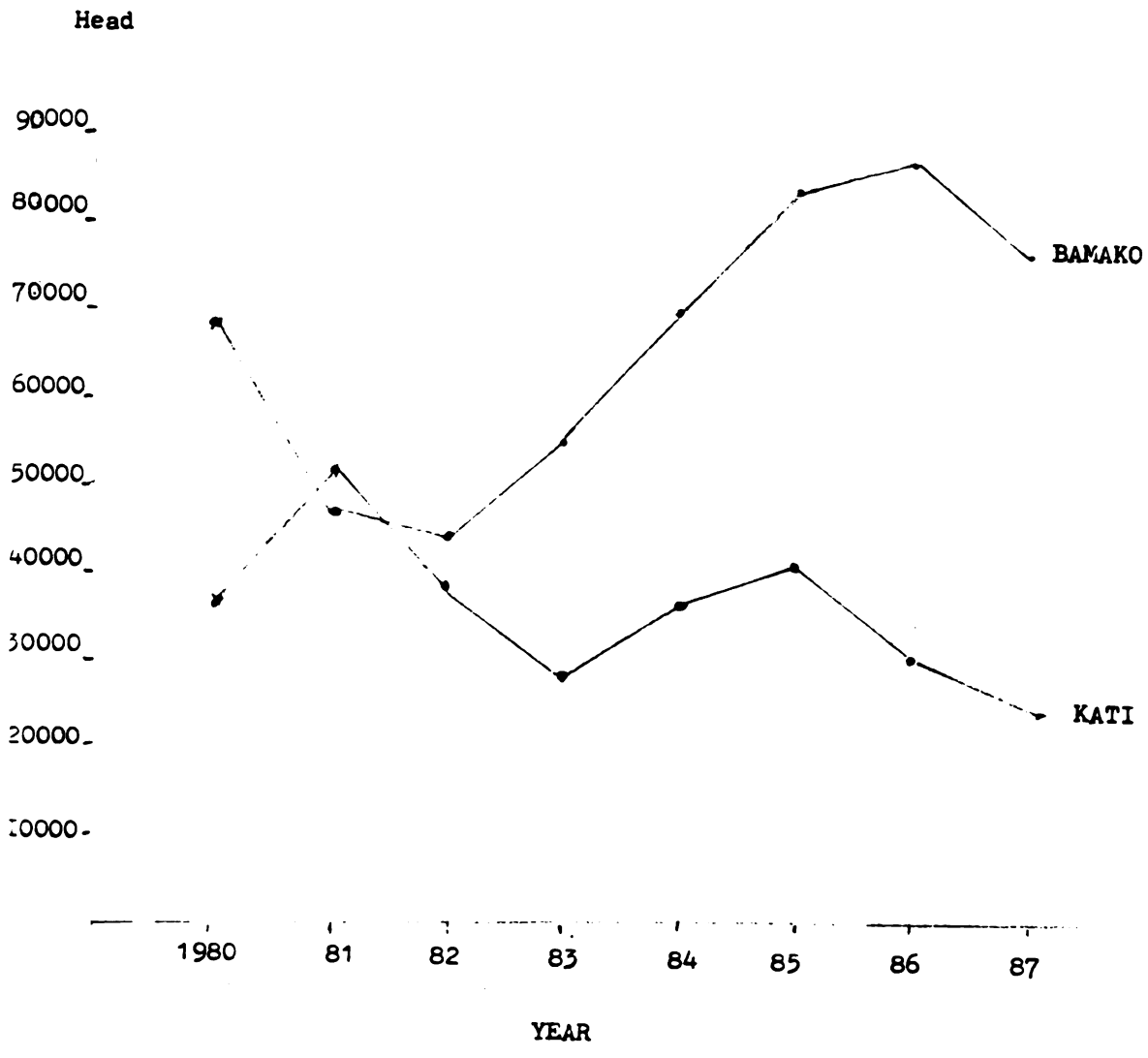
Figure 2.5. (derived from Tables C5 and C6 in the Appendix section) presents the sales of cattle in Kati and Bamako from 1980 to 1987. The Kati cattle sale graph in Figure 2.5. shows noticeable upward and downward variations from year to year between 1980 and 1987. Since no persistent trend for at least three years has been observed, it is difficult, however, to analyze and interpret the variations of cattle sales during the period under study.

The Bamako cattle sale graph in Figure 2.5. shows three different movements between 1981 and 1987. From 1980 to 1982 the movement was downward. Between 1980 and 1981 sales decreased by 30 percent, between 1981 and 1982 cattle sales in Bamako fell by 33 percent. From 1982 to 1986, the trend of cattle sales was upward. From 1982 to 1983, sales rose by 23 percent. Between 1983 and 1984 they rose by 24 percent. Overall, cattle sales rose by a dramatic 88 percent between 1982 and 1986. These cattle sale increases in Bamako from 1982 and 1986 might be explained by four factors: 1) the length of the drought, which forced many cattle owners to sell off some stock or take complete losses; 2) the currency change in June 1984, which made the Bamako cattle market

---

[13] Josserand, "Impact of Non-African Meat Imports on Cattle Trade Between West African Countries" (p.6).

Figure 2.5
Annual Cattle Sales in Kati and BAMAKO MARKETS(1980-87)



Source : Tables C_5 and C_6

One would observe that since 1981 Kati is losing out to more direct shipment to Bamako.

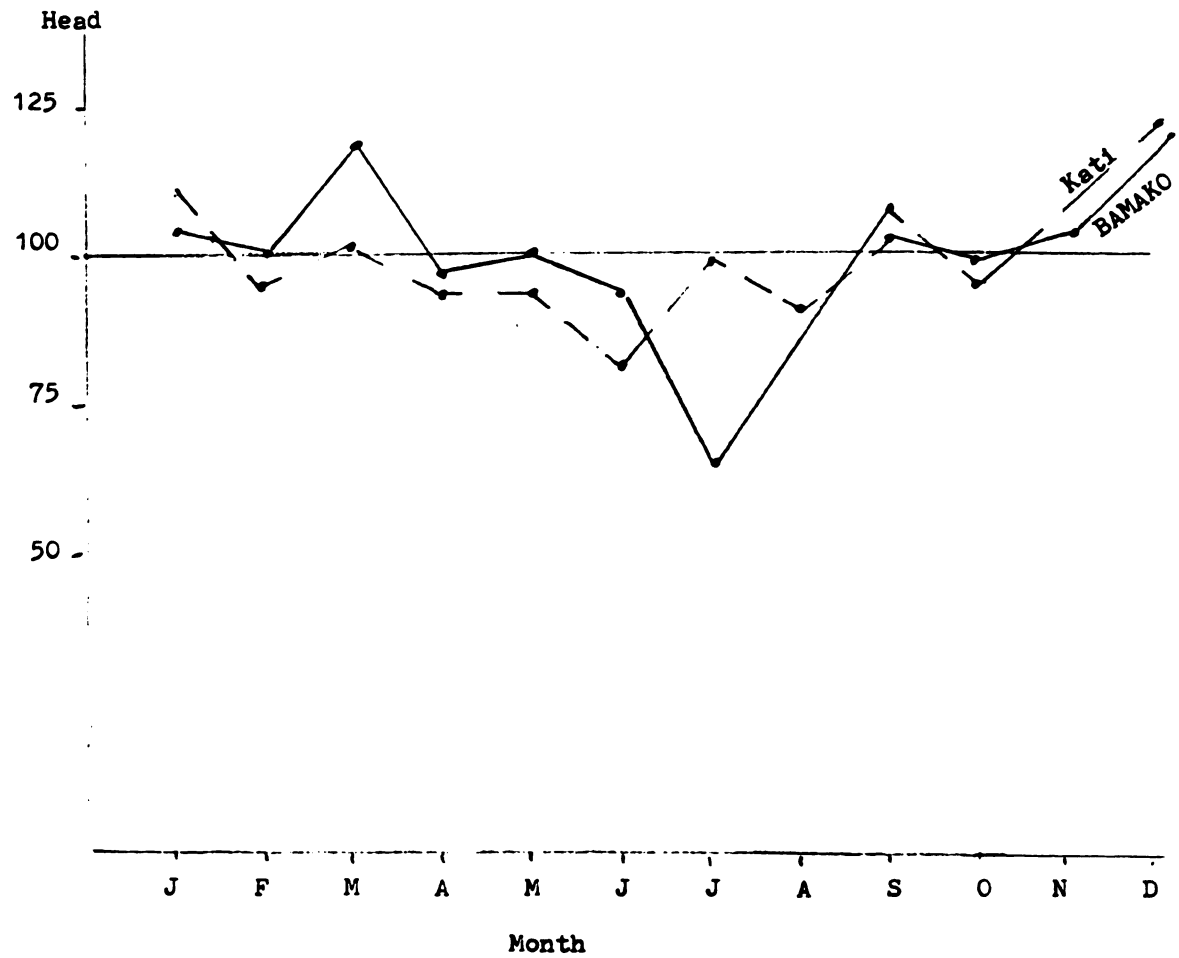
more attractive for traders than export markets, chiefly Côte d'Ivoire markets; 3) the substitution of the Bamako market for the Kati market by traders, who may have found the Kati market less profitable and thus bypassed it; 4) recording beginning in 1983 of figures from the suburban cattle markets of Faladié and Djicoroni into Bamako cattle market record.

Seasonal Variations

Tables C.2 and C.3 in the Appendix section present the monthly sales of cattle in Kati and Bamako markets from 1980 to 1987. Furthermore, Tables 2.8 and 2.9 present the indexes of variations of the average recorded monthly cattle sales from 1980 to 1987 and the 8-year period average indexes. The indexes are determined as follows: for example, the recorded total sales of cattle in 1980 in Kati was 36,436 head. Hence, the average per month in 1980 was 36,436/12 = 3036. Since the January 1980 sales figure was 2,388, its index will be: (2,388/3,036) x 100 = 79. All other indexes in Table 2.8. and 2.9. were estimated in the same manner. An index less than 100 indicates that sales for that month were below the average of the monthly sales of the year. An index greater than 100 indicates that sales for that month were above the average of the year. Then the monthly average indices are determined for the eight year period. Figure 2.6. presents the average monthly sales indices for the eight year period according to data presented in Tables 2.8 and 2.9.

According to both the Kati graph in Figure 2.6. and Table 2.8., December and March showed the most important seasonal peaks of the year, while July and August showed the lowest records of the year. According

Figure 2.6
Cattle Sale Monthly Index of
Variations in Kati and BAMAKO
(1980 - 1987)



Source : Tables 2.8 and 2.9

Table 2.8

Cattle Monthly Sale Variations Index
Market of Kati (1980-1987)

Month	1980	1981	1982	1983	1984	1985	1986	1987	Avg. Index
Jan.	79	94	120	87	143	91	115	122	106
Feb.	65	97	130	128	90	74	119	121	103
March	101	174	137	119	98	95	117	108	119
April	84	64	131	87	80	90	135	111	98
May	81	80	105	84	93	142	115	107	101
June	108	135	99	68	90	116	66	73	94
July	59	102	49	60	74	57	48	70	65
August	85	85	64	77	93	76	82	73	79
Sept.	130	89	102	93	120	120	119	90	108
Oct.	102	62	65	116	106	100	110	105	96
Nov.	125	108	81	136	83	117	98	114	108
Dec.	180	110	117	146	128	121	76	105	123

Calculated from OMBEVI annual reports 1980-1987

Table 2.9

Cattle Monthly Sale Variations Index
Market of Bamako (1980-1987)

Month	1980	1981	1982	1983	1984	1985	1986	1987	Avg. Index
Jan.	132	121	99	105	109	110	115	97	111
Feb.	129	98	83	76	100	89	106	85	96
March	132	110	68	79	112	100	107	104	101
April	95	69	87	78	107	112	102	106	94
May	91	61	101	75	104	102	104	103	93
June	91	73	100	77	96	48	75	100	82
July	96	108	104	94	95	109	93	98	100
August	81	119	98	110	59	89	83	95	92
Sept.	90	126	96	123	102	94	100	104	104
Oct.	91	105	103	86	100	106	115	100	101
Nov.	85	89	112	140	81	120	104	102	104
Dec.	86	121	149	157	135	120	95	104	121

Calculated from OMBEVI annual reports 1980-1987

to the Bamako graph in Figure 2.6 and Table 2.9, December and January were the period of seasonal peaks in cattle sales in Bamako. Moreover, May and June had the lowest cattle sales in Bamako.

The December-January seasonal peaks in the cattle market of Kati and Bamako might be explained essentially by six factors: 1) the increases of the herder's sales of cattle during that period in order to best take advantage of cattle being in their best physical condition following the rainy season, and throughout the harvest period; 2) higher sales by herders to take advantage of cheaper harvest time grain prices; 3) the need to pay taxes which are due at the end of the year; 4) the desire to purchase household goods with the cash left over; 5) the end of the year holidays discussed in the slaughter section, which increases the demand for meat in the city; and 6) the acquisition of wealth by farmers after the crop sales. The farmers' income earning usually results in boosting all types of businesses in cities, including the government budget through the massive tax payments at that period. This allows the government to pay civil servant salaries without long delays. Overall, the income earning leads to increased expenditures and increased demand for beef particularly.

The March period peak in Kati can be explained by the large number of fed cattle from the embouche paysanne zone of Banamba that started embouche in February and presented earlier for sales. However, this supply of fed cattle during March is generally not large enough to create the same seasonal peak in the biggest market of Bamako as does in Kati. The lowest records of cattle sales in Kati in July and August are

due to the dramatic decline of Zebu cattle offered for sale, as discussed in the source of cattle supply section. During this period, Zebu cattle are generally in poor condition. They have not regained weight from dry-season weight losses. Thus, cattle owners are reluctant to sell such a low-valued product. They prefer to hold their animals off the market waiting for them to fatten up on the new and rich pastures. Furthermore, during the rainy season, trading is more risky for long distance traders (from Kolokani, Nara, Nioro, etc.) because of the rain-related problems such as travel difficulties for both trekked animals and persons, and the threat of disease and crop damage, particularly in the vicinities of Kolokani and Kati. In addition, many small sellers from the rural areas are busy planting and cultivating their crops. Consequently, they have little time to collect cattle.

In Bamako, the lows occurred mainly during the dry season from February to June, with May and June being the lowest. These seasonal lows correspond to periods when most herds are in transhumance, away from owners. To remedy such a situation, more research is needed to recommend ways and means that can make the beef supply adequate throughout the year in Mali in general and in Bamako in particular, since the embouche program failed to prevent seasonal shortages.

Figure 2.2. and Figure 2.6. show that the Bamako market cattle sale variations are more seasonal than the Bamako slaughters which appear to be rather stable. This may be explained by the relative stability in beef demand in the city on the one hand, and seasonal cattle exports from Bamako on the other. This seasonality of export

from Bamako may be due to both the seasonality of cattle supply in Bamako (Figure 2.4.) discussed above and the seasonal pattern of beef consumption in exporting countries, especially in the Côte d'Ivoire rural areas (Staatz, p.86).

Cattle and Beef Market Structure

This section discusses the structure of cattle markets in the Banamba embouche zone fed cattle market, in the markets of Banamba, Kati, Bamako, and the beef market in Bamako in three main dimensions: the cattle seller and butcher concentration (measured by the number and sizes), degree of cattle and beef differentiation, and the barriers to entry in the cattle and beef markets.

Cattle and Beef Market Concentration: Sellers

Several types of market participants are involved in buying and selling cattle and beef. They include cattle sellers from the interior market, cattle buyers (both sellers and buyers are mostly traders), intermediaries, and butchers.

In the Fed Cattle Market of Banamba

A fed cattle market is defined here not as a physical place where buyers and sellers meet on a regularly scheduled basis, but rather as a sum of fed cattle commercial transactions made by sellers and buyers throughout the commercialization period in physical market places as well as in villages.

In the primary stage, such as at the farm or village level, all sellers are local farmers (emboucheurs) whose main economic activities are cropping millet, beans or peanuts, with an experience in cattle feeding ranging from 2 to 11 years, averaging at 6 years (Table 2.10).

Table 2.10
Producers, Traders, Intermediaries and Butchers Socioeconomic Characteristics
(May - July 1986)

Participants	Dominant Ethnic Group	Region of Origin	Main Activity	Other Activity	Experience (Average Year)	Average Apprent-iceship Duration (Year)	Average Business Scale (Head)	Residence	Sample Size (n =)
Producers	Saracolle	Koulikoro	Cropping	Cattle feeding	6	-	5/year	Banamba County Villages	29
Banamba Market Traders	Fulani and Saracolle	Banamba (Koulikoro Region)	Cattle Trade	Cropping	21	-	14/week	Banamba	6
Bamako and Kati Traders	Fulani	Mopti Region	Cattle Trade	None	15	-	40*/week	Bamako	8
Intermediaries	Fulani	Mopti	Interm.	Cattle Trade (for 6 of them)	19	-	-	Bamako	8
Bamako Butchers	Several Ethnic group	Various Regions	Butchering	None	25	7	16**/week	Bamako	16

* In 1988 the average scale found was about 13 head/week for a sample of 35 participants (Table 4.1 through 4.3)

** In 1988 the average scale was about 15 head/week - Table 4.4 -

According to ECIBEV, a total of 465 farmers participated in the 1986 embouche season in the Banamba zone and 1862 cattle were fed (see Table 2.1b.).

At the second stage, such as in market places such as in Banamba, Kati and Bamako, almost all fed cattle sellers are traders, either professional or part-time. Only eight farmers interviewed out of a sample of 29 had attended the Banamba cattle market several times in 1986.

In the Banamba Market

The sellers at the Banamba market, which is essentially a collection or primary market, were mostly producers (herdsmen and peasants), although sometimes 5 to 10 small part-time traders sell a few cattle bought in Banamba county villages or in neighboring Nara and Djidiéni cattle markets. During each weekly market day in Banamba, each seller normally offers two or three cattle. Small part-time traders, however, can each offer up to 10 head in a single market day. The number of sellers offering cattle for sale at each market day is between 30 to 40, and the average number of cattle offered for sale per market day during the 1986 research period was about 100 head, as presented in Table 2.11.

In the Kati and Bamako Markets

In the two terminal markets of Kati and Bamako, which are only 25 kilometers apart, the market participants are almost all the same people and are professional traders. They attend the Kati market each Saturday and the Bamako market every day. However, a few sellers in the Kati market came from neighboring rural counties, such as Kolokani, Nara and

Table 2.11

Cattle Presented Monthly in Banamba: (May-July 1986)

Month	Total Cattle	Fed Cattle	
		Number	Percentage in Total Cattle Presented (%)
	(head)	(head)	
May	643	151	23
June	422	103	24
July	214	8	4
Total	1279	262	20

From this table, it appears that the activities of the cattle market in Banamba are reduced as the rainy season advances.

Banamba, and usually do not extend their trip to Bamako. Because there were no specialized sellers or buyers (selling and buying are simultaneously made by the same trader in these two markets), it was difficult to determine the number of exclusive sellers and the scale of their selling businesses. Thus, the discussion of traders' activities in the markets of Bamako and Kati below deals with all aspects relevant to traders' buying and selling activities.

Cattle and Beef Market Concentration: Buyers

In the Fed Cattle Market

It is difficult to determine the exact number of buyers at the farm level because of the part-time trading system, which is made possible by the prevalence of buyers' credit purchases. Nevertheless, eleven fed cattle buyers at the farm level were identified during the first phase research period (May-June 1986). At Kati-Bamako second buyer's level, only three traders reported trading fed cattle during the research survey. In addition to traders, butchers also buy fed cattle in the Kati-Bamako market.

Among the eleven buyers identified in the Banamba zone as fed cattle first buyers during the 1986 research period, six were professional traders; the other five were part-time traders, mostly agriculturalists or merchants of miscellaneous goods taking advantage of speculative opportunities given to them by the practice of fed cattle purchases on credit. All traders were from the villages of the areas and they belonged to different ethnic groups (Table 2.10).

In the Banamba Market

According to the 1986 research survey results presented in Table 2.10, six professional traders in the Banamba market regularly attend the cattle market. Moreover, two Banamba butchers were active buyers. Other buyers were rare in Banamba even during the period of fed cattle marketing. The part-time traders mentioned above were exclusively cattle sellers in the Banamba market.

This relatively small number of buyers in the market of Banamba can be explained by the fact that it is a primary market and the low level of cattle supply in a collection market cannot support trading activities by more than a few traders.

All six traders active in the Banamba market were from the county of Banamba and lived there, although in different villages. Three out of the six belonged to the Fulani ethnic group and were herdsmen like their fathers before becoming cattle traders. The three others belonged to the Sarakolle ethnic group and worked as agriculturalists (their fathers' professions) before becoming merchants. Three traders in Banamba have been trading cattle for thirty years or more. The other three had between four and fourteen years of experience in cattle trading. All of them have cropping activities during the rainy season in addition to cattle trading.

In the Market of Kati and Bamako

Traders in Kati and Bamako markets were both buyers and sellers. About 25 cattle traders regularly attended the Kati and Bamako markets during the research period in 1986. A sample of 8 of them were interviewed in 1986 in Kati and Bamako. They all lived in Bamako. Six

out of the eight traders frequented both the Kati and Bamako markets. Two attended only the Bamako market. Seven of the eight were from the region of Mopti and seven out of eight belonged to the same Fulani sub-ethnic group of Diawambe, while all the eight belonged to the same large ethnic group of Fulani. The eight traders interviewed had five years or more experience in cattle trading in Bamako and Kati, and three had ten years or more of experience in these markets. More than one half of the merchants interviewed had practiced the cattle trade for ten years or more. Seven of eight had cattle trading as their primary jobs and only one trader earned additional income from other activities (Table 2.10).

During the 1988 research phase, only 15 traders were operating actively. Because of butchers' non repayment of debts, several professional cattle traders had temporarily moved out of the cattle trade.

In addition to the classical cattle merchants, there are also cattle intermediaries-brokers involved in cattle transactions. These terms historically are used to refer to two types of marketing agents: the landlords who provide housing and food to cattle buyers and/or cattle sellers, and the brokers whose primary role is to arrange commercial transactions between a seller and a buyer (but do not buy cattle themselves), and provide some other miscellaneous marketing services to a buyer or a seller. It was not uncommon that both functions were performed by the same person. At present, the term "intermediary" has been broadened to encompass small traders who themselves buy a small number of cattle on a cash or credit basis to resell within one or two days. Thus, it is no longer easy to designate

a stereotyped picture of an intermediary. In Bamako-Kati markets, the vast majority of so-called intermediaries are speculators who buy on credit and sell for cash on the same day.

However, there are still a few commercial transaction facilitators or brokers remaining. There are no intermediaries or transaction facilitators in the Banamba market.

The total number of intermediaries (including both brokers and speculators) operating actively in Kati-Bamako markets in 1986 was relatively large, about 20 to 25. In 1988 there were about 40.

Eight intermediaries selected on a random basis were interviewed in Kati and Bamako during the 1986 research period. Table 2.10 shows that seven out of eight intermediaries interviewed had residence in Bamako. Six frequented both Kati and Bamako while one attended only the Bamako market and another one frequented only the Kati market. Six intermediaries were from the region of Mopti, and five belonged to the Fulani ethnic group. Out of eight, five intermediaries had ten years or more of experience in the Bamako-Kati market. Six of the intermediaries interviewed reported that they occasionally buy and sell cattle for themselves in addition to their brokerage activities. The others did not have other economic activities.

Butchers in Bamako

Bamako butchers are the final buyers of most cattle offered for sale in Kati and Bamako. They constitute the main group of beef sellers in Bamako.

The active types of butchers in Bamako are wholesale butchers, retail butchers, modern retail butchers, and clandestine meat sellers

for whom data are not available. In the context of the Bamako beef marketing system, the apprentice butchers do not directly participate in the exchange functions, although apprenticeships provide training for future butchering. According to the 1986 OMBEVI figures, 53 butchers were licensed wholesalers. Retail licensed butchers were estimated at more than 400. The OMBEVI figures remain unchanged in 1988 although about 10 to 20 butchers have left at least temporarily the profession according to the 1988 research findings.

Both retail and wholesale butchers make retail sales of meat, depending on the capital they own or the opportunity to purchase cattle on credit.

During the 1986 research period, four modern meat shops were operating. Official regulations do not make distinctions between traditional retailers and modern retailers, although in practice the distinction does exist.

In a traditional retail shop, all beef must be sold within a few hours. Facilities needed are usually simple, with a table or stall, a chopping block, hanging space, and sometimes a scale, while in modern shops designed for longer storage, more capital-intensive technologies such as refrigerated storage facilities are used.

From the background information on the sampled butchers in Table 2.10, one can observe that no single ethnic group and no single region dominated the butcher profession in Bamako. Sample butchers belonged to at least six ethnic groups, and they were from at least four regions.

According to the same data, 14 out of 16 butchers had 10 years or more of experience in butchering in Bamako. They were all apprentices

before becoming butchers. The apprenticeship duration was between 3 and 15 years. Sixty-nine percent of sampled butchers had more than 5 years of apprenticeship.

The vast majority of butchers interviewed came from agriculturalist families. None of them had other economic activities.

Data collected in 1988 from traders in Bamako (see footnote in Table 2.10) show that both cattle traders including professional merchants and intermediaries buying and selling by themselves, and butchers operated at very small scales. The average business size for cattle traders is about 2 head per day in Bamako, with a lowest size of one head per day and a maximum size of eight head per day. The daily average total share of sales during the 1988 research period accounted for by the largest four traders was about 26 percent. Such a concentration ratio is too low to confer marketing power to these leading firms.

In the beef market, too, the 1988 findings show large number of butchers, low market concentration, and small scale of operation. The average business size of the butchers sampled is about two head per day, with a minimum size of one head and a maximum size of six head per day. The concentration ratios for butchers based on average daily slaughters indicate that the four leading butchers have about 15 percent of the total beef market.

Product Differentiation

Available information relative to product differentiation indicates that most of the factors such as sales-promotion activities (there is no advertising in the beef or cattle trade), name brands, and

effective locational differences (most fed cattle are produced and consumed in the same areas) influencing the occurrence of product differentiation are absent in the cattle and beef industries. However, data presented in Table 4.7 (on fed cattle and range cattle per kilo prices), in Table 4.8 (on high quality and low quality carcass purchase prices and per kilo sale prices), in Table 4.9, (on fed and range cattle dressing percentage and carcass composition), and in Tables 3.3 and 3.4 (on high and low quality beef per kg prices and compositions) suggest that there exists a premium for fed cattle and fatty beef. This evidence suggests also that consumers have a preference for fatter meat, and through the implicit price differential observed they implicitly rank the two beef qualities according to their preferences. Since fed cattle and high quality beef are preferred to range cattle and low quality beef, one may suggest that the income elasticity of demand for fed cattle and fatter beef may be higher than that of range cattle and leaner meat. That implies also that if there is no change in relative prices, as incomes rise the demand for fed cattle and the consumption of high quality beef would increase more rapidly than that of lean beef.

Barriers to Entry

Data collected during both the 1986 and 1988 research phases referring to conditions of entry indicate that:

1. The low trader and butcher concentration in Bamako, and the small size operation in both cattle and beef markets (as described earlier in this section), imply that it is not necessary for an entrant to come in on a large scale. Thus, scale economies are unimportant and do not constitute an entry barrier.

2. Cost data discussed in Chapter 4 show that cattle traders as well as butchers for all categories have almost constant

costs. When costs disparities exist, they appear to be small (Tables 4.1 through 4.4).

Traders who buy and sell cattle in Bamako may incur no cash costs at all. Twelve out of 35 sampled traders declared having no cash costs at all since they bought and sold their animals the same day in the Bamako market with no transport cost, no drovers' salary, no brokers' fees, and no government taxes and license overhead fees (in fact, these traders were officially categorized as intermediaries and therefore not required to hold a trading license).

Nine other interviewed traders incurred a total cash transaction cost per head between 150 F CFA (about $0.50) to 190 F CFA (about $0.63). These transaction costs are composed of 150 F CFA for the overnight corral grazing costs, and 40 F CFA for the pro-rata share of their license fees for those traders who hold trading licenses. Traders who incurred these costs bought in Bamako one day and sold their animal the next day in Bamako. Among them, five were intermediaries.

The 14 remaining traders in the sample incurred a total cash transaction cost per head between 750 F CFA (about $2.50) and 1,660 F CFA (about $5.50), composed of overhead, drovers' salary, round trip travel ticket costs for the traders, and license fees. Those costs are incurred in the markets of Kati (between 750 F CFA and 980 F CFA, with an average of 820 F CFA) and in the long-distance markets of Niono, Fana, Konobougou (between 1,330 and 1,660 F CFA, with an average of 1445 F CFA per head costs). Eight out of the 14 were intermediaries operating in Kati but who did not hold licenses.

There was evidence that scale of operation conferred pecuniary advantage in license overhead fees and traders' round trip ticket costs.

However, these advantages were so small in absolute terms that their effect on total per head costs are negligible. The maximum cash transaction cost incurred by cattle buyers (in long distance markets) are about one percent of the total cost for a range animal purchased at a average price of 104,000 F CFA (about $346, see Table 4.7). Such a cost difference is indeed small.

In the beef market, the twenty butchers (wholesalers as well as retailers) who slaughtered 7 to 9 head per week incurred an average total operational cost per head of 4,610 F CFA (about $15.36). The 23 butchers who slaughtered between 10 and 19 head per week incurred an average total cost per head of 4,575 F CFA (about $15.25). The 14 butchers who slaughtered at the largest scale between 20 and 40 head per week, incurred an average 4,630 F CFA (about $15.43) total operational costs per head.

According to these figures, a butcher slaughtering 7 to 9 head per week, incurred a total operational cost 0.75 percent higher than his colleague slaughtering between 10 to 19 head per week. However, his total operational costs were .43 percent lower than those of his colleagues operating at a larger scale between 20 and 40 head per week. Because of these findings, one may conclude that in the beef market, butchers operational cost variations are of minimal importance.

Capital Barriers

Little capital was required for buyers or butchers to do business in both fed and range cattle trading or in butchering. In Chapter 3 evidence is presented on cattle sales and purchases indicating that

since most transactions were on credit, it was not necessary for buyers to possess liquid funds to do business in fed cattle trading at the first buyer's level. However, a good credit reputation is necessary, and those traders with a bad reputation may find it a barrier to entry. No such trader was found during the study period. Consequently, one may conclude that capital was not a barrier to entry into the fed cattle trade.

According to data presented in Chapter 3 (Table 3.1) the average capital required to enter into the range cattle trade, was in 1986 approximately 1,000,000 F CFA (about $3,333) in Banamba, Kati, and Bamako. These amounts are relatively large by Malian standards. In 1988, however, 20 out of the 35 sampled traders were trading on a credit basis. Such a heavy reliance on credit purchases indicates a considerable reduction of requirement for working capital. Thus, the 1988 data suggest that capital is a negligible barrier to enter the cattle trade.

Similarly, butchers' cattle procurement conditions indicate also a heavy reliance on credit. In 1986, 13 out of 16 butchers and in 1988, 44 out of 55 butchers interviewed purchased regularly on a credit basis.

Such traders' and butchers' reliance on credit could largely be explained by the scarcity of capital available.

As a consequence of the heavy reliance on credit purchases and butchers' long delays of repayment and defaults, both cattle traders (sellers) and butchers (buyers) in Bamako and Kati recognized that there was a high premium on butchers' credit purchases ranging from 5 percent to 20 percent for one- to three-day credit depending on the butchers'

credit worthiness (Chapter 3, Table 3.1.). Therefore, although working capital is not expressly required to become a butcher in the Bamako beef market, the possession of capital prevents the payment of high interest rates on capital to sellers creditors (resulting from possible delayed repayment and even defaults), and enables the butcher to reduce his costs. Chapter 5 discusses recommendations to deal with the capital issue.

Social Ties

Although there was no evidence concerning social ties and their effect on prices in the market, the fact that 50 percent of the emboucheurs sold their cattle to their habitual trading partners could support the assumption that, for some farmers, social ties based on a reliable trading relationship, familiarity, trust, fairness, and honesty of traders are important in fed cattle trading, at the farmer's level.

Thus, traders without such qualities may find doing business with certain farmers very difficult, especially since most sales are on credit. Because it may take relatively long time for an outsider to be trusted by the producers in order to compete successfully with the trusted and longtime buyers within the same trading context, social ties could be a barrier to entry for newcomers.

Much of the trading activities, including intermediary activities in Banamba, Bamako and Kati, are in the hands of the Fulani ethnic group, different in language and culture from the majority of the population of Banamba and Bamako. The prominence of this ethnic group reflects historical advantages derived from the possession of skills,

experience, and knowledge to manage cattle. Furthermore, they have commercial experience which enables them to assess by eye the return (based on weight and quality) and costs (risks) in cattle operations. They also have a large network of relations and market information in which trade is conducted between herdsmen, intermediaries, speculators, moneylenders, traders, drovers, etc., all along the complete trade channel. It is unlikely that an outsider could reproduce successfully such advantages, at least in the short run.

Nonetheless, to the extent that the Fulani ethnic group is very large (the second largest in Mali) and members help relatives get started in the trade, entry into cattle trade is made easier for these people.

Butchers interviewed came from various ethnic groups and regions. In addition there was no evidence of any kind of cooperation other than market information exchange among butchers. Furthermore, there was no evidence of ethnic or region-based acceptance of apprentices by butchers. Thus, ethnic or social ties apparently did not constitute a barrier, in contrast to in some countries (e.g., Nigeria, Ghana), where meat trading is monopolized by a very distinct professional group.

Legal Barriers: Licensing Requirements

Licensing objectives in Mali are to provide resources to the government budget, to allow adequate control over trading activities, and to ensure fair trading. However, beyond these aspects, licensing can also restrict the right to enter the trade and therefore reduces market competition. But no evidence was found to support the view that licensing was a barrier to entry. No such constraints were mentioned by

traders as a problem. This may stem from the fact that licensing regulation is not usually enforced or is only slightly enforced. This allowed many traders to bypass regulations by not having licenses, as data in Chapter 3, Table 3.1 and Chapter 4 (Tables 4.1 through 4.4) show.

Moreover, Banamba part-time traders did not hold licenses. Furthermore, several professional traders in Banamba confirmed to the author that part-time traders usually do not have licenses. Another way for traders to bypass the regulations is to pay fees for lower license categories than they were required to, or to be registered as a broker. Licensing is not required for brokers.

In the meat trade, legal barriers include not only licensing requirements but also meat price control. Licenses are required for wholesale butchers as well as retail butchers operating in Bamako. The number of licenses issued is not limited (as attested by the large number of licensed butchers), provided the butcher applicant can pay the fees and is in good health. The amount paid for license fees in 1988 ranged from 15,000 F CFA to 107,500 F CFA ($50 to $358) per year depending on the business size. These fees do not appear high enough to be a significant barrier to entry.

Meat price control, however, if associated with legal penalties such as heavy fines, jail or license denial, would be an important legal barrier because the risk of these might discourage entry into the beef trade, particularly if the meat prices set by the government were out of line with the cattle prices. But so far sanctions have been limited to payment of fines.

According to the findings of this study, butchers in Bamako, by using various strategies, were able to evade the regulations. Besides selling in parallel markets and cheating on the weight or composition of a kilogram of beef, butchers in breaking the bulk into small piles or "tas" easily evaded price control regulations, which did not apply to "tas" and certainly could not be enforced since the units dealt with were so small and their composition so varied.

Market Information Constraints

In a competitive market, the bargaining position of buyers and sellers is conditioned to some extent by the degree to which they are informed. Buyers and sellers utilize information about supply conditions and price levels which is available. Better information for all participants should allow the marketing system to operate more efficiently or economically, and with more equity. Knowledge of prices and supplies in a market, thus, is essential if buyers and sellers are to take advantage of price differentials for a better allocation of resources. In contrast, uncertainty involves risks of wrong decision-making, which in turn involves costs.

According to the data presented in Chapter 3 (Table 3.1.), in the cattle marketing systems under study, producers in the zone of Banamba generally have only indirect access to market information. Among the 29 producers interviewed in 1986, only 8 attended the Banamba market and reported having direct access to market information. The other 21 relied on market information provided by buyers or other producers.

Cattle traders had access to market information by attending every market day and by exchanging views frequently on market cattle offers,

sales and prices in Banamba, Kati, and Bamako as well as in other markets. Such market information exchanges should be seen as a means to improve the market knowledge and thus enhance competition. The market information is available to anyone who attends the market since all animals offered for sale are exposed in the market yard and the bargaining is openly done. Moreover, information concerning other supplying markets flows easily and quickly (within one or two days) to all participants thanks to word of mouth and the market information exchange during traders' conversations.

The conclusion that should be drawn from the above is that market information does not constitute a barrier to entry into the cattle trade. Traders in Banamba, Kati, and Bamako markets generally have knowledge of cattle supply and sales conditions, and price levels in the markets they regularly attend and in other markets. This is possible because country markets generally are held once a week, therefore one week is necessary for information to vary.

The results of the butchers' interviews in Table 3.1 indicated that all butchers involved in the purchase of cattle for slaughter claimed to have information concerning market conditions (prices, quantity of cattle offered and attending buyers) in Bamako by regularly attending the markets of Bamako or both Kati and Bamako markets themselves. Given the long experience (more than 10 years on average) of these butchers in purchasing and slaughtering cattle in Bamako and the fact that prices are openly discussed in the cattle markets, one should believe them. Furthermore, information is available to all participants, even to those who were not attending the market, due to

the market information exchange between participants. However, one may be skeptical about the usefulness of such market information in the absence of a standardized cattle grading system in Mali. Malian authorities, however, have designed for about 5 years standardized uniform grades for livestock. Yet, these grades and classifications are not completely established. This absence in fact is just apparent because market participants (herders, traders, butchers) themselves have evolved a classification system based on the sex, age, weight, use, and breed that aids in the transmittal of market information. The rationale behind this classification is that the value of cattle depends largely upon the above physical characteristics, in addition to health and fatness.

Given the extensive stockraising system in Mali, age, weight, and fatness are generally correlated. Cattle reach maturity between six and eight years. They usually tend to increase in weight and become fatter as they get older. However, the quality of meat (fat and tenderness) falls at older ages, especially for cows. Moreover, the constraints imposed by on the hoof transportation requires that cattle be at ages between six and eight to sustain the trekking effort. The older cattle, especially cows over eight years, and young animals are not suitable for export.

Export cattle tend to be heavier, with an average carcass weight estimated in 1977 at 170 kg at the time they cross the border and 150 kg when slaughtered in Abidjan (Delgado, p. 338). During the same period, the average carcass weight of cattle slaughtered in the Bamako abattoir was about 130 kg. In general, steers are most used for export because

they tend to weigh more and are fatter than others. Younger cattle (heifers particularly) destined for breeding are generally valued more than those destined to abattoirs.

Cows are usually sold at relatively old ages after serving for a long time as milk animals. They tend to have lower carcass weights and lower quality meat than steers. For that reason, cows have little export potential and are slaughtered locally.

The breed and region of origin are also very important in the determination of the value of cattle. Large-frame Zebu from the Sahel are preferred to small-frame taurine from the south. The Sahelian cattle weigh more, are fatter, shrink less, and thus are more suitable for export than the lighter, smaller southern breeds.

Overall, the traditional grading system provides a price premium to larger males between six and eight years old, with higher weight, better quality and export potential (Stryker, Table A-1).

But this classification is not standardized and descriptions vary from one region to another. Farmers who are agriculturalists are generally not familiar with cattle trade language. For these reasons, the study recommends in Chapter 5 that a further study be conducted in order to establish a sound uniform grading system.

Transportation Barriers

It seems unlikely that better information about price and supply conditions discussed above will be of much benefit to traders and butchers who do not have adequate means to transport their cattle from or to distant markets.

During the 1986 research period and in the markets under consideration, traders transporting their cattle to Banamba, Kati or Bamako were not faced with shipment problems because the single method of transport used was trekking (Table 3.1), and no restriction was involved. Furthermore, the costs involved (the money outlay essentially) appeared small (Tables 4.1 through 4.4). Thus, transport was not a barrier to entry. Since different transportation methods do not compete along the same routes, the comparison of trekking versus trucking or rail shipment is difficult.

The transport of beef from the abattoir to the different markets in Bamako was made by private taxi in 1986 at the cost of 400 F CFA per carcass. Since 1987, beef transport has been made by the equipped meat transport trucks of the Bamako abattoir at the same cost (400 F CFA per carcass). No constraints have been found in access to this beef transport means, and transport costs were not found excessive by butchers. As a consequence, transport means was not a barrier to entry in either the cattle or the beef market.

Conclusion

From the above discussions on traders', intermediaries', and butchers' socioeconomic characteristics, concentrations, and barriers to entry into the cattle and beef markets under study, one can conclude that:

1. The cattle trading profession is largely dominated by the Fulani ethnic group which is very knowledgeable about livestock. This may suggest some barrier to entry related to ethnic and social ties. In contrast, there was no ethnic or regional domination in butchering. This implies that the profession is open and there is no ethnic barrier.

2. Cattle traders and intermediaries in Kati and Bamako, and butchers in Bamako relied exclusively on cattle trading activities and butchering for their living and those of their families. This makes their financial stability vulnerable to their business shrinkage as there exists no diversification. The rural cattle merchants in Banamba, however, relied to some extent on cropping.

3. With the large number of cattle sellers and butchers, and their low concentrations, no individual firm can noticeably influence the market price and the quantity of cattle or beef on the market. Similarly, concerted actions by competing market participants to control the market price and the quantity of cattle and beef on the market, is unlikely because every market participant would find it advantageous to violate any collective agreement and could do so without retaliation from his colleagues.

4. Cattle traders, intermediaries, and butchers had long experience in their professions. This suggests that both cattle trading and butchering require training and experience.

5. The degree of product differentiation has been found slight in both the cattle and beef markets under study.

6. Barriers to entry overall were quite low in both cattle markets (fed cattle primary market and fed and range cattle markets in Banamba, Kati and Bamako) and the beef market in Bamako. In such easy entry markets, established firms are unlikely to enjoy cost advantages over potential entrants. Economies of scale were relatively unimportant as each firm supplies an insignificant percentage of the total market sales. Neither capital requirements nor legal barriers were the basis of a deterrent to entry in either the cattle or beef markets. Market information was available to anyone interested. Transport was not restricted and its costs were low.

The large number of cattle traders and butchers associated with the quite low barriers in the cattle and beef markets, and the availability of market information suggests that both the cattle market (including the fed cattle and range cattle) in Banamba, Kati, and Bamako, and the beef market in Bamako were effectively competitive in the structural sense.

Cattle traders and butchers in Bamako are financed largely by cattle traders from the interior. Though concentration ratios in the cattle credit market have not been estimated, one should expect that, given the large number of local and interior traders who provide credit, the cattle credit market concentration ratios could be low.

The performance expectations of these competitive markets are: (1) lower marketing costs and normal profit margins for subsector participants, and (2) efficient resource allocation.

CHAPTER THREE

CATTLE AND BEEF MARKET CONDUCT

Chapter 4 will address the extent to which the competitive market for cattle and beef contributed to good market performance. Before addressing that, this chapter will discuss the conduct of participants in the cattle and beef market, which is also influenced to a large extent by market structure.

Chapters 1 and 2 have suggested that market structure influences market conduct. In this chapter, we present and discuss the research findings on the market behavior of cattle sellers and buyers in the primary fed cattle market, in the Banamba, Kati, and Bamako cattle markets, and in the Bamako beef market. The first section of this chapter describes the conduct of fed cattle producers. The second section describes the behavior of traders in buying and selling cattle, and the behavior of butchers in the procurement of live animals and in selling beef. Finally, Section 3 deals with the conclusion and the analysis of the findings on the market conduct of cattle sellers, buyers, and butchers.

For both sellers and buyers in a market, a matter of first importance is the determination of commodity selling or purchasing prices and the quantity of the commodity to be traded. The questions that arise then are: (1) whether the market participants really compete by acting independently in setting their prices and/or quantities, or do

they agree on what prices they will ask (or offer); and (2) what quantities to buy from or sell to the market. To the extent that cattle traders or butchers are able to coordinate their marketing strategies they may defeat the competitiveness of the cattle and beef markets observed in Chapter 2. The basic objective of this chapter is to analyze the available observable evidence on patterns of market conduct in the primary fed cattle market, in the cattle market in Banamba, Kati, and Bamako, and in the beef market of Bamako. This evidence is derived from the observation of indicators of conduct such as collective (interdependent) and independent marketing decision making. In the ideal world of perfect competition, prices are sufficient to coordinate individual behavior, but in the real world with market constraints and uncertainties, additional vertical coordination mechanisms also are necessary to ensure specialized marketing agents that commodities are available, with a certain level of reliability, in the quantities and qualities, and when and where they are needed. Thus, it is necessary to look at the vertical coordination in the cattle and beef subsector to gain insight into how the subsector works. According to Marion,[14] vertical coordination is defined as activities employed to harmonize vertical stages of production and marketing. Pricing systems, integration (both vertical and/or horizontal), and contracting singly or in combination are some of the alternative means of coordination.

---

[14] The Organization and Performance of the U.S. Food System (p. 60).

Surveys conducted in 1986 with fed cattle producers, cattle traders in Banamba, Kati, and Bamako, and butchers in Bamako provided the data relevant to market conduct and vertical coordination (Table 3.1).

Fed Cattle Producer (Seller) Market Behavior

As shown in Table 2.10, farmers fed on average 4 to 5 cattle during the 1986 campaign. Twenty-seven out of 29 farmers interviewed sold their animals in villages (on farm) directly to buyers without intermediaries, and they reported always preferring to do so.

Though transactions were made directly between sellers and buyers, trades were not made in secret. Rather they were made in the presence of many people, and the transactions conditions (price and terms of trade) were usually known to several people, as in traditional markets such as Banamba, Kati, etc.

Only 2 sampled farmers sold their animals in the Banamba market. All the farmers who sold their cattle at the farm made sales on credit, with the agreed periods of repayment averaging 30 days. However, the period of repayment takes in general a longer time than the agreed-upon period. Only one emboucheur in the sample charged any interest, 5 percent on 40 day credit. None of them claimed that buyers default on credit.

Almost 50 percent of the farmers interviewed sold their animals to part-time traders and 50 percent sold to professional traders. According to the results of the same interviews, the farmers dealt equally with traders with whom they were used to doing business and

Table 3.1
Producers, Traders, Butchers Market Conduct: March - July 1986

Participants	Requirement for Initial Capital CFA	Dominant Purchase Terms	Dominant Sale Terms	Late Credit Repay	Credit Default	Interest on credit %	Means of Information access	License possession Requirement	Transport Method	Market Agreement
Producers	feeder cattle and feeding costs*	cash	credit	frequent	None	None	other producers and buyers	None	Trek	None
Banamba Traders	1,000,000	cash	cash	rare	rare	None	attending markets and info.exchange	Not enforced	Trek	None
Bamako-Kati Traders	1,150,000**	cash**	credit	Most of the time	very often	5 to 20 in 1 to 7 days	attending markets and info.exchange	Not enforced	Trek	None
Bamako Butchers	Not required	Credit	Cash	often	frequent	10 to 20 in 1 to 3 days	attending markets and info.exchange	Required	Trek	None

* Until 1986 these were provided by ECIBEV. In 1987 they were provided by BNDA. In 1988 producers financed their own embouche activities.

** Capital was less required according to the 1988 research findings based on the extended use of credit purchases by buyers, especially intermediaries.

traders who were not their habitual clients. All the traders they dealt with were from their villages or neighboring villages.

When a farmer produces several animals, he usually sells all his fed cattle in one lot. Sales by weight were not used despite the effort of ECIBEV to introduce weighing in fed cattle sales. Nine producers out of 29 sold one to three fed cattle in 1986.

Two emboucheurs sold 6 to 7 cattle, five sold 8 to 9 and three farmers sold 10 to 12 head in 1986. Two farmers preferred to keep their animals for plowing and repaid loans from their savings. Seven producers reported making their initial reservation price for their cattle on the basis of Banamba cattle market prices. This is a pricing method which allows producers in the course of a bargaining process to arrive at price by asking for prices that their colleague obtained for their animals of approximately the same age and weight. Seventeen farmers reported making initial reservation prices on the basis of their feeding costs. These farmers followed a kind of cost-plus-margin method pricing. The size of the margins (thus the settlement price) may vary depending on changes in market conditions. Two emboucheurs only made initial reservation prices taking into account both the feeding costs and the Banamba cattle market prices.

For all emboucheurs, there were no forward sale contracts. Moreover, there was no farmers' association and no evidence of either price and/or market sharing agreements between sellers, even those belonging to the same village. The setting of selling prices apparently was made by each farmer independently. Finally, there was no farmer cooperation for production or for marketing in long-distance markets.

However, most farmers interviewed declared sharing market information (price essentially) with colleagues.

City dweller fed-cattle producers interviewed in the 1988 research phase had similar market conduct to that of farmers discussed above except they usually fed on a larger scale, between 20 to 30 head per producer on average. They also generally use a trusted intermediary to negotiate terms of sale with buyers and as a guarantor of the buyer's credit.

Traders' Market Conduct

The very basic conduct of cattle traders can be pictured as follows. They essentially buy cattle in one market for resale later either in the same market or in a different market, in order to benefit from temporal and/or spatial price adjustments.

Banamba Traders

Traders in Banamba usually operate individually in the purchase of cattle. In 1986 they purchased animals in the Banamba town cattle market, in the villages of the Banamba county, and in two neighboring county cattle markets of Sirakorola and Nara. These markets are primary markets located on open ground with no facilities.

All traders interviewed reported that they prefer procuring cattle in market places rather than in villages because, they said, the market competition makes peasants more realistic in their price bidding than at their farms, where they enjoy a kind of monopolistic power.

None of the Banamba traders had regular cattle suppliers. They dealt with any seller willing to do business with them. Transactions were made at the marketplace openly and directly between sellers and

buyers without the participation of intermediaries. Trade cattle are usually physically assembled at the market place at the time of sale and inspected by buyers before bargaining begins.

Both cash and credit terms were used in the purchase of cattle; however, according to informal interviews, cash payment is usually reserved for range cattle purchases from herders who sell mostly because of cash needs, while credit term purchases are widely used for fed cattle from farmers, who are less under pressure as long as they get repayment on time to reimburse ECIBEV's loans. No down payment was required in credit purchases. Buyers usually repay credit, although they very often fail to repay on time. Thus, ECIBEV was in fact running an indirect trader credit program.

The credit purchase opportunities that existed in the fed cattle marketing system at the farm level explained to a large extent the entry of several part-time traders (who are usually agriculturalists or merchants of miscellaneous goods) into the trade during the fed cattle sale period.

The traders' business volume was relatively small, between 10 and 15 head per week (Table 2.10). Five out of the six traders interviewed reported that one million F CFA capital (US $3,077) was necessary to enter into the cattle trade in Banamba.

Two traders got their initial capital from their families, and three from personal savings. Only one of them had access to a bank loan. The loan, however, had been granted by the BNDA for cattle feeding and only for the cattle feeding campaign. It was not for cattle trading.

Four of six traders had third category licenses, with total fees of 18,000 F CFA per year. The two others did not have licenses. The average direct operational cost per head for transport of cattle from Banamba to Kati was about 900 CFA (US $3), including license overhead.

According to the 1986 surveys (Table 3.1) more than one half of the traders interviewed in Banamba usually sell their animals only for cash. The others accepted credit sales only to some of their trusted fellow countrymen butchering in Bamako (although they sold most of the time for cash). The duration of the credit was 15 days on average, and most of the time the credit was paid on time. Only one trader declared charging 20 percent more per animal sold on credit than for cash; the others did not charge interest rates on credit sales.

Four out of six traders said they usually sell only in the Kati market. One said he usually sells in both Kati and Bamako. The last one reported selling in Kati, Bamako, and Banamba. All Banamba traders said that they did not export cattle to foreign countries and their clients in Kati and Bamako were traders and butchers living in Bamako.

The prices in Kati and Bamako markets were set through an open bargaining process between sellers and buyers. Brokers were often involved in the process of bargaining to facilitate transactions. Almost all sales made by the Banamba traders in Kati were in lots of 10 to 20 head including both fed and range cattle. There were no sales on a weight or even a per head basis. All the Banamba traders reported having access to market information in Kati by regular attendance and by information exchange during trader talks. Although most of them did not

attend the Bamako market, they all reported that they knew all about what was going on in Bamako thanks to traders' word of mouth.

There were no forward sales contracts, price and/or market sharing agreements, or traders' associations in the Banamba market. Moreover, there was no integration, either vertical (fed cattle production associated with marketing activities) or horizontal (traders' joint ventures or cooperatives). However, all traders interviewed shared market information with colleagues during casual meetings and conversations.

Kati - Bamako Traders

Six traders out of eight in Kati-Bamako reported in 1986 having occasional joint ventures with colleagues in purchasing animals, but they usually operate individually. Only two among the eight interviewed reported buying cattle through buying agents in other markets (Léré, Niono, and Korientzé) in addition to the Kati and Bamako markets, where all of them do business on a regular basis. Only three traders identified themselves as fed cattle buyers in addition to the purchases of range cattle. These traders are able to buy on a cash basis. This is because interior traders from Banamba cannot afford long delays in Bamako before repaying their farmer creditors. The others dealt only with range cattle because of capital constraints, of the high prices of fed cattle (see allocative efficiency section in Chapter 4), and because of the sale in lots practiced by fed cattle sellers (discussed above in the section on traders' sale conduct in Banamba), which were not affordable for small traders. Price bargaining is usually made openly

between the buyer and the seller (who is also a trader) in the markets of Kati and Bamako, which are terminal markets.

The market of Kati is equipped with holding pens, loading ramps, covered hangars, and scales. But these facilities were not used by traders, who preferred to do their trading activities in the open field near the structure.

In Bamako, market facilities are composed of holding pens and water supply sources. Although brokers are often used with traders coming from the interior markets, none of the traders interviewed used brokers during their purchases. These purchases for most of the persons interviewed in 1986 were made on cash basis. Three traders only were using both cash and credit transactions. The purchase on credit, however, was occasional and its duration was between one and three days. The average weekly cattle purchase of each of the five sampled small-scale traders in 1986 was between 15 and 20 head, while the weekly cattle purchases of each of the three other traders were between 50 and 100 head. The overall traders' weekly purchase average was about 40 head (Table 2.10).

On average 1,150,000 F CFA ($3538) was necessary to enter into the trade according to the respondents in 1986. Only one among the people interviewed got bank loans and the others got their initial working capital from personal savings as intermediaries.

Although licenses were legally required for all cattle traders, two of the eight traders interviewed in 1986 did not hold licenses. The others each paid an average of 7500 F CFA per year. These fees were required for traders of the fourth category (the lowest).

The cash operating costs per head varied, according to the distance involved. For long distance trade (such as from Niono, Léré, Fatoma, etc.), they were between 900 to 1500 F CFA ($3 to $5) per head including the license overhead costs. From Kati to Bamako the costs of transportation on average were about 500 F CFA ($1.70). The Kati market tax was 50 F CFA ($.15). In Bamako the overnight grazing corral cost was about 150 F CFA ($0.50 per head).

In the Kati and Bamako markets, where final cattle sales usually take place, two out of eight traders (sellers-buyers) interviewed in 1986 reported they sold all their animals on credit. The other traders reported selling both on cash and credit, though credit sales were largely dominant.

The agreed-upon period of repayment ranged from one to seven days, with an average of three days. But all the traders agreed that credit was not repaid on time. However, credits were generally repaid entirely within a ten-day period from August through January and twenty days from February through July. They all reported also, that some credit was not repaid at all. Accordingly they almost all (except one) charged interest rates ranging from 5 percent to 15 percent more per animal sold on credit (Table 3.1).

Two traders sold their animals in Bamako only; the others sold in Bamako as well as in Kati. For the last two years none of the sampled traders exported cattle (exports are more and more made by traders from Côte d'Ivoire). In Bamako as well as in Kati, their trading partners were primarily Bamako butchers (both wholesale and retail butchers) and

to a lesser extent, cattle exporters (from Côte d'Ivoire or Malian traders who usually specialize in industrial goods trading).

The 1988 research findings showed, however, changes in many patterns of the 1986 purchase conduct of cattle traders in Kati and Bamako. The most important changes were: (1) 20 out of 35 buyers in the sample purchased on a credit basis; (2) the periods of repayment were between two and seven days (according to both butchers and traders, credit extended during the dry season is generally repaid in twenty days, while during the other periods, credit is repaid in ten days; this difference in repayment is due to the fact that, in dry seasons, butchers lose more often than in the other periods); (3) because of the extended use of credit in purchases, capital possession was no longer required for entry into the cattle market; (4) none of the 35 traders interviewed was able to purchase more than 50 head per week; and (5) more than half of the sampled traders did not hold a trading license.

The above changes which took place between 1986 and 1988 may be explained largely by capital losses that the largest traders underwent because of butchers defaulting on credit. This resulted in the reduction of the traders' business scale and their capacity to buy cattle on a cash basis, and the entry of many new small traders and intermediaries into the cattle trade. Most of the traders interviewed

deplored the increase in butchers' default rates on credit resulting in higher interest rates, ranging now from 5 to 20 percent.

Forward purchase and sale contracts, purchase and sale price agreements or market sharing agreements, and traders' associations were not found to exist in either the Kati and Bamako markets though market information sharing among traders exists.

Kati-Bamako Intermediaries

In addition to professional traders, intermediaries also can influence cattle market conduct, especially those whose activities are partially or exclusively devoted to facilitating trade transactions between sellers and buyers. Only 37 percent of the intermediaries interviewed devoted their time exclusively to facilitating transactions. The other 63 percent, in addition to brokering, also purchased cattle on their own. In 1988, 71 percent of cattle buyers were intermediaries.

Table 3.2 presents the results of the 1986 survey of the conduct of intermediary brokers in Kati-Bamako. When asked what services they provided to the sellers, they declared that besides providing market information, they also provided other various services outlined in Table 3.2.

For the payment of their services, the intermediaries received an amount of money between 500 and 1000 F CFA per head from the seller. They also got some non-mandatory gifts both from the seller and the buyer.

Table 3.2

Services Provided by Intermediaries

Service Provided	Frequency	Number of Intermediaries who provide Services (out of the Total Sample [N = 8]
Finding buyers	always	5
Finding buyers	from time to time	2
Providing housing and food	often	2
Guaranteeing credit	often	3

When they were asked what services besides market information they provided to the buyers they reported:

Service Provided	Frequency	Number of Intermediaries who provide Services (out of the Total Sample [N = 8]
Finding animals	always	2
Finding buyers	often	3
Providing housing and food	always	1
Guaranteeing that animals are neither sick nor stolen	often	1

Intermediaries did not incur cash costs such as licenses, or taxes.

Like traders, intermediaries have access to market information by attending market sessions and by market information exchanges with colleagues as well as with traders. Thus, one would expect brokers to play a more important role in long-distance trade, where buyers usually do not know sellers, and where language differences are more frequent.

Butchers' Market Conduct

Cattle Procurement

According to the study findings, 5 out of the 16 butchers interviewed in 1986 did not purchase cattle. Rather, they purchased meat from other butchers on credit for resale. The others made their procurement of cattle at Bamako and/or in the Kati market exclusively through the same bargaining process as described for cattle transactions.

The number of cattle bought per butcher ranged from 7 to 50 each week, with an average between 16 and 17 cattle (Table 2.10). The purchases were exclusively on a per head basis (between 2 and 3 per day) or in lots, but never on per kilogram live weight basis. The purchases of cattle were made through both brokers and traders by 8 of the 11 butchers who reported purchasing cattle for slaughter. Only 3 butchers reported dealing exclusively with traders. The others dealt both with traders and intermediaries.

More than 90 percent of the sample wholesale butchers and about 95 percent of retail butchers purchased 94 percent or more of their animals on credit basis without down payment. The length of credit theoretically ranged from one to three days. But in fact some credits last for years and therefore are sometimes even defaulted. Several

butchers believed that they usually pay more for cattle bought on credit than for cash. In 1988 they estimated at between 5 and 20 percent the interest rate charged for one to three days credit, which translates into more than 500 percent per annum. However, since evidence exists that an important portion of the debt is not paid back on time and is even defaulted, this interest rate includes a very high risk premium which is an additional margin charged to offset a cost of anticipated capital losses.

At least 75 percent of the wholesale butchers and 87 percent of retail butchers interviewed declared delaying repayment of credit, and 50 percent of sampled wholesale and retail butchers admitted even defaulting on some portions of their debts. Between January and June 1988, 86 percent of the 57 butchers interviewed declared owing on average about 1,235,000 F CFA to traders. A total of about 60.5 million F CFA were owed by butchers to cattle traders from January to June 1988. Although there are cases in which the indebtedness is not paid for years, or is defaulted entirely, the vast majority of butchers and traders agreed that credits are entirely repaid usually within twenty days in dry season and ten days during the other period.

The butchers interviewed did not have regular cattle suppliers, and they usually bought from several traders and/or brokers. They were not tied and did not depend for any reason on any particular seller provided they had the opportunity to purchase on credit from sellers. According to the author's observation during both research periods, butchers were not in most cases restricted from credit purchases even if

there was outstanding debt. In 1988, however, according to butcher interviews, 10 to 20 butchers moved permanently or temporarily out of the profession because of credit restrictions. Some traders reported that the creditors generally encourage other sellers to sell animals to their debtor butchers on credit in order for the former to get repaid. This may explain partly how despite their financial losses butchers manage to stay in business.

Fifty percent of sample wholesale butchers and 75 percent of sample retail butchers did not have preferences for the quality of cattle they bought, while 50 percent of wholesalers and 25 percent of retailers preferred fat cattle (namely fed cattle) because the high quality beef is sold out more quickly. These butchers who prefer fat cattle are generally large scale butchers who have dealt with fed cattle for many years, ranging from 3 to 10 years, with a total average between 6 and 7 years. For those small butchers who did not have preferences, it was a matter of staying in business rather than a preference for a cattle type business. Since they were small and did not have working capital, they were dealing with whatever cattle types were available to them. Because fed cattle were more expensive than range cattle and were sold more rapidly, there is little chance that traders will sell these cattle to them on credit. The fact that fed cattle are sold more rapidly suggests that premium other than price premium exists for fed cattle.

About 63 percent of wholesale butchers and 75 percent of retail butchers interviewed in 1986 had not had initial capital when they entered into butchering. The others entered with an initial capital

ranging from a minimum of 500,000 F CFA to a maximum of 2,000,000 F CFA. Only one wholesale butcher got loans from a bank. For the remaining sample members, the origin of their capital was from personal savings as apprentice butchers.

All the butchers who were purchasing slaughter cattle during the period of research declared having access to market information by attending the Bamako and/or Kati cattle markets and through market information exchanges between butchers.

Beef Sales

Beef is usually sold fresh just a few hours after the cattle slaughter because of its perishability and the lack of refrigeration equipment in traditional shops. Furthermore, it is often sold at retail by non-registered meat sellers, retail butchers, and wholesale butchers, although wholesale butchers according to the regulation should not sell beef retail.

According to the results of the 1986 butcher survey, 62 percent of wholesale butchers and only 12 percent of retail butchers sold beef both retail and wholesale, though retail is far the most important butchers' activity. Only one wholesale butcher made exclusively wholesale transactions. In contrast, 26 percent of wholesale butchers and 88 percent of retail butchers did not make wholesale transactions. In 1988, 60 percent of wholesale butchers and 90 percent of retail butchers interviewed sold beef retail, and 40 percent of wholesale and 10 percent of retail butchers sold beef wholesale to retail butchers and hotels. Retail butchers were the most important category among those who buy

beef wholesale. The other beef wholesale buyers were public institutions, modern meat shops and hotels.

Beef retailing by retail and wholesale butchers is usually done on a kilogram basis and rarely on the basis of tas, which are sold mostly by apprentices. Beef sold by kilogram comprises two categories: beef with bones, and beef without bones. The former is supposed to be exclusively composed of skeletal meat while the latter is an assortment of portions of skeletal meat, fat, bones, stomach, and intestine. Meat in tas, which is the cheapest (Table 3.3.), is particularly destined to lower income consumers who can only afford to spend a small amount for meat.

Wholesale transactions are in general made on a credit basis, with a short repayment period (one day) for retail butchers and a long repayment period for others (lasting a few days for hotels and modern meat shops, and several months for public institutions). In contrast, retail sales are mostly made on a cash basis to housewives or maids.

Among the 15 butchers who declared in 1986 selling beef retail, 7 sold their beef exclusively by kilogram, and the 8 others sold both in "tas" and by kilogram. The retail sales in tas were practiced primarily in neighborhood markets, while in central markets retail sales by kilogram were mainly used. All the butchers interviewed, except two, reported purchasing meat on credit from other butchers for resale when the former do not buy cattle to slaughter. This is intended primarily to satisfy the needs of regular clients (housewives), and for some to earn daily costs of living.

Table 3.3
Weight, Per Kg price and Composition of Different Price tas:
Bamako: March - July 1988

Tas Price	Weight (Grs)	Per Kg Tas Price (CFA)	Meat Component Gr/Kg	%	Fat Component Gr/Kg	%	Offal Component Gr/Kg	%	Bone Component Gr/Kg	%
100 CFA (n = 50)	185	541	270 s=39.421	27	278 s=60.184	22	160 s=40.112	16	351 s=54.0	35
200 CFA (n = 50)	350	572	315 s=25.808	31	257 s=22.265	26	143 s=24.9	14	285 s=24.432	29
t =		7.675	6.718		4.297		2.546		7.874	

X2 = 1.305 Test of X2 using significance at α = .05
df = 3

Beef selling prices are fixed by the government. These governmental regulated or official beef prices per kilogram both with bones and without bones are set by the Governor of the Bamako City District. In contrast, the prices of tas are set by the butchers themselves. During both research periods, two different sizes of beef tas were available, at 100 CFA and 200 CFA per tas. In addition to the differences in size, these tas were also different in composition. As data in Table 3.3 show, the larger size contained a higher proportion of meat and fat, and less in bone and offal.

During the 1986 research period, some cases of price increases from 7 to 10 percent above the official prices were observed for beef with bones, chiefly in neighborhood markets where price controls were less enforced. In the central beef markets, marketing regulations are enforced by "Les Affaires Economiques," whose agents make unannounced spot checks in market places to verify if official prices are being respected and/or that weighing scales are accurately calibrated, and by butchers' designated controllers. These controllers are butchers chosen by the chief butchers to enforce official beef prices in the different markets.

Nevertheless, during the 1986 survey, 5 butchers admitted selling from time to time in parallel markets, high quality beef at prices 7 to 14 percent above the official prices. Their main clients in parallel markets were Westerners, diplomats, local wealthy businessmen, hotels, and senior civil servants. They justified their conduct by the fact that fat cattle are expensive and unless a price premium exists for high quality beef, trading it will not be profitable. Only two butchers

interviewed declared not selling at prices above the official price while 9 butchers preferred not to respond. Although the 1986 official prices remained unchanged, in 1988 no such illegal price increases had been observed.

In any case, because of the risk and fear of paying fines up to 30,000 CFA (the price of almost a quarter of a carcass) when caught by control authorities, butchers who sold above the official prices were cautious to whom they sold, and they did not do it very often. Thus, prices of a kilogram of low quality beef were fairly stable in both central and neighborhood markets. However, the effective prices of the beef sold by tas fluctuated more often. According to data collected during the 1988 surveys, beef sold at 100 CFA per tas sizes ranged from 170 grs to 200 grs, equivalent to a per kilogram price ranging from 500 F CFA to 588 F CFA, while those of tas sold at 200 F CFA varied from 330 to 370 grs, equivalent to a per kilogram price ranging from 540 F CFA to 606 F CFA. Because of the absence of price controls and the difficulty for consumers to notice small changes in size or in the composition of the tas, by using such a strategy of varying the price of the tas, the butchers are able to increase the real price of a tas at a stable nominal price.

In the overall evaluation, the nominal (official) prices of beef sold in Bamako did not fluctuate noticeably. But this is just an apparent situation. According to the findings of this study, the real prices of high quality beef (both with bones and without) were higher than those of low quality beef. Data presented in Table 3.4 show that the effective weight of high quality beef with bones was on average

Table 3.4
Real Weight, Real Price, and Composition of a Nominal Kg of High Quality and Low Quality Beef With Bones: Bamako March - July 1988

Beef Quality	Expected Weight Grs	Real Weight Grs	Nominal Price CFA	Real Price CFA	Meat Content gr	Fat Content gr	Bone Content gr	Offal Content gr
High Quality (n = 50)	1,000	981 s = 51.428	700	719 s= 43.768	501.2 s =54.347	190.6 s =74.762	208.38 s= 56.469	74.2 s= 47.427
Low Quality (n = 50)	1,000	1,018 s = 59.795	700	689 s= 39.325	639.4 s= 108.466	30.4 s= 42.328	200.6 s= 72.910	147.4 s= 58.582
t =		3.281		3.605	8.055	13.186	.596	6.867

Test of t using significance at α = .025
X2 = 15.930

about 981 grs, 2 percent less than the expected 1,000 grs for a kg paid by consumers. This made the average real price for a kg cost to consumers on average about 719 F CFA (3 percent above the 700 F CFA officially set for a kg of beef with bones). At the same time, according to empirical findings, the real weight of a nominal kg of low quality beef with bones was about 1,018 grs, about 2 percent higher than the expected normal weight of 1,000 grs. This made the real average price for 1,000 grs of low quality beef about 689 F CFA (2 percent less than the 700 F CFA nominal price for a kg). As a consequence, the average real price of a kg of high quality beef with bones paid by consumers was 5 percent higher than the average real price paid for a kg of low quality beef with bones, a statistically significant difference. Similarly, the average real price of a kg of high quality boneless beef paid by consumers was found to be 3 percent higher than the real price of a kg of low quality boneless beef paid by consumers (1,017 F CFA vs. 988 F CFA), again a statistically significant difference. This was because the effective beef weight sold on average for one kg weight was 984 grs for the high quality boneless beef and 1,011 grs for the low quality boneless beef (Table 3.5).

Although the price premiums for high quality beef are small, the above findings suggest that a premium exists for high quality beef and that one of the butchers' strategies in trading high quality beef was to cheat on the total weight sold for a price of a kg. These strategies, however, are risky. Because of the riskiness, these practices may entail higher transaction costs. One would expect (though in the longer run) a lower price differential between high and low quality beef if

Table 3.5

Real Weight, Real Price and Composition of a Nominal Kg of High Quality and Low Quality Boneless Beef: Bamako March - July 1988

Beef Quality	Expected Weight (Grs)	Real Weight (Grs)	Nominal Price CFA	Real Price CFA	Meat Content gr	Fat Content gr
High Quality (n = 50)	1,000	984 s = 38.065	1,000	1,017 s = 40.607	885.6 s = 5.256	98.4 s = 5.256
Low Quality (n = 50)	1,000	1,011 s = 22.201	1,000	988 s = 22.003	997.86 s = 1.606	13.14 s = 1.606
t		4.397		4.474	11.211	11.211

Test of t using significance at α = .025
X2 = 7.792

retail beef price controls are removed as a result of economies of scale and/or reduced transaction costs.

In addition to the above findings, the study results also show differences in the beef kg composition sold to consumers. According to data presented in Table 3.5, for boneless beef sold at the same weight (e.g. 1,000 grs for each quality), the high quality beef would contain 10 percent less structural meat than low quality beef (898 grs vs 987 grs). In contrast, high quality beef would be about 8 times higher in fat than the low quality beef (100 grs per kg vs 13 grs per kg).

For beef sold with bones at the same weight (e.g. 1,000 grs of each quality), the high quality beef would contain 23 percent less structural meat (511 grs vs 628 grs per kg) and 97 percent less offal (75 grs vs 128 grs per kg) than low quality beef with bones. However, the low quality beef with bones would contain 10 percent less bones (197 grs vs 216 grs per kg), and 7 times less fat (30 grs vs 194 grs per kg) than the high quality beef with bones (Table 3.4). Table 3.3 shows that the pattern of tas composition between the 200 CFA and the 100 CFA tas is also significantly different. Moreover, Tables 3.4 and 3.5 show that patterns of a beef kilogram composition between high and low quality beef are significantly different. In addition to these findings, Tables 3.3, 3.4, and 3.5 show that except for bones, all individual component differences between high and low quality beef are significant.

These results on beef kg composition suggest that butchers also used the composition of sale cuts as a strategy in beef trading according to its quality. Consumers received more fat and bones and less structural meat and offal when they purchased high quality beef.

But when they purchased low quality beef, they received more structural meat and offal, and less fat and bones. Moreover, consumers who purchased beef per tas received more meat and fat on a kilogram basis in purchasing 200 CFA tas than in purchasing 100 CFA tas. But those who purchased 100 CFA tas received more bones and offal on per kilogram basis.

According to the overall meat surveys, one may conclude that the existence of a price premium for high quality beef and its higher content in fat (which is the major attribute retained in this study to qualify a higher quality beef) suggests consumer preferences for high quality beef. It also may suggest that the beef pricing system is efficient. However, to prove this pricing efficiency, one needs to show that the price differences between the two beef qualities were equivalent to differences in the costs of production, and market price differentials were reflected back to the producers. Yet, data on the reflection of market price differentials to producers, and the costs of production of range cattle meat are not available in Mali.

Collusion

There was no evidence of market agreements among butchers, no joint ventures in cattle purchases, and no butcher cooperative found to exist. Although a large majority of butchers interviewed were members (automatically) of the butcher's trade union, only one knew the role and services it provided to union members. Moreover, no integration (horizontal or vertical) and no contracting were found to exist.

Conclusion

This chapter has described the market conduct of cattle traders and butchers. The focus has been on the behavior of market participants, while vertical coordination mechanisms have been given attention.

The evidence concerning participant behavior suggests the following:

1. each participant in both cattle markets (fed and range) and in the beef market makes his price or offers his market commodity quantity unilaterally without engaging in prior consultation or entering into agreement with his colleagues;

2. each participant in any given market has such a small market share that his own price or product adjustments would not noticeably affect the business or profit margins of his rivals;

3. these conduct patterns suggest a competitive structure of these markets.

The predictable effects of these conduct patterns is to preserve and strengthen market competition compared with that which would otherwise exist. Their effects on market performance are essentially those of the competitive market.

As far as vertical coordination mechanisms are concerned, the following conclusions can be made:

1. there is no evidence of the existence of coordination mechanisms such as contracting, or vertical or horizontal integration; because of that, market price is relied upon as the main coordinating mechanism;

2. Cattle prices are determined in market places or villages by buyers and sellers through open bargaining transactions; although nominal beef prices were stable, real beef prices varied for beef of different qualities because of butchers' sale strategies;

3. sellers (mostly traders in Bamako and Kati) and buyers (butchers in Bamako) appear to be effective in coordinating

their economic activities particularly through the credit purchase system despite extending periods of credit repayment and many credit defaults. They generally develop good working relationships based on mutual interests and understanding. These relationships may explain the smooth flow of desired slaughter cattle quantities in Bamako during most of the year. The only time this coordination breaks down is the dry season period when butchers have difficulties to procure slaughter cattle on credit and/or when they are reluctant to take the risks of losing money by slaughtering the seasonally expensive animals.

CHAPTER FOUR

CATTLE AND BEEF MARKET PERFORMANCE

In Chapter 2 and Chapter 3 we have presented and analyzed empirical evidence concerning the current cattle and beef market structures and market conduct. In this chapter we will look at the empirical findings on market performance.

How good is the performance of cattle and beef markets in Banamba, Kati, and Bamako? The answer depends upon the performance dimensions examined. This study chiefly looks at two very important performance dimensions: operational efficiency and allocative efficiency.

The first section of this chapter examines the operational efficiency dimension through cattle traders' transaction costs and butchers' beef distribution costs. The second section examines the allocative efficiency dimension through looking at cattle trader and butcher profit margin rates. The chapter concludes by analyzing the empirical evidence on the cattle and beef market performance and identifies constraints to good performance.

Operational Efficiency

Operational efficiency is defined here as a situation in which market functions are performed at the lowest costs possible. As such, operational efficiency entails the use of efficient and appropriate technologies, the exploitation of economies of scale, and the avoidance

or minimization of unnecessary costs. Within this guidance, efficient marketing agents in the markets under study would choose those transport, processing, and distribution methods that make best use of the least-cost or most efficient available technologies. They would operate at optimal scales to reduce overhead costs. Finally, overall marketing operations should be justified on economic grounds and should not be performed if they involve unnecessary costs. This may not be possible if too many transactions are made for a commodity within any given market, and/or when redundant market agents exist in the marketing systems. Thus, this section discusses first the per kg and per head operational costs and per kg and per carcass butchering costs. Next, it discusses the technology used by traders and butchers in performing their marketing operations. In addition the section looks at the alleged redundancy of cattle traders in Bamako.

Finally, the chapter draws conclusions about the efficiency or inefficiency of the marketing systems in the cattle and beef markets.

Traders' and Butchers' Marketing Costs

The following discussion relies on data obtained from the 1988 research phase, described in Chapter 1 and in Appendix section A. According to data presented in Table 4.1, marketing costs are essentially:

Cattle Traders

For people buying in Bamako and selling in Bamako the per head cash cost structure includes:

trading license overhead fees (depends on business scale);

per head overnight corral grazing cost (constant fees = 150 F CFA);

intermediary commissions per head (constant = 1,000 F CFA)

These people incurred following costs presented in Table 4.1.:

TABLE 4.1

Operating Cash Costs per head for Market Participants Buying in Bamako and Selling in Bamako:

March - July 1988

Participant Number	Operation scale/week (head)	Cost F CFA per head overnight grazing	License overhead Fees	Intermediary Commission per head	Total cost per head	Participant Status
1	7	0	0	0	0	Interm
2	7	0	0	0	0	Interm
3	10	150	0	0	150	Interm
4	5	0	0	0	0	Interm
5	8	0	0	0	0	Interm
6	15	150	0	0	150	Interm
7	15	150	40	0	190	Trader
8	10	150	40	0	190	Trader
9	20	150	0	0	150	Interm
10	7	150	0	0	150	Interm
11	10	0	0	0	0	Interm
12	15	0	0	0	0	Interm
13	10	150	0	0	150	Interm
14	7	0	0	0	0	Interm
15	5	0	0	0	0	Interm
16	6	150	0	0	0	Interm
17	7	0	0	0	0	Interm
18	10	150	0	0	150	Interm
19	8	0	0	0	0	Interm
20	15	0	0	0	0	Interm
21	7	0	0	0	0	Interm

These people had scales of operation ranging from five to twenty head per week, with about ten head per week on average. Overnight corral grazing costs per head represent between 79 and 100 percent of total costs per head. There is nothing to do to reduce these costs except to buy and sell the same day. Moreover, the total cash costs are very low (less than U.S. $1 per head).

Therefore the above per head operational cash costs can be considered as minimum costs.

For people buying in Kati and selling in Bamako, cash marketing costs may include:

1. trading license overhead fees (depend on business scale);
2. cattle transport costs from Kati to Bamako (drover's salary) constant at 500 F CFA per head;
3. market participants round trip taxi ticket Bamako-Kati-Bamako (variable overhead);
4. Kati market tax (fixed at 50 F CFA per head);
5. intermediary commission in Kati market (constant at 1000 F CFA per head);
6. overnight corral grazing costs in Bamako (constant at 150 F CFA per head).

TABLE 4.2

Operating Cash Costs per head for Market Participants Buying in Kati and Selling In Bamako:

March - July 1988

Participant		Cost F CFA						Participant Status
No.	Operation scale/week (head)	License	Drover salary	Taxi fees	Mkt tax	Over-night	Commission	Total Costs	
1	15	80	500	250	0	150	0	980	Trader
2	10	0	500	300	0	0	0	800	Interm
3	15	0	500	100	0	150	0	750	Interm
4	13	0	500	100	0	150	0	750	Interm
5	10	0	500	150	0	150	0	800	Interm
6	7	0	500	300	0	150	0	950	Interm
7	15	0	500	200	0	150	0	850	Interm
8	20	20	500	300	0	0	0	820	Trader
9	20	0	500	100	0	150	0	750	Interm
10	10	0	500	150	0	150	0	800	Interm
11	15	0	500	150	0	150	0	800	Interm

For these participants, the scale of operations ranged from seven to twenty head per week, with an average of fourteen head per week. The average cash cost per head was about 820 F CFA, and there was no scale cost advantage. Within this range of per head costs, transport costs represent 61 percent of total operational costs. Since trekking was the

only available means of transport (and apparently the least expensive one), one may say that the Kati traders' operational costs per head were minimal. However, when the opportunity cost of their capital tied up in defaulted credit is taken into consideration, traders' costs would be higher.

For people buying in long-distance markets and selling in Bamako, cash marketing costs may include the same components as in the Kati market. For these traders, data show the following costs.

TABLE 4.3

Operating Cash Costs per head for Market Participants
Buying in Long Distance Markets and Selling In Bamako

March - July 1988

Participant			Cost F CFA						Participant Status
No.	Operation scale/week (head)	License	Drover salary	Taxi fees	Mkt tax	Over-night	Commission	Total Costs	
1	30	30	750	200	0	150	200	1330	Trader
2	50	50	750	200	0	150	200	1350	Trader
3	25	60	750	200	0	150	500	1660	Trader

The scale of operation was between twenty-five and fifty head per week. The average cash cost per head was about 1,445 F CFA per head.

Since the largest trader incurred higher operational cash cost per head than the second largest, one can conclude that cash cost advantage due to scale does not exist. The cash cost difference per head between the third largest traders and the other long distance traders, are exclusively due to the difference in intermediary commission per head

which is specific to any given market. These traders procured cattle in three neighboring markets with small shipment cost differences. Again, total cash transaction costs, exclusive of opportunity costs of capital, are low.

Butchers

For butchers (wholesalers as well as retailers), operating costs per head include:

1. abattoir tax (slaughter fees = constant);
2. beef transport costs from abattoir to markets (constant);
3. apprentice salaries (overhead);
4. city government tax (overhead);
5. wrapping paper (overhead);
6. butchering license fees (overhead);
7. butchers' association membership fees (constant = 50 F CFA).

According to the research findings, wholesale and retail butchers in Bamako incurred the operating costs per head shown in Table 4.4.

TABLE 4.4

Operating Cash Costs per Carcass for Butchers in Bamako:

March - July 1988

Participant	Cost F CFA								Participant Status
Scale/ week (head)	Abattoir Tax	Li- cense	Trans- port	Union Fees	City Tax	Appren tice Salary	Paper Wrap	Total Costs	
20-40	2,400	70	400	50	50	1,350	310	4,630	Wholesaler
10-19	2,400	75	400	50	50	1,200	400	4,575	Wholesaler
1-9	2,400	80	400	50	50	1,025	605	4,610	Retailer

Fourteen butchers were butchering between twenty and forty per week;

Twenty-three butchers were slaughtering between ten and nineteen head per week;

Twenty butchers slaughtered between one to nine head per week.

The average total cash operating costs per head are almost constant for all butchers.

According to the above figures, the per-head cash cost variations among categories are less than one percent. Within these cash cost structures, the government levies through the abattoir tax account for 52 percent of the total butchers' operational costs per head. This suggests that the reduction of the government tax would increase the per head profitability of butchers. Yet, it may not be a good policy to reduce this tax if it really is used to maintain the abattoir. For the remaining cost, reductions can be made by reducing the service of apprentices and/or increasing the scale of operation.

The relatively low level of cash costs per head discussed above is possible only because of the use of simple and inexpensive technologies both in cattle trading and butchering. In cattle trading, trekking is the only means of transport used. It has the advantage of not requiring cash outlays and little or no infrastructure, at least for the routes under consideration and the period of this research. Moreover in Kati and in Bamako, buyers and sellers more and more avoid the interference of brokers. The direct bargaining between buyers and sellers reduces costs by 1000 F CFA (about $3.33) per head. Butchers also make large use of direct bargaining in their cattle purchases.

In addition, they predominantly used labor-intensive technologies in meat selling processes such as in cutting. They used capital-intensive technologies only when it is required by law and/or by hygiene (such as slaughtering in the modern abattoir of Bamako and transporting beef from the abattoir to meat markets by trucks), or when they are inexpensive and easy to operate, such as beef weighing using small scales. These technologies in addition to their relatively lower costs and constant availability, are also appropriate in the sense that they require neither imported machinery nor spare parts. Besides, these technologies allow easy repair and operation.

The Alleged Redundancy of Middlemen in the Bamako and Kati Cattle Markets

Another aspect of marketing operational efficiency considered in this study is the need for all operations in the transaction processes to serve economic functions. Here is the place to examine the proposition that there is a redundant number of middlemen in the Kati and Bamako cattle markets.

It is a common complaint of marketing reformers that an unneeded number of traders are able to interpose themselves between producers on the one hand and the needed traders, on the other, and that thereby the costs of marketing are raised. Bain (p.470), for example, believes that atomistic structures may be associated and perhaps responsible for excessive or destructive competition, and therefore socially undesirable market performance. Atomistic market structures are expected to be plagued with chronic redundancy, leading to inefficiencies of (among others) resource allocation, and destructive competition. In Bamako, the number of cattle traders and intermediary traders have been much

criticized by OMBEVI officials and sometimes by butchers. They are condemned as wasteful and are said to be responsible for wide distributive margins. It is argued that if fewer participants were operating in cattle trades, the differential between the first buyers' prices and the final buyers' (primarily butcher) prices would be less. Such a contention implies that economies of size of operation exist.

As a corollary, reformers and critics advocate elimination of redundant elements in the chain of cattle distribution and/or limitations of entry into cattle trade. The advocates of such measures generally fail to ask the relevant question concerning why the so-called "redundant" middlemen are not bypassed by those with whom they deal.

In fact, it is more likely that whenever a market agent does not provide any service at all or if his service costs are excessive in comparison with the costs his customers will incur if they provide these services themselves, the market agent will be bypassed unless parties served by them are unaware that it is cheaper to bypass him or unless official regulations prevent them from doing so.

Thus, redundant middlemen charging excessive prices will be eliminated without official intervention. Furthermore, generally there are at least 2 or 3 stages in the marketing chain. Therefore, the supposedly redundant trader must stand between another middleman and the producer, or between two traders. In each case, at least one of the parties served by the assumed redundant trader is a trader himself. Now, even if it is true that the average farmer is unaware of other marketing alternatives or is unable to pursue economic opportunities (evidence from this study rejects this assumption), a redundant trader

would not be used so long as his colleague customer was able to see a profit or a saving in dealing directly with a producer. It is unlikely that a trader will fail to see an economic opportunity within his area of business or fail to take advantage of it.

In order to investigate the matter in depth, one should look at issues such as: 1) the length of the cattle buying chain; 2) the middlemen profit margins; 3) the economic logic behind the large number of middlemen and 4) the consequence of reducing the number of middlemen or limiting the entries into cattle trade.

The Length of the Buying Chain

The length of the marketing chain is measured by the number of times a commodity changes hands between the primary market and the final market. These changes depend to some extent on the distance between the primary market and the final market. The marketing chain generally tends to be longer as the animal travels longer distances. However, if vertical integration exists, the marketing chain may be short since traders in final markets would procure cattle in long-distance markets.

In Mali, a large portion of the national cattle herd is located in the Sahelian zone and consumed many hundred kilometers away in the south. It is not surprising in this context that cattle change hands several times. Each time they change hands it is expected that margins (marketing costs and return to trader) be added as a payment of services rendered at each market stage. (These marketing costs and returns to traders may or may not be high depending on the nature and value of services rendered and the market competition). This in turn would increase the final purchase price of the animals. However, in the

particular case of fed cattle in the Bamako and Kati markets, typically the buying chains are short. The number of middlemen between producers and butchers seldom exceeds three. They include the first buyer in villages and the butchers from (in the Kati market) Bamako or the first buyer, the second buyer in Kati (or third buyer in Bamako) and the final buyer, generally the Bamako butcher.

Middlemen Profit Margins

As discussed later in this chapter, evidence presented in the next section shows that profit margins of traders engaged in the fed cattle trade represent about 13 percent of the total per animal procurement costs, while profit margins of traders engaged in range cattle trade represent about 9 percent of the total per animal costs. These margins, as shown later, ranged from mostly high for fed cattle to mostly low for range cattle traders in the West African standards if default risks on credit sale are taken into account.

Logic Behind Large Number of Traders

Two main economic reasons are behind the relatively large number of traders in Bamako: 1) the small amount of working capital available to both traders and butchers and 2) the search for employment due to the lack of better income earning opportunities.

The large number of traders in the marketing system is due primarily to the size of individual businesses, which depends largely on the stage of the Malian economic development, and the difficulty of having access to capital for increasing the scale of operations. Moreover, the large number of active butchers in Bamako, their lack of working capital, and their heavy reliance on credit purchases as

discussed in preceding chapters required the presence of a large number of creditors to divide the total butcher's credit, so that each of them handles a small portion of credit. In the absence of an important number of traders, some butchers, particularly the smallest ones, would not be able to access credit, procure animals, and stay in business, because they do not have the necessary financial resources. Thus, reducing the quantity of beef on the market would lead to higher beef prices. Moreover in the absence of large scale traders in the Kati and Bamako markets, the large number of small traders is the only means to speed up the sales of the volume of cattle presented in the two markets. This allows the interior traders to rotate their capital more rapidly and increase their profit margins.

The second economic aspect which explains the large number of middlemen is the employment issue. There are many people (among the Fulani ethnic group primarily) available to provide cattle marketing services even at a low daily wage because few other profitable employment opportunities exist for them. Particularly because during the droughts in 1972 and 1984 many of them lost part or all of their herds.

The consequences of reducing the number of traders in the cattle market or the limitation of entry into the cattle trade will be assessed through the following issues: 1) provision of marketing services; 2) market competitiveness, and 3) employment.

Provision of marketing services. The primary economic role of cattle traders in Bamako is to perform the marketing exchange function,

namely buying and selling. In performing the exchange functions they ensure that Bamako is supplied with beef and reduce the seasonal and short-term variations in the cattle supply. However, more and more they also perform financing functions by providing credit to butchers. The reduction in the number of market participants without an improvement in the access to capital would limit the flow of cattle to the Bamako market, resulting in cattle price increases.

In addition, the reduction in the number of traders would involve a reduction in the number of marketing alternatives open to the parties concerned and would increase the amount of capital necessary for individuals who stay in the business to face their increased market shares.

Market competitiveness. Reducing the number of cattle traders or limitations to entry (especially) into cattle trade, would reduce the competition in the cattle and beef trades. This would lead to higher cattle and beef prices and higher profits for the privileged small number of traders authorized to stay or to enter into the business.

Employment. Compulsory reduction in the number of traders or the limitation of entries into cattle trade would serve to add to the number of redundant unemployed and unskilled people, to worsen the income distribution, and to aggravate the lack of employment opportunities for people (Fulani particularly) as well as for butchers.

The current marketing system is economic in saving those resources which are particularly scarce (capital) by using the resources which are largely redundant (labor) and for which there is little

demand. Table 4.5 shows 148 people employed in the Kati and Bamako cattle markets. This excludes the very large number employed in slaughtering (in the abattoir) and selling beef (butchers and apprentices).

In addition to the above consequences, restricting the right to enter the cattle trade through licensing limitations may create an opportunity for corruption for government officials in charge of the distribution of licenses to trade cattle.

In conclusion, one would say that if some middlemen traders in the Bamako-Kati cattle market were effectively redundant, they would be bypassed by those with whom they deal, and be eliminated without official intervention. Since they have not been eliminated, one should conclude that they are not redundant. In fact, the study's findings have shown that the traders in Bamako provided economic services including the provision of credit to butchers and the diffusion of credit risks, the improvement of market competition, the facilitating of cattle flows in Bamako, and the improvement of employment levels and income distribution.

There is no evidence that destructive competition exists and that the performing of these economic functions by the large number of middlemen in Kati and Bamako involves unnecessary costs. Therefore, one should be cautious about moves to forcibly reduce the number of middlemen in the markets of Kati and Bamako.

Table 4.5
Employment Generated in Cattle Marketing
in Kati and Bamako (March - July 1986)

Profession	Number
Cattle Traders	25
Intermediaries	20
Drovers	60
Vendors of Food, Drink and Miscellaneous *	25
Taxi Drivers *	10
OMBEVI Enumerators and Veterinary agents	8
Total **	148

* The vendors of food, drink and miscell
and taxi drivers are not employed full-t
livestock trade.

Allocative Efficiency (Pricing Efficiency)

Market allocative efficiency, also called pricing efficiency, is the ability of the marketing system to transmit incentives to producers so they have better guides for allocating productive resources to their best use according to consumers' choices. As one can observe, such a definition is too general and not operational to help in the efficiency evaluation. Thus, for operational consideration, allocative efficiency in marketing is in practice judged by the relationship of selling price to average costs. The most convenient indicator of this price-average cost relationship is the rate of profit margins of firms in the industry. High or low profit margin rates within the marketing system suggest that too few or too many resources have been allocated to supplying the commodity on the market. In this study we will use this profit margin rate to evaluate separately the allocative efficiency of fed cattle and high quality beef markets on the one hand, and range cattle and low quality beef markets on the other hand. Margins presented here, however, are estimated only for a certain season of the year and they vary seasonally, as butchers and traders recognized during the research interviews.

According to results from surveys conducted in 1988 (Tables 4.6 through 4.8), the following average profit margins have been determined for emboucheurs, traders of fed cattle, range cattle traders, butchers butchering fed cattle and for butchers butchering range cattle. Surveys were conducted on 50 emboucheurs' costs and margins (for 270 head), fed and range cattle (100 head of each category) in the cattle market, and

on carcasses of fed and range cattle (100 carcasses of each category) in the beef market of Bamako.

The average profit margin obtained by emboucheurs in the Banamba zone was about 14,200 F CFA ($47.33), representing 16 percent of the total embouche costs (feeder purchase price and feeding costs), while that of emboucheurs in Bamako was about 26,000 F CFA ($86.66) per head, representing 24 percent of the total embouche costs (Table 4.6). Profit margins obtained by urban producers were significantly higher than those obtained by rural producers. The average profit margins obtained by traders in Bamako and Kati was about 46 F CFA per kg for fed cattle or 17,000 F CFA ($56.60) per head of 371 kg average live weight. This represents 13 percent of the total animal costs (procurement price and transaction costs). The Bamako producers' and traders' profit margins, however, would be lower if the credit sales risks are taken into account.

The average profit margin of cattle traders for range cattle was about 31 F CFA per kg or 9,500 F CFA ($32) per animal of 309 kg average live weight. This margin represents 9 percent of the total cost per head (Table 4.7). The margin per kilogram found for fed cattle traders was significantly higher than those of range cattle traders.

Butchers who slaughtered fed cattle obtained a profit margin averaging 17 F CFA per kg of beef or 3,000 F CFA ($10) per carcass of 191 kg (average weight for fed cattle carcasses). This profit margin (significantly higher than the profit margin obtained by low quality beef butchers) represents 2 percent of total carcass costs (including live animal procurement prices and beef distribution costs).

Table 4.6

Banamba Zone and Bamako Emboucheurs'
Cost and Profit Margins
March - July 1988

Embouche Areas	Feeder Procurement Price (F CFA)	Feeding Costs* (F CFA)	Fed Cattle Selling Price (F CFA)	Gross Profit Margin Per Head (F CFA)
Banamba Zone (n = 155 Head)	76,000 s= 5782.505	14,800 s= 3116.233	105,000 s= 9008.884	14,200 s= 5883.161
Bamako n = 115	80,000 s= 8003.979	29,000 s= 4418.850	135,000 s= 17100.345	26,000 s= 12132.669
t =	5.005	29.453	17.131	9.624

Test of t using significance at = .025

* The large difference between rural emboucheur and Bamako emboucheur feeding costs can be explained by the fact that farmers did not pay for forage and labor (they used their own resources) while city emboucheurs paid for hay, labor and for some of them, molasses.

Table 4.7

Fed and Range Cattle Traders' Profit Margins of live weight per Kg and per Head Bamako and Kati Markets: March - July 1988

Cattle Category	Average Purchase Price/head (F CFA)	Average Purchase Weight (Kg)	Average Transaction Costs/head (F CFA)	Average Total Costs/head (F CFA)	Average Total Costs/Kg (Kg)	Average Sale Price/head (F CFA)	Average Sale Price/Kg (F CFA)	Average Margin Per Head (F CFA)	Average Margin Per Kg (F CFA)
Fed Cattle	131000	371	378	131,000	357	148,385	403	17,000	46.34
(n = 100)	s = 24245.5	s = 59.256			s = 44.110		s = 43.780		s = 27.526
Range Cattle	104,350	309	536	104,900	337	114,000	368	9,000	30.77
(n = 100)	s = 26842.7	s = 66.296			s = 37.783		s = 34.772		s = 14.389
t =	7.628	6.994			3.394		6.327		5.014

Test of t using significance at α <= .025

Butchers who slaughtered range cattle during this period incurred on average a loss of 18 F CFA per kg of beef or 2,600 F CFA ($8.60) per carcass of 146 Kg (average weight for range cattle carcasses). This financial loss is equivalent to about 2 percent of total carcass costs (Table 4.8).

These data, however, do not reflect the yearly situation of the beef trade in Bamako, but rather the dry period picture characterized by unusually high cattle prices due to the decreased cattle flows to Bamako (Table C.1. in Appendix) resulting from the climatically determined production patterns in Malian producing areas mentioned in Chapter 1.

According to the results of interviews conducted with both butchers and cattle traders in Bamako, during the other part of the year, because of favorable cattle supply conditions, butchers in Bamako are able to offset losses they incur during the dry season period by earning positive net margins. They may even be able to have positive average yearly profits. This may also explain why the Bamako butchers in a very large majority stay in butchering despite losses they incur during the bad period.

The results of the study (especially those of fed cattle and fed cattle carcasses returns) are surprising and interesting since they reject the allegation generally accepted that fed cattle and high quality beef businesses are not profitable because the government price fixing system does not provide a price premium for fed cattle and high quality beef.

In the absence of a uniform grading system for live animals and meat in Mali, and in the context of a uniformly administered pricing

Table 4.8

High and Low Quality Beef Carcasses Costs and Profit Margins
Bamako: March - July 1988

Carcass Quality	Average Carcass Weight (Kg)	Average Carcass Total Costs (F CFA)	Average Per Kg Total Costs (F CFA)	Average Carcass Sale Receipts (F CFA)	Average Per Kg Sale Receipts (F CFA)	Average Per Kg Profit Margins (F CFA)
High Quality Beef (n = 100)	191 s = 32.110	153,600 s = 29083.24	808 s = 79.119	157,000	825 s = 40.020	+ 17 s = 74.683
Low Quality Beef (n = 100)	146 s = 32.633	118,650 s = 27395.67	812 s = 71.885	115,540	794 s = 19.428	- 18 s = 72.471
t =	9.766	8.70	.387		6.933	3.320

Test of t using significance at α = .025

system for beef, the reason for the profitability of the fed cattle trade and high quality beef butchering over range cattle and low quality beef businesses could be essentially due to higher live and carcass weight for fed cattle, bearing in mind that positive relationships exist between weight and boneless yield. According to the findings of this study, fed cattle weighed on average 20 percent more than range cattle (371 kg vs 309 kg). Fed cattle carcasses weighed 31 percent more than range cattle carcasses (191 kg vs 146 kg). The live weight average total costs per kg for fed cattle was only 6 percent higher than the live weight average total costs per kg for range cattle (357 F CFA vs 337 F CFA, Table 4.7). All the above differences in means between fed cattle and range cattle are statistically significant.

The average total costs per kg carcass for fed cattle was 0.50 percent lower than the average per kg carcass costs for range cattle (808 F CFA vs 812 F CFA, Table 4.8). In the Bamako and Kati cattle markets, the average per head transaction cost differentials between fed and range cattle were very small in absolute terms (379 F CFA vs 536 F CFA). In the beef market of Bamako, the high quality beef and low quality beef butchering and distribution costs per carcass were the same (4,600 F CFA for each).

Comparative Carcass Yield of *Embouche* and Range Cattle

The reason for higher live and carcass weights for fed cattle over range cattle was due to the combination of the effects of the dry season weight loss that range cattle generally undergo, the well known compensatory growth phenomenon that fed cattle benefit from during their

feeding period (which is the dry season February-May), and the related higher dressing percentage.

According to Mittendorf,[15] cattle on natural grasses without supplemental feeding in West Africa may lose 10 to 33 percent of their weight by the end of the dry season. This is due to the rapid decline in the grass quantity and quality to a level inferior to the maintenance allowance during the dry season. Furthermore, the crude protein content and digestibility decline as the grasses lignify over the hot dry season.

The compensatory growth phenomenon is the ability of animals to obtain a high growth rate on unrestricted feeding (such as the embouche) after a period of restricted feeding following feed shortages, such as occurs after the harvest period (November-December). Growth is defined here as an increase in weight, which in the embouche case in Mali is primarily an increase in fat and water retention, considering the maturity of the cattle fed. The rate of growth within genetic potential limits is principally associated with variations in nutrition, especially the level of energy intake.

In addition to live weight increases, another consequence of the cattle feeding system is a higher dressing percentage for finished animals. Dressing percentage, which expresses the live animal carcass yield (chilled carcass weight/live weight x 100), is essentially influenced by three factors: the amount of fill, the degree of finish,

---

[15] cited in C. Bocoum: Master's Thesis (Michigan State University - 1984) p.142.

and the weight of the hide. For the same animal breed and sex, the weight of the hide has only a marginal effect on dressing percentage.

Thus, only the amount of fill and the degree of finish have influence on the live animal carcass yield.

1. The amount of fill (the stomach and intestinal contents) has great influence on the dressing percentage, and dressing percentage decreases as fill increases. Generally, the stomach of a finished animal (fed animal) is proportionally smaller than that of range cattle because of fat deposits and smaller stomach capacity required to handle feed concentrates.

2. The degree of finish or fatness is the other factor that is closely correlated with dressing percentage.

Data presented in Table 4.9 show that the fed cattle dressing percentage was about 51 percent while those of range cattle was about 47 percent.

Besides its consequences for live and carcass weights, the effect of differences in plane of nutrition of the embouche has also been reflected in differences in carcass composition, especially the quality of beef or fatness.

According to the data presented in Table 4.9, fed cattle carcasses were composed of 58 percent of lean and 24 percent of fat. Range cattle carcasses were composed of 71 percent of lean and 11 percent of fat. Meat and fat composition patterns between high quality beef carcasses and low quality beef carcasses have been found to be significantly different.

In comparing the results in Table 4.9, it appears that one effective kg of carcasses of fed cattle contained 9 percent more fat than one effective kg carcass weight of range cattle. This explains why beef from fed cattle is classified high quality beef while beef from

Table 4.9

Fed and Range Cattle Dressing
Percentage and Carcass Composition:
Bamako: March - July 1988

Cattle Category	Average Live Weight (Kg)	Average Carcass Weight (Kg)	Mean Dressing Percentage %	Mean Meat Component %	Mean Fat Component %	Mean Bone Component %
Fed Cattle (n = 100)	371 s = 59.256	191 s = 32.110	51.5 s = 1.875	58.39 s = 7.526	23.61 s = 7.526	18
Range Cattle (n = 100)	309 s = 66.296	146 s = 32.633	47.241 s = 1.873	71.37 s = 6.664	10.83 s = 6.733	18
t =	6.994	9.766	15.700	12.928	12.541	

Test of t using significance at<= .025
X02 = 6.040
df = 1
Test of X02 using significance at<= .05

range cattle is classified low quality beef, although no specific standard fatness limits have been determined between high and low quality beef.

In comparing lean figures, it appears that one effective kg of fed cattle carcasses contained 22 percent less lean meat than one effective kg of range cattle carcass.

These differences in carcass composition, especially fatness, are to be expected considering the state of advanced maturity of these cattle.

In order to evaluate the allocative efficiency of the marketing systems, it is necessary to qualify the above observed profit rates as normal, excessive or subnormal profit rates compared with rate of return to capital invested in other activities. According to Staatz (p. 365), the generally accepted range of estimates of the opportunity cost of capital in West Africa varied from 20 to 30 percent. However, before one can compare the trader or butcher profit margin rates to these estimates, it is necessary to recall that profit margin is composed of return both to capital and participant labor. To determine the return to capital it is necessary to know the number of times a producer, a butcher, or a trader rotates his capital per year. The return to labor is estimated by fixing an implicit wage for these producers, traders, and butchers.

Producers' Profit Margins

For producers, it is known that capital used for cattle feeding activities does not rotate within a year because usually producers (both in urban and rural areas) feed cattle once a year. Cattle feeding

activities usually take place from January to April. Then, the production period is followed by a period of one month during which cattle are marketed. After June, it is no longer profitable to feed cattle since the finished cattle will not be cost effective because of the competition of fat cattle from abundant and highly nutritive rainy season pastures. Should one attempt to make an approximate estimate for the four months of the return to capital invested in feeding one head, then the result would be as follows:

A daily wage for an unskilled worker in Banamba is about 400 F CFA while it is about 500 F CFA in Bamako. In 120 days a cattle producer in Banamba could earn (as opportunity cost) about 48,000 F CFA wage. Assuming that each cattle producer fed on average 5.5 head (in 1988, 28 sampled producers fed a total of 155 head), one head should provide a producer in 120 days with a wage equivalent to 8,725 F CFA (48,000/5.5). This leaves 5,475 F CFA for the return to capital invested (Table 4.6) in 120 days, equivalent to 6 percent or a rate of 18 percent per year, which would be considered close to the normal profit rate. However, if the opportunity cost of non tradeable inputs such as hay used in cattle feeding is taken into account, this rate would be considered as low.

For a cattle producer in Bamako, who is generally a high level civil servant or a relatively important business man (for whom cattle feeding activities are rather a leisure than a lucrative job) an implicit wage of 750 F CFA per day is assumed. This is slightly higher than a daily wage of an unskilled worker in Bamako. Then, in 120 days, a cattle producer could earn a wage of 90,000 F CFA. Since he fed on

average 5 head (22 producers in the sample fed 115 head in 1988), one head would provide an urban producer with 18,000 F CFA as implicit wage in 4 months. That leaves 8,000 F CFA from a four month total profit margin (Table 4.6) as return to capital invested. This is equivalent to a rate of 7.3 percent in 120 days or about 22 percent per year. This rate would be considered as normal. However, it would be lower and even negative if the risk cost is taken into account, as will be seen later in this section.

The significant difference in the per head profit margins earned by producers in Banamba rural areas and those earned by producers living in the city of Bamako (see Table 4.6), however, may be explained by a better bargaining position of urban producers through the use of go-between traders or intermediaries discussed earlier, and the Bamako market credit sale risk premiums.

Nevertheless, one may be tempted to explain the rural producers' lower profit margin rate as compared to those of urban producers by the existence of possible exploitation of rural emboucheurs by buyers, as alleged by many people. In order to explore this allegation, this part analyses the circumstances under which the alleged exploitation of emboucheurs by buyers may be possible. The analytical framework used for examining farmer exploitation is based on Bauer and Yamey's theory[16] of producer exploitation, which is in line with the effective competitiveness concept discussed in Chapter 2.

---

[16] Bauer and Yamey: West African Trade (1954)

Producers' Exploitation

According to Bauer and Yamey, exploitation of producers by middlemen is made difficult if one of two conditions holds:

1. if there is competition among traders seeking to purchase agricultural commodities at the farm level; or
2. if viable marketing alternatives are available to the producer and he is informed of these options.

The rationale for the first condition is based on the assumption that effective competition assures producers a fair price. However, such competition may not always prevail because production may be so dispersed and/or so small that some villages may not be able to support commercial activities by more than one or a few traders. This situation leads to natural monopsonies or oligopsonies. With such possible market power, traders may be able to secure large profits to the detriment of producers.

The importance of Bauer and Yamey's second condition stems from the above possible market power situation. Indeed, the rationale for the second condition is based on the belief that where producers are able to get their produce to other markets without great sacrifice of time, effort, or resources, the prices they receive locally cannot be far below those obtained in the more important market centers. The reason is that monopsonistic or oligopsonistic buyers, while appearing to have no competitors or imperfect competition, have nevertheless to set their buying prices in competition with other buyers elsewhere and they cannot depress their own buying prices so low that producers would be better off by taking their produce to other more distant buyers.

Analyzing the market conditions faced by farmers within this framework entails looking at the following data:

1. market structure data, including the number of market participants and the existence of barriers to entry into fed cattle trade at primary level;

2. data on the existence of market arrangements among traders;

3. data on traders' profit margins (for Bauer and Yamey's first condition);

4. data on the existence of market alternatives available to farmers;

5. farmers' access to market information data (for testing the second condition).

Almost all these data have been already discussed in the evaluation of the degree of competition in primary markets for fed cattle. The conclusions were that the market was generally competitive with no evidence of market power, no large profits, no serious barriers to entry, and no evidence of collusion among first buyers. Moreover, all market participants have access to market information.

About the existence of market alternatives, theoretically, five marketing alternatives including farm level sales were available for the farmers. However, according to the findings of this study, almost all the sample farmers sold on farm. Several reasons advanced by farmers themselves explain the choice of the farm market option. They include the farmers' lack of market experience, the small number of cattle and the cost (both direct and indirect costs) involved in moving cattle long distances, and the inconvenience of the trip in comparison with the price differential between farm and market options.

According to data collected during the 1986 research period, the average price per head obtained for the sample cattle sold on a farm was

about 3 percent higher than the average price per head obtained for fed cattle sold in the nearby collection market of Banamba (122,000 F CFA vs 118,000 F CFA). However, it was not possible to be sure whether cattle were comparable since it was not possible to weigh cattle in the market of Banamba. One may speculate that the fed cattle sold in Banamba might be animals refused by traders at the farm level because of their low quality. But the average price of the 21 cattle sampled at the farm level was 6 percent lower than in long distance market of Kati (129,000 vs. 122,000 F CFA). The cost of moving cattle was estimated at 900 F CFA per head on large scale shipment basis. Apparently, the advantage that might accrue from selling in long distance was offset by the risk and inconvenience that such an alternative involved. In addition, there is no guarantee that farmers could obtain in long distance markets those higher prices obtained by professional (specialized) traders.

In the overall assessment of market conditions faced by fed cattle producers in rural areas, one can conclude that there was no evidence to support the alleged exploitation of the producers by the buyers.

Traders' Profit Margins

Given the prevalence of butchers' credit purchases and butchers' defaulting or not paying back credit on time, it is difficult to know how many times a traders' capital rotates in a year. However, based on follow-up interviews conducted with traders and butchers in 1989 and discussed in Chapter 3, it appears that traders' capital may rotate one time every 20 days from February to July and once every ten days from August to January. As a consequence, a fed cattle trader would possibly

rotate his capital nine times in six months while a range cattle trader would possibly rotate his capital 27 times in a year. If each trader receives a daily implicit wage of 1000 F CFA (an amount above the daily wage of an unskilled worker, but equivalent to a junior staff member's daily pay) with a business scale of about 2 head per day, the return to labor for each trader would be about 500 F CFA per head. In 181 days, the implicit total wage to be provided to a trader by one head would be about 90,500 F CFA. With nine possible capital rotations, a fed cattle trader would earn a total margin per head of 153,000 F CFA (Table 4.7). This leaves the return to capital invested in six months at 62,500 F CFA, about 47.7 percent or a yearly rate of about 95 percent. This rate could be considered theoretically excessive compared to standards referred to in this study.

For a range cattle trader, the per head annual implicit wage would be 182,500 F CFA. With 27 possible capital rotations he would earn a total yearly margin per head of 243,000 F CFA (Table 4.7). This leaves the return to capital invested at 60,500 F CFA, an annual rate of return of about 58 percent. This rate also could be considered high. These rates, however, do not take into account possible losses of principal due to loan defaults.

Assuming one to five percent credit default risks on capital (Table 4.10), the yearly rate of return to capital per head for fed cattle would be:

- 77 percent at one percent credit default risks;
- 59 percent at two percent risk;
- 41 percent at three percent risk;

Table 4.10
Cost of Credit Default Risk
(From 1 to 5% Risk)

Risk Percentage (%)	Cost per Fed Cattle (F CFA)	Cost per Range Cattle (F CFA)
1	1310	1049
2	2620	2098
3	3930	3147
4	5240	4196
5	6550	5245

Source: Table 4.7

- 23 percent at four percent risk; and
- 5 percent at five percent credit default risks on capital.

From the above sensitivity analysis, only the rate of return to capital obtained at 4 percent risk of defaults would be considered as normal. The three first results are very high rates while the last one is a very low rate.

For range cattle, a yearly rate of return to capital per head would be:

- 31 percent at one percent credit default risk; this rate would be considered as normal.
- 4 percent at two percent risk; this rate of return would be considered very low.
- at a credit default risk higher than two percent, the rate of return to capital would be negative.

Butchers' Profit Margins

About butchers' capital rotation, there exist also some difficulties since butchers generally move out of the profession, at least temporarily during periods of cattle shortages to avoid heavy financial losses, the threat of which was evidenced by the losses many butchers experienced in the beef market. According to the study findings, 33 percent of sampled fed cattle carcasses and 56 percent of range cattle carcasses were sold during the period with a loss. Due to this situation and also, from time to time, supply difficulties on the one hand, and the fact that beef is often not sold out within a day, and/or that credit sales made to retailers (which are repaid between one and three days) on the other hand, it is estimated that butchers' capital may rotate once every five days. This means that butchers' capital may possibly rotate 36 times in the period between February and July, and 73 times between August and January.

If a butcher receives a daily implicit wage of 1,000 F CFA as his colleague trader, an implicit total wage for a high quality beef butcher in 181 days would be 181,000 F CFA. Since, on average, a butcher slaughters two head per day, the overhead implicit wage for the same period would be 90,500 F CFA. The total six month margin for a high quality beef butcher would be 108,000 F CFA (Table 4.8). Then, the return to capital invested in 181 days would be 17,500 F CFA, a rate equivalent to about 11 percent or an annual rate of 22 percent.

For butchers who slaughtered range cattle during the same period, the performance is bad. Based on the above implicit wage and possible capital rotation times, and on negative margins obtained by low quality beef butchers in Table 4.8, the rate of return for the period between February and July would be about -155 percent. This means that during the bad period, a range cattle butcher may lose about two thirds of his total capital of two head.

CONCLUSION

As one can conclude, empirical evidence in this chapter suggests that:

1. in both cattle and beef markets, participants performed their marketing operations quite efficiently by using simple and inexpensive labor intensive technologies, by operating at low costs and by avoiding unnecessary costs.

2. profit margin rates for producers in the Banamba zone may be considered as low while those of Bamako producers may be considered as acceptable; the differential in margins between urban producers and rural producers may be due to urban producers' better bargaining position and credit sale risk premiums in the Bamako cattle market;

3. the existence of price differentials between fed and range cattle on the one hand, and between fed and range cattle carcasses associated with the suggested fed cattle quick sale premium and consumer preference for high quality beef on the other hand, may suggest that the cattle pricing system is efficient (see beef sale section in Chapter 3);

4. cattle trader profit margin rates (without taking into consideration cost of possible loan default) appeared to be high; however, they should be judged within the particular environment of the Bamako cattle market, where uncertainty and risks are great; thus, these high rates may be the results of both normal return to capital and risk rewards or payment for the cost of uncertainty, especially credit risks;

5. profit margin rates obtained by butchers suggest that high quality beef butchering yields a normal profit while low quality beef activities lead to financial losses. This poor seasonal performance (see Chapter 4) suggests that some allocative inefficiencies could exist in beef markets. Should this situation last long, it would compromise the performance of the entire cattle and beef subsector. In order for the subsector to be efficient, all systems must function as part of a single system that efficiently moves beef from producers to consumers. Within the subsector under study, one should believe that butchers suffering losses would pass some portions of their losses on to traders (as evidenced by credit defaults discussed in Chapter 3), who in turn would pass them on to traders in collection and distribution markets, and to producers, causing producers' selling prices to fall. This would result in a decline in quantity supplied and even a possible cattle shortage in the long run. The Government price fixing system could largely be responsible for these inefficiencies. However, an unambiguous single cause of these inefficiencies was difficult to establish in this study because one or two of the identified causes may interact (see Chapter 2).

Other additional factors which could be responsible for the inefficiencies in the beef market may also be butchers' misjudgments of the live animal carcass weight (though it is generally accepted that given their long experience in butchering, butchers have the ability to evaluate live animal carcass yield with only small errors).

Finding remedies to these constraints to good performance is central to public policy and will be discussed along with the general conclusions of this study in the next chapter.

CHAPTER FIVE

GENERAL CONCLUSIONS AND POLICY RECOMMENDATIONS

Market Structure

The findings of the study indicate that with the large number of cattle traders and butchers and their low concentration ratios, the possibility for individual firms to influence market price and quantities of commodities sold is very limited. Similarly, chances for collusion among participants to control market prices and commodity quantities are small. Even if traders or butchers want to collude, their large number and their small size of operations would make any concerted actions unstable. In addition to the large number of traders and butchers, and their low market concentration, the degree of product differentiation and barriers to entry have been found to be quite low in both cattle and beef markets. This is because:

1. economies of scale have been found to be relatively unimportant; and

2. capital requirements, information access, transport means, and legal barriers have not been found to be deterrents to entry. The dominance of the cattle trading profession by a single ethnic group, however, suggests that some barriers to entry related to ethnic and/or social ties may exist. The large number of market participants, on the one hand, and the low barriers to entry on the other, suggest that both the cattle and beef markets are effectively competitive.

Market Conduct

The study findings on participants' behavior suggest:

1. participants in both cattle and beef markets made their marketing decisions independently. There was no evidence of

traders or butchers engaging in prior consultations or entering into agreements with rivals to raise or lower commodity prices or to restrict the entry of newcomers. In any circumstances, the large number of participants in each of the cattle and beef markets would make collusive behavior difficult or at least unstable;

2. there is a lack of the coordination mechanisms such as contracting, vertical integration, and horizontal integration which could reduce both price and supply uncertainties and risks, and therefore costs for both traders and butchers. The absence of grading and unreliable contract enforcement, and the scarcity of capital, make contracting or integration more difficult;

3. despite the lack of these coordination mechanisms, sellers and buyers appeared to perform effectively their activities as evidenced by the smooth flow of desired slaughter cattle quantities in Bamako during most of the year;

4. prices in cattle markets were set in market places through open bargaining between buyers and sellers.

Beef prices were fixed by city authorities and they were generally respected by butchers at least in nominal terms. However, the real price of high quality beef exceeded the nominal price while the real price of low quality beef was lower than nominal price. By selling by tas, some butchers could evade price controls and sell their beef at higher prices by varying the weight of tas. Thus, consumers do not have the protection that is the main objective of the beef price control policy.

Market Performance

Empirical findings presented on market performance suggest that both the cattle and beef markets operated efficiently at low costs, using inexpensive labor-intensive technologies, and avoiding unnecessary costs. There is no evidence that the large number of middlemen in Kati and Bamako involved unnecessary costs. Rather, available evidence suggests that the middlemen performed economic functions. With regard to pricing efficiency, available evidence suggests that premia exists

for fed cattle and high quality beef carcasses because they are heavier and fatter than range cattle and low quality beef carcasses. However, data available cannot allow one to make decisive conclusions concerning the efficiency of the pricing system.

The study's evidence suggests that the profit margin rate for urban producers is normal, but that of rural producers is slightly below the lower limit of the normal rate, which is between 20 and 30 percent annual return to capital in West Africa. For cattle traders, profit margin rates were above the normal rate, but this rate may reflect to some extent the risk involved in credit sales to Bamako butchers. However, financial losses experienced by some high quality sellers and a very large portion of low quality beef butchers (Table 5.1), suggest the existence of some allocative inefficiencies in the beef market which call for remedies. These remedies are discussed in the next section.

Policy Recommendations

The conclusions discussed above call for the following policy implications and recommendations:

Market Competitiveness and Large Numbers of Traders

The effective competitiveness of the cattle and beef markets (given the current scarce capital availability) stems from the relatively large number of participants, and the general absence of barriers to entry and collusion among participants. Consequently, any attempt to reduce the number of market participants may have negative results on market conduct and performance, notably on the market competition, leading to possible market power and increases in large traders' profit margins. The consequences of such a situation (see the

section on alleged redundancy of middlemen in Chapter 4) would be reduced welfare for producers (lower cattle prices) and consumers (higher beef prices). Thus, the cattle marketing reorganization under study in Mali (if it includes limitation of the number of traders) could reduce cattle market competition and lead to higher beef prices, an increased parallel market, and the opportunity for corruption in the allocation of limited trading licenses by civil servants.

Moreover, it is wrong to suppose that improvement could be obtained in marketing by compulsory limitation of the number of traders, so long as trade is productive and so long as no more productive alternative employment is available for those engaged in the trade. One should remember that besides its role of linking production and consumption sectors, the marketing system also contributes to economic growth and income distribution through the generation of many jobs involved in the transfer of the commodity from producer to consumer. Therefore policy makers should be cautious about any policy which leads to the limitation of market competitiveness and opportunities for employment. Policies should rather be aimed at removing constraints to good performance, enhancing competition by eliminating entry barriers, and promoting productive employment opportunities.

In this regard, this study has identified two possible major constraints in the beef market for which government interventions may provide corrective measures: the high interest rates charged by cattle traders when selling cattle on credit to butchers, and the government beef price fixing system. In addition to these major constraints, the possible butchers' misjudgment (mostly carcass weight overestimation)

Table 5.1
Per Kg net Margin Distribution
Between High and Low Quality
Beef Butchers in Bamako
(March - July 1987)

Margin Range (F CFA)	Number of High Quality Beef Butchers * n = 100		Number of Low Quality Beef Butchers n = 100	
	Gainers	Losers	Gainers	Losers
1 - 10	9	7	7	6
11 - 20	15	4	7	6
21 - 40	12	5	10	13
41 - 60	10	7	8	13
61 - 100	19	6	7	8
101 - 150	6	4	1	7
151 - 270	2	2	2	5
Total	63	35	42	58

* 2 High Quality Beef Butchers broke even

due to the lack of adequate live cattle evaluation measures could also constitute a performance constraint.

Capital Constraint

The issue of high interest rates charged by traders is related to the lack of working capital, especially for butchers. Although capital possession has not been found as a barrier to entry into the cattle and beef markets (Chapter 2), the lack of capital has resulted in the payment of higher interest rates on credit purchase. These high interest rates are a result of increased butcher indebtedness and higher risks of default. Butcher indebtedness and defaulting may be largely attributable to the impossibility for butchers to adjust the price of beef to live animal price fluctuations in the official beef pricing system. When total carcass sale receipts cannot cover the price of live animals and operation costs, a butcher goes into debt, possibly defaulting. Thus, the capital constraint involves two related issues: the lack of adequate working capital and the abuses of credit.

Limited (or lack of) capital for traders/butchers

A solution to this issue is necessary, not only for the expansion of cattle and beef marketing operations, but also for the enhancement of market competition to the benefit of producers and consumers. However, the solution of the capital crisis as discussed in Chapter 2 is a very complex one.

The solution of access to capital by traders and butchers requires the design of a sound and comprehensive financing policy agreed to by all interested parties including financial institutions, policy makers,

expert analysts, traders, and butchers. According to Adams,[17] "there is a general tendency to set interest rates for agricultural credit below the market equilibrium levels in an attempt to subsidize borrowers. These cheap credit policies in general result in the undermining of agricultural development."

To be successful, a financing policy should provide adequate solution to the following issues:

- credit guarantee scheme
- credit interest rates
- credit duration

From the experience in Mali, the guarantee of formal credit reimbursement is still questionable. The problem of credit guarantee could be solved, however, if the borrowers are backed by the Chamber of Commerce[18] or Cooperatives, which would offer security for the borrowers to the banks provided the Chamber of Commerce or cooperatives have the means to oblige the borrowers to comply with the terms of credit. One alternative may be to give to the Chamber of Commerce or cooperatives the possibility of precluding the delinquent from doing business until repayments are met. Within this guarantee scheme, banks could allocate certain percentages of their loan portfolio to cattle traders and butchers. Yet, neither the Chamber of Commerce nor cooperative associations have the financial resources to repay banks in case of market participant default. In addition, they lack legal means

---

[17] Dale Adams, D.H. Graham, and J.J. Von Pischke, "Undermining Rural Development with Cheap Credit."

[18] Public Office dealing with private entrepreneurs' matters.

to oblige a member to comply with the terms of credit. Therefore, the solution of the problem of credit guarantee rests on the rigorous enforcement of existing laws and regulations of credit abuses discussed below.

Interest rates should be equal to the opportunity cost of capital and should reflect resource scarcities in order to avoid discouraging savings.

Abuse of credit

The abuses of credit (long delays of repayment and defaults on credit) are generally the results of butchers' financial losses due to the fact that carcass sale receipts cannot offset the total cost. Among other solutions of abuses of credit, the government needs to take corrective measures by enforcing rigorously the existing regulations on credit abuses, which compel the payment of debt according to the agreed terms between the creditor and the debtor, otherwise the delinquent debtor would be jailed and his belongings seized to repay the creditor. Unless these measures are taken, long delays in repayment and defaults on credit will jeopardize in the short run the efficient capital turnover and in the long run the efficiency of the marketing system as a whole because of higher capital risk premiums and limited cattle supply, which both have strong impacts on cattle prices. Moreover, the prevalence of default by butchers on credit purchases would reduce the attractiveness of the Bamako cattle market as a major Malian cattle transaction center.

This, however, is a very complex problem because, beyond just the cattle and beef marketing system, it would require the overhaul of the whole system in Mali by which disputes are adjudicated and laws are enforced.

Beef Price Control

The second major identified constraint to market performance of a policy nature is the government beef price fixing system. Official beef prices in Mali are set by the government and held constant for a period of one or more years. One of the most important shortcomings of this policy is the lack of flexibility. Official beef prices generally fail to take into account spot information on factors affecting production and market conditions. The result is the impossibility for butchers to make the necessary seasonal (and/or quality) price adjustments. One should recall that in Mali, the dry season is generally characterized by increased live animal prices and lower yield. This situation possibly led to the observed financial losses of butchers during this period, resulting in large credit defaults when carcass sale receipts cannot offset the live animal purchase price and operational costs.

In order to improve the performance of the beef market and subsequently the overall cattle and beef subsector performance, it is important that the current beef pricing system be altered to let market forces determine beef prices. The benefits of this would be (1) improved pricing flexibility (as is the case in the live animal market) resulting in a better allocative efficiency, which better reflects prevailing supply and demand conditions back to other market participants, such as traders, consumers, and farmers; and (2) better incentive transmission to butchers by increasing profit margins, reducing or eliminating financial losses; to traders by reducing or eliminating butchers' credit defaults; to producers by providing guidance for best use of productive resources into the quality

of beef that consumers value more; and to consumers by better opportunity for choice between different qualities of beef, and increased satisfaction.

These price adjustments would result in beef price decreases in periods of high supply of animals (August through January), and beef price increases in periods of cattle shortages (February through July). The latter adverse effects may largely be offset by the saving of former price decreases as recognized by both butchers and traders. Within such a pricing system and given the beef market competitiveness, one would anticipate that consumers would be better off under a beef price determined by market forces.

Overall, the impact of the removal of beef price controls on producers and consumers should be analyzed within short- and long-run contexts. In the short run, one should expect the removal of the beef price control to increase the quantity of fed cattle demanded as butchers are able to increase the price of high quality beef (quality price adjustment). This would attract additional resources into the production of fed cattle, and consumers could find more high quality beef in their nearby markets (in neighborhoods, towns and villages).

In the long run, however, the increased quantity of fed cattle produced may result in lower prices for producers, leading to the reduction of quantities produced if additional markets (e.g. exports) are not available to absorb the surplus, and/or if fed cattle production costs are lower than fed cattle sales revenues. Lower production costs can be obtained through technological changes.

Since high quality beef and low quality beef are close substitutes, another factor related to the cost of production of high quality beef which should be taken into account is the proportion of high quality beef in the total beef demand under a policy of beef price liberalization. That proportion will depend essentially on changes in per-capita income and the cross-price elasticities between high quality beef and low quality beef. However, higher prices may be necessary, at least in the short run, to induce increased fed cattle production, and this imposes a heavy cost on low-income consumers. That is, in addition to beef prices, increased incomes are necessary to make the demand for high quality beef effective.

Several other factors may play important roles in the outcome of the removal of beef price controls. Among others are the ability of butchers and traders to respond to the new opportunities created by changes in the macro-economic policies (i.e. beef price liberalization), and the ability of the government to take on new responsibilities such as providing credit markets in order to enhance butchers' and traders' ability to respond to new market opportunities.

An alternative solution to remedy partially allocative inefficiencies in the beef market would be for the government to set beef prices twice each year: One set of lower prices for the period of high supply, and another set of higher prices for the period of shortage. Such price fixing systems however would be confusing for both butchers and consumers and would not solve the long-run problem of the government price fixing system since the occurrence of drought may cause

a heavy flow of animals in a normal period of cattle shortage and a shortage of cattle in a normal period of high supply.

Selling Cattle on a Weight Basis

Cattle prices are determined on a per head basis or in lots, and never by unit of weight even in the Kati market, where a live weight scale has been installed. Cattle buyers and especially butchers visually evaluate the carcass weight (particularly) and the quality of meat an animal can yield. It is generally alleged that butchers throughout their training period as apprentices have acquired experience and ability to visually judge a live animal carcass yield with only small errors. In this study, however, it has been suggested that this might not be accurate and butchers could make mistakes in their expectation of live animal carcass yields. As a consequence, butchers could excessively value slaughter cattle.

To remedy such possible mistakes in the future, one would recommend determining cattle weights by direct measurements since accurate evaluation is essential to economic success. However, despite its apparent appeal, because of its simplicity, weighing cattle may not be easy to implement because of some problems that can inherently be involved. The most important of these problems are: (1) dishonesty of agents in charge of weighing cattle; (2) lack of accuracy of weighing scales; (3) costs of the necessary investment in many markets; (4) risk of injury to animals being weighed, especially range cattle that are not used to being handled; and (5) fear of merchants that cattle weighing will be used by the government to fix prices in the live animal marketing system.

In addition to the solutions of these problems, in order to be effective a marketing system based on weighing live animals should be voluntary and its use should depend upon the acceptance of interested parties.

The introduction of live weight determination in cattle transactions would be an innovation in the Malian cattle marketing system and could serve as a starting point for more comprehensive uniform cattle and beef classification and grading systems.

In addition to the above recommended measures to remove the most crucial identified constraints to better performance, the author has also identified some limitations to this study. The author believes that further studies should be conducted in the longer term for a better understanding of the other aspects of the Malian cattle and beef market in order to enhance market performance. These studies should investigate such important issues as: long-term nationwide market performance, the outlook of Malian cattle and beef exports in coastal markets, market infrastructural requirements, the production and consumption of beef in Mali, the implementation of a cattle and beef grading system, and the credit market.

These issues are discussed in the next section.

Study Limitations and Research Needs

This study has examined in depth the organization, conduct and performance of the cattle and beef subsector in Mali. One of the limitations of the study is the analytical framework, especially as it pertains to the difficulty of evaluating performance. This difficulty is essentially due to the absence in economic theory of universal performance criteria, and to the subjective nature of the interpretation of the findings as discussed in Chapter 1. Because of that, it is difficult to predict real subsector performance.

Beside this analytical limitation, there are other circumstantial limitations related to:

The geographical scope of the study

Actually, the study data were collated in the major urban beef markets in Mali, and in a selected sub-portion of its supply system. A nationwide study would provide better understanding of the whole Malian cattle and beef subsector performance and constraints for the design of a sound national livestock marketing policy. Such a study should be conducted as soon as possible.

The seasonal scope

This study mostly addressed dry season marketing patterns. In order to capture changes which occur in the system over time, especially changes related to seasonal cycles, it is necessary that the nationwide study be conducted for at least one entire year.

Infrastructure improvement

Because of its geographical and seasonal scope, the study has not identified many of the infrastructural constraints expected in a

marketing system. Thus, this study had limited recommendations for infrastructure improvement.

Export market

The study has been devoted to the understanding of the domestic market organization, operation, and performance, with little attention to export market arrangements.

The exportation of cattle plays an important role in the total cattle demand in Mali. Since the colonial period, Mali has always exported cattle (and also beef for a short period) to its coastal neighboring countries. The cattle export business is usually in the hands of private traders operating on a relatively small scale with a low level of investment. Because of this type of management and also because of the absence of competition from the world beef market, Malian traders were able to sell to countries such as Ghana and Cote d'Ivoire without great concern about sustaining financial losses. Beginning in 1972, however, when the Ghanaian market integrated with the world market, followed by Cote d'Ivoire in 1975-76, the demand for Malian cattle and other Sahelian cattle fell. According to Josserand (1989), this was from 670,000 head in 1980 to 457,000 head in 1987. During the same period, the import of non-African meat grew from an equivalent of 370,000 head in 1980 to 740,000 head in 1987. These new market conditions will in the long-run have important effects on the expansion of Malian cattle exports, despite the fact that new foreign markets such as Liberia and Nigeria are temporarily available. Although the disappearance of the coastal markets is not foreseeable, it is certain that the relative share of Malian cattle in foreign markets depends on

the capacity of Malian traders to offer cattle at the lowest prices. This implies that Malian exporters must be able to adopt cost-saving technologies. OMBEVI (1978), Staatz (1980), and Delgado (1980) investigated the cost structure of Malian cattle exported to Cote d'Ivoire and found costs to be high. Since then, the conditions may have changed, particularly with the replacement of the Malian currency by the CFA franc and the recent IMF-induced economic policy reforms. However, even if traders are willing to hold down their operating costs, Malian cattle still may not be competitive if barriers to entry into foreign markets exist, if the government of Mali continues to heavily tax export cattle, if negative differential inflation rates exist between Mali and trading partners, and if European countries continue to subsidize their exports to African countries.

Thus, it is very important that such information be updated in order to estimate the outlook for Malian cattle exports (especially fed cattle, whose marketing costs per kg are expected to be higher because of their weight loss and mortality related to transport stress).

Beside competitiveness, the level of beef exports depends also on production parameters and the level of domestic consumption which are both currently rough guesses. More reliable data are needed, as shown below.

Production of Beef

Most of the production parameters currently used in the design of livestock policies were estimated in 1974-75 after the 1972-73 drought. Since many events (the 1981-84 drought, the implementation of the cattle feeding program, the integration of coastal markets into world beef

markets) occurred between 1975 and 1988 which may certainly change production and consumption conditions, one may believe that these data may no longer be accurate and reliable. Thus, an updated database is needed to allow planners and policy makers to design and implement policies based on more reliable information. These data should include an accurate national cattle herd size, its geographical distribution, its structure, the gross productivity rate, the net offtake rate, and production costs, especially for range cattle.

Domestic Beef Consumption

Very little evidence is available particularly concerning the consumption of beef in rural areas. Since the rural area beef consumption is an important component of the total domestic beef consumption which in turn determines the quantity of beef available for exports, it is necessary that an investigation be carried out to obtain the most accurate domestic beef consumption estimates. A nationwide ongoing study on food consumption conducted by the Direction Nationale de la Statistique et de l'Informatique, however, is expected to provide data on overall domestic beef consumption.

Stable Beef Supply

The failure of the market to provide adequate beef supply throughout the year is an indication that the market does not always result in satisfactory performance. In the context of seasonal supply shortage, the problem is how to improve cattle production techniques and most importantly to store beef on the hoof. Such improved cattle production and storage are impossible for range animals because of the deterioration of grazing conditions during the dry season. The

government of Mali tried to solve the seasonal shortage problem by the implementation of large-scale government ranches and a feedlot along with the embouche paysanne program. Yet, the ranches and the feedlot failed and the embouche paysanne, despite its important development, has not been able alone to prevent a beef seasonal shortage. However, there still is a large opportunity for increasing the volume of beef which can be produced according to projected estimates of feeder cattle and feedstuffs production. Increasing the number of cattle channelled through cattle feeding not only would increase the weight of carcasses but also would allow storage on the hoof until the shortage period. This, however, would require incentive sale prices to offset costs of production and, most importantly, costs of storage.

Grades and Standards

The absence of uniform classification and grades in cattle and meat marketing has been discussed in Chapters 2 and 3. The issue remains as to what classification and grades are suitable to Malian livestock production systems. To address this issue, information must be obtained from all interested parties to determine attributes which impart values to the product and indicators by which the attributes can be measured. The problem is primarily one of establishing classifications and grades that are uniform at all times and at all points.

BIBLIOGRAPHY

Abattoir Frigorifique de Bamako. "Rapports annuels," 1980-1987.

Adams, Dale W., Douglas H. Graham, and J.D. Von Pischke. "Undermining Rural Development with Cheap Credit," (Boulder: Westview Press, 1984).

Babbie, Earl. "The Practice of Social Research," Third Edition: Wadsworth Publishing Company (Belmont California, 1983).

Bain, Joe S. "Industrial Organization," Second Edition: John Wiley and Sons, 1968.

Bauer, P.T. "West African Trade: A Study of Competition, Oligopoly and Monopoly in a changing Economy". Cambridge: University Press,1954.

Bauer, P.T. and **Yamey, B.S.** "Markets, Market Control and Marketing Reform". London: Weidenfeld and Nicolson, 1968.

Bocoum, C.A. "Losses Occurring in Marketing Cattle and Effects of Regain on Live Weight and Carcass Composition in Tropical Areas." Master's Thesis, Michigan State University, 1984.

Boggs, Donald l., Merkel, Robert A. "Live Animal Carcass Evaluation and Selection Manual" 1979.

Brandow, George. "Appraising the Economic Performance of the Food Industry," in Lectures in Agricultural Economics, Economic Research Service, USDA, 1977, pp. 81-100.

Breman, H., N. Traore, A. Bonfiglioti, J.H. Eriksen, J.J. Ketelaans, K. Sawadogo. "Analyse des conditions de L'Elevage et Propositions de Politiques et de Programmes," OCDE, 1986.

Cohen, Abner. "Custom and Politics in Urban Africa: A Study of Haussa Migrants in Yoruba Town." (Berkeley: University of California Press, 1969).

Delgado, Christopher. "Livestock and Meat Production, Marketing and Exports in Mali." Ann Arbor: Center For Research on Economic Development, University of Michigan, 1980.

Direction Nationale de l'Elevage in Mali. "Etat Récapitulatif des Opérations de Conditionnement du Bétail et des Produits d'Origine Animale à l'Exportation" 1980-1987.

Direction Nationale de la Statistique et de l'Informatique du Mali, (1988).

Eddy, E.D. "Development of the Livestock Sector in West Africa, "Cornell Agricultural Economics Staff Paper NO.75-17, 1975.

Eicher, Carl K., Doyle C. Baker. "Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey." Michigan State University International Development Paper NO. 1, 1982.

Etablissement de Credit et L'Investissement Betail Viande, (ECIBEV). "Rapport de Campagne." 1976-1986.

Evangelon, Phylo. "Cattle Marketing Efficiency in Kenya's Maasailand." Edited by James. R. Simpson, and Phylo Evangelon in Livestock Development in Sub-Saharan Africa," 1984.

Feffer, Joe K. "Technical Assistance Final Report." Chemonics International, March, 1986.

Fenn, M.G. "Marketing Livestock and Meat". FAO Marketing Guide No.3, 2nd ed. Rome, 1977.

Forrest, John C., Aberle, Hedrick, Judge, Merkal. "Principles of Meat Science", 1975.

French, B.C. "The Subsector as a Conceptual Framework for Guiding and Conducting Research." AJAE. Vol.56, No. 5. December 1974, pp.1014-22.

Goetz, S. and **M.T. Weber.** "Fundamentals of Price Analysis in Developing Countries Food System." Michigan State University International Development Working Paper No.29, 1986.

Gregory, M. Sullivan. "Impact of Government Policies on the Performance of the Livestock-Meat Subsector." Edited by James R. Simpson and Phylo Evangelon. In "Livestock Development in Sub-Saharan Africa." 1984.

Herman, Larry. "The Livestock and Meat Marketing System in Upper Volta: An Evaluation of Economic Efficiency." Ann Arbor: Center for Research on Economic Development, University of Michigan,1978.

Holtzman, John S. "Rapid Reconnaissance Guidelines for Agricultural Marketing and Food System Research in Developing Countries," Michigan State University International Paper (Draft), 1986.

Holtzman, John S. "A Socioeconomic Analysis of Stall-Fed Cattle Production and Marketing in the Mandara Mountains, Region of Northern Cameroon." Ph.D. Dissertation, Michigan State University, 1982.

INRZFH. "Rapport Intérimaire d'Evaluation Economique de la Campagne d'Embouche Paysanne 1984/85." December, 1985.

INRZFH. "Embouche Paysanne: Analyse Economique de la Campagne 1983/84." August, 1985.

Jones, William O. "Marketing Staple Food Crops in Tropical Africa". Ithaca, New York: Cornell University Press, 1972.

Henri, P. Josserand. "Impact of Non-African Meat Imports on Cattle Trade between West African Countries". CILSS October 1989.

Kellogg, Earl Duane. "A Temporal and Spatial Model to Assist in Evaluating Investments in the Nigerian Beef Distribution System." Ph.D. dissertation, Michigan State University, 1971.

Kohls, Richard L. "Marketing of Agricultural Products."

Marion, B.W. "Some Soughts on Terms and Classifications to be Used in Sub-Sector Performance". February, 1976.

Marion,B.W. "Application of the Structure, Conduct Performance Paradigm to Subsector Analysis." NC 117, March, 1976.

Marion, B.W. "Organization of the U.S. Food System" D.C. Heath and Company, 1986.

McLeroy, George B. "Suggested Guidelines for Improving the Livestock Marketing Information Service of Mali". USAID, Office of Food and Agriculture, January,1974.

Mittendorf, H.J. and **S.G. Wilson.** "Livestock and Meat Marketing in Africa." FAO, 1981.

Nigerian Federal Ministry of Agriculture and the National Committee on the Green Revolution. "A Livestock Production Plan for Nigeria". July,1981.

OMBEVI. "Première Evaluation A Posteriori du Projet Sectoriel de l'Elevage au Mali". Document No.128, 1986.

OMBEVI. "Rapports Annuels". 1976-1987.

OMBEVI. "Commercialisation du Bétail de la Viande et des Cuirs et Peaux au Mali". Juillet, 1984.

OMBEVI. "Note sur la Filière Bétail-Viande du Mali". December 1983.

OMBEVI. "Synthèse des Statistiques du Bétail et de la Viande de 1974 à 1981". November 1983.

Riley, Harold M. and **Michael T. Weber.** "Marketing in Developing Countries". Michigan State University Rural Development Series Working Paper No.6, 1979.

Robert R. Nathan Associates, Inc. "Economic Analysis of the Livestock Sector in the Republic of Mali", USAID/Bamako, June 1988.

Roemer, Michael. "Simple Analytics of Segmented Markets: What Case for Liberalization?" Harvard Institute for International Development Paper No.175, July 1984.

Rogers, Beatrice L. and **Melanee L. Lowdermilk.** "Food Consumption in Urban Mali" (DNSI-Tufts University, 1988).

Sandford, Stephen. "Management of Pastoral Development in the Third World." 1983.

Scherer, R.M. "Industrial Market Structure and Economic Performance." Chicago: Rand McNally and Company, 1970.

Sosnick, S. "Operational Criteria for Evaluating Market Performance." Chapter 6 in Market Structure Research, ed. Paul Farris. Iowa State University Press, 1964, pp. 81-125.

Staatz, John. "Cattle and Beef Marketing in the Ivory Coast." Report to USAID. Ann Arbor: Center for Research on Economic Development, University of Michigan, 1977.

Stryker, J. Dirck. "Livestock Production and Distribution in the Malian Economy." Report Prepared for USAID, 1973.

Stryker, J. Dirck. "The Marketing of Malian Cattle." Fletcher School of Law and Diplomacy, Tufts University, 1975.

Sullivan, Gregory. "Ghana" in Livestock and Meat Marketing in West Africa, **Ariza-Nino** and **Steedman,** eds. Vol.II. Ann Arbor, Michigan: Center for research on Economic Development, 1979.

Timmer, C. Peter. "Private Decisions and Public Policy: The Price Dilemma in Food Systems of Developing Countries." Michigan State University International Development, Paper No.7, 1986.

Timmer, C. Peter, Walter Falcon, Scott R. Pearson. "Food Policy Analysis." World Bank Publication, 1983.

Tomek, William G. and **Robinson, Kenneth L.** Agricultural Products Prices. Ithaca, New York: Cornell University Press, 1972.

U.S.A.I.D. "Mali Livestock Sector Project Phase II Paper." 1982.

U.S.General Account Office. "Progress and problems in Managing the Mali Livestock: Sector II Project." Audit Report, March, 1985.

World Bank. "Economy of Specialized Farm Credit Institutions in Low-Income Countries." World Development Report, 1985.

World Bank. "Mali: Situation et Perspectives de l'Elevage." 1980.

APPENDIX

APPENDIX A

CONDUCT OF FIELD RESEARCH SURVEYS

Trader Surveys

Because of the requirement that the researcher personally conduct all participant interviews during the first phase, the sample of traders as well as other survey samples was restricted to a size consistent with the research time period and the human resource limitations. Thus, it was decided that for the Kati-Bamako market, 8 subjects (32%) of the 25 traders in the total universe could be handled by the researcher within these limitations. Because the cattle traders in Bamako had different business sizes and dealt with different categories of cattle (fed and range), it was decided to include in the sample: (1) all the three traders dealing with fed cattle; (2) the two largest traders; and (3) representatives of the remaining class of traders. Consequently, the two largest merchants, trading 100 head per week, were selected for the purpose of learning about their market conduct and to see if their conduct differed from that of the other traders, and if that conduct could result in market power and large profit margins.

In addition to the two largest traders, who were also fed cattle buyers, another trader was selected because he was one of the most regular buyers of fed cattle in Kati. The importance of this target group is justified by the fact that this study strongly addresses fed cattle marketing issues. The remaining 5 members of the trader's sample

were selected on a random basis among the core of the dominant class of merchants who traded between 10 and 20 head per week.

The same sample of traders was used for both the markets of Kati and Bamako because almost the same traders attended the two markets, which are 20 miles apart. Furthermore, the Kati market is held once a week from about 9 a.m. to 3 p.m., while the cattle market in Bamako is held daily from about 5 to 7 p.m. Traders can attend both markets the same day without any time conflict.

In Banamba, the sample comprised the entire universe of the 6 active and regular traders in the cattle market. During the first phase research period, each sampled trader in the markets of Banamba, Kati, and Bamako was interviewed by the researcher using a questionnaire. The objective of this survey was to provide cattle market structure and conduct data.

During the second phase in 1988 the objective of the research was to determine traders' costs and profits per kg and per head for fed and range cattle through traders' interviews in order to evaluate cattle market performance. From March to July 1988 a sample of 35 cattle merchants (both traders and intermediaries) in the Bamako and Kati markets was used to obtain information on operational costs and margins in a sample of 100 fed cattle and a sample of 100 range cattle. Each subject was interviewed once by the researcher using a questionnaire.

Butcher Surveys

A total of 16 butchers were selected (about 4%) out of the universe of about 453 butchers operating in Bamako in the 1986 phase. Like traders, butchers also differ in business scale and in types of

cattle they slaughter. According to OMBEVI, there were 53 wholesalers and 400 retailers in 1986.

Since butchers are administratively listed as wholesalers and retailers largely according to the scale of their businesses, it was decided to have some representatives from each group. However, since this part of the study was intended to address primarily the high quality meat problems, it was decided also to include in the sample all butchers involved in the slaughter of fed cattle, no matter which group they belonged to. Consequently, the sample consisted of 6 butchers (4 wholesalers and 2 retailers) involved in slaughtering fed cattle, 4 wholesale butchers randomly selected from the list of wholesale butchers (excluding those previously selected), and 6 retail butchers, also randomly selected from the list of retail butchers (without the intentionally selected ones).

Each element of the sample was interviewed during the research period. The interviews were conducted on a questionnaire basis. The objective of the butchers' surveys was to provide information on the beef market structure and conduct.

During the 1988 research phase, the objective was to determine the different portions of carcasses sold with bones, without bones, to hotels and other institutions for fed and non fed cattle through butcher interviews in order to estimate each carcass category's retail sale receipts, to determine the butchering costs and butchers' profit margin per kg and per head. To satisfy these objectives, 57 butchers (36 wholesalers, and 21 retailers) operating during the research period were interviewed about the costs they incurred and the sale of carcass

portions in butchering a sample of 100 fed cattle and 100 range cattle. Butchers were interviewed for each of the sampled cattle by the researcher through a questionnaire.

Intermediary Surveys

The sample of intermediaries constituted of 8 subjects out of a total universe of 20 in 1986. Although the findings of the study pointed out two distinct classes of intermediaries (those whose role was exclusively devoted to facilitate trade transactions and those who, in addition to their trade facilitating role, purchased and sold cattle on their own), the sample was selected on a random basis from the list of all intermediaries. The purpose of these surveys was primarily to assess the marketing services provided by the intermediaries to the sellers and/or buyers and their contribution to market competitiveness. During the research period, each subject was interviewed through a questionnaire.

Producer Surveys

The producers' sample in the Banamba cattle feeding zone was designed by the Institut National de Recherche Zootechnique Forestière and Hydrobiologique (National Institute in Charge of Animal Husbandry Research (INRZFH). According to the 1984 and 1985 INRZFH reports, the selection of the sample subjects had been made during the 1983/84 campaign on the basis of the number of cattle fed by the farmer and the ease of access to his village. Different strata were made based on the producer's size of feeding operations, and a distribution of quotas among the strata was made according to the relative numerical importance of each class. Whenever a selected subject belonged to a village that was difficult to access by vehicle for the transportation of weighing

cattle scales, it was replaced on a random basis by another subject of the same stratum from another village which had better access. When one or several subjects defected for a campaign, he or they were replaced by an equal number of people. The working sample in Banamba comprised 30 individuals from an universe of 465. However, during the 1985/86 campaign, one farmer dropped out one month after the feeding program started and he was not replaced; thus the sample was reduced to 29 farmers. The researcher had been advised by USAID to use this sample for budgetary and time-saving reasons. The INRZHF had been conducting farming system studies in the area for 3 years. The main purpose of these surveys was to provide reliable information on producers' marketing conduct, particularly to evaluate the marketing alternatives available to them, and their access to market information. In addition, data obtained from these surveys provided information on the profitability of the cattle feeding enterprises.

A questionnaire was administered to each sampled farmer by the researcher during the research period. Farmers interviewed before they sold their cattle were interviewed a second time to obtain information on the name of the buyer, the terms of sales and the sale prices of their animals. Farmers interviewed after they sold their cattle were interviewed only once because the complete questionnaire could be responded to at that time.

In 1988, a total of 50 farmers (22 farmers from the Banamba zone who were still feeding cattle despite the lack of external financing sources, and 28 producers from Bamako) were interviewed on their feeding costs and margins. The purpose of the producers' survey was to evaluate the profitability of cattle feeding activities.

Cattle Market Surveys

The 1986 market survey was conducted weekly by the enumerators (livestock agents) in Banamba, Kati, and Bamako. The purpose was to generate quantitative data to describe the activity of the market.

A report was filed for each market by the enumerator at the end of each weekly market session. A total of 13 reports were filled out during the 3 months of research. Each report was comprised of 5 categories: types of cattle (fed or range), number of cattle offered, number of cattle sold, prices, and cattle shipment method to and from the market.

In 1988, 200 sampled fed cattle and non fed cattle bought at Kati and Bamako markets were weighed by the researcher at the Bamako abattoir. These weights were used to determine the per kg live purchase price for both fed and non fed cattle by butchers.

Abattoir Surveys

Surveys discussed in this section pertain exclusively to the 1988 research phase. The abattoir survey was the follow up of the market survey. The sampled cattle (both fed and range) weighed in the Bamako abattoir prior to slaughter were followed to slaughter. The carcasses of both fed and non fed cattle were then weighed following slaughter. The carcass weights were recorded on a survey sheet. A total of 100 carcasses of each quality of cattle were weighed both in the Bamako abattoir and in meat markets where scales were available. The data were used to estimate the average (cold) carcass weights of both fed and non fed animals. They were used also to determine carcass weight and dressing percentage differentials between fed and non fed cattle.

Retail Beef Composition Surveys

These 1988 beef kg and carcass composition surveys also were follow up surveys to the market and abattoir surveys. The beef kg and tas surveys were conducted by an enumerator. Once the sampled carcasses were transported to the butcher sales shop, the enumerator purchased one kilogram of beef with bones, one kilo without bones from sampled carcasses at the official prices, and one tas at 100 F CFA and one tas at 200 F CFA. Then the kilogram of beef of each category and the tas were reweighed on the researcher's scale to verify and record the exact total weight of the purchased meat which was supposed to be 1,000 grams for the kg of beef with and without bones. The next step was to separate the different components of the kilogram and the tas. The skeletal meat, bones, fat, and internal organs were weighed separately, and their weights were recorded on a survey sheet along with the exact total weight of the "kilogram" and the tas. A total of 50 observations were made for each category of the beef, and each tas category.

In addition to these surveys, carcass lean and fat composition surveys were conducted by the researcher on 100 fed cattle and 100 range cattle to determine the percentage of carcass and fat.

Estimation of the differences in lean yield of fed and range cattle were made by determination of longissimus dorsi weights. The following formula was used to estimate carcass lean:

$$CMC = \left[(CW \times 1 - .18) \times \left(\frac{LW}{(LW + KPHW + \text{external fat})} \right) \right] \times \frac{100}{CW}$$

CMC = Carcass Edible Meat Component

CW = Total Carcass Weight
LW = Longissimus Muscle Weight

KPHW = Kidney, Pelvic, Heart Fat Weight

.18 = Carcass Bone Component percentage

The longissimus muscle was cut from the hip bone to the first thoracic vertebra.

The carcass fat yield was estimated through the kidney, pelvic and heart fat (and external fat where it existed) weight according to the formula below.

$$CFC = \left[(CW \times 1 - .18) \times \left(\frac{KPHW + \text{external fat}}{(LW + KPHW + \text{external fat})} \right) \right] \times \frac{100}{CW}$$

CFC = Carcass Fat Component percentage

It is important in the study of alternative production systems such as Embouche to know what output is being generated in comparison to the normal range systems. It was particularly important in this study to know what these differences in carcass composition are and whether the marketing system was able to reflect these differences in terms of consumer and producer values.

It should be noted that bone composition was estimated to be a constant 18 percent and could be a bias in composition estimates given the ranges in body composition in the sample as reflected by the ranges in dressing percentage.

Finally, the sale prices of a "fifth quartier" for each sampled animal was obtained through surveys with sampled butchers. The purpose of these surveys was to estimate the real price of a kg of beef sold by

butchers, the difference in fat and structural meat contents between fed and range cattle, and to determine butchers' profit margins in order to evaluate the allocative efficiency of the beef market in Bamako.

Table B1

ECIBEV Total Estimates of Emboucheurs
and Fed Cattle: 1975-1985

Year	Emboucheurs (Farmers)	Cattle
1975/76	50	108
1976/77	110	212
1977/78	?	444
1978/79	160	377
1979/80	159	533
1980/81	439	1291
1981/82	992	2049
1982/83	842	1500
1983/84	848	2982
1984/85	1140	3310
1985/86	1862	4655

Source: ECIBEV (Annual Reports)

Table C1

Monthly Index of Slaughter
in Bamako (1980-87)

Month	1980	1981	1982	1983	1984	1985	1986	1987	Average Index
January	105	105	90	88	95	122	101	107	102
February	93	90	96	82	95	101	92	94	93
March	101	102	102	90	101	116	105	101	102
April	102	100	91	87	104	116	104	98	100
May	101	102	87	102	101	113	106	109	103
June	95	99	99	95	100	98	90	81	95
July	108	115	112	107	91	85	105	102	103
August	97	101	98	101	93	91	92	87	95
September	94	102	97	92	86	85	104	104	95
October 91	94	110	114	109	97	106	108	104	
November	101	97	103	112	104	91	98	102	101
December	102	93	114	131	120	85	97	105	106

Source: Table C2

Table C2

Monthly Recorded Cattle Slaughter
in Bamako (1980-87)
(number of head)

Month	1980	1981	1982	1983	1984	1985	1986	1987
January	4,889	4,825	4,063	5,014	7,226	9,295	6,240	5,979
February	4,322	4,115	4,363	4,673	7,218	7,746	5,667	5,281
March	4,617	4,671	4,619	5,165	7,629	8,821	6,462	5,764
April	4,711	4,604	4,120	4,959	7,906	8,895	6,411	5,471
May	4,698	4,669	3,960	5,844	7,677	8,650	6,545	6,092
June	4,425	4,552	4,470	5,468	7,566	7,492	5,554	4,553
July	5,021	5,291	5,082	6,121	6,931	6,508	6,449	5,723
August	4,490	4,621	4,427	5,791	7,047	6,925	5,692	4,862
September	4,346	4,670	4,398	5,285	6,501	6,505	6,420	5,817
October	4,223	4,311	4,987	6,508	8,239	7,382	6,527	6,043
November	4,668	4,466	4,675	6,397	7,918	6,951	6,042	5,694
December	4,718	4,288	5,169	7,508	9,084	6,461	5,959	5,894
TOTAL	55,628	55,083	54,333	68,733	90,942	91,631	73,968	67,173

Source: AF B (Annual Reports, 1980-87)

Table C3

Cattle Presented Monthly in the Bamako Market (1980-87)

Month	1980	1981	1982	1983	1984	1985	1986	1987
January	16,616	18,724	8,277	7,347	10,788	22,196	12,059	14,415
February	12,832	19,712	7,588	5,404	11,452	12,320	11,620	12,404
March	16,618	24,738	5,363	5,487	12,617	13,082	11,408	14,198
April	12,150	6,630	4,200	5,100	10,830	13,560	10,560	10,800
May	10,100	6,603	5,270	4,650	9,982	10,912	10,819	12,927
June	14,700	5,010	6,540	4,440	8,730	9,060	7,290	9,720
July	13,516	7,347	6,138	5,952	10,137	12,741	9,486	11,222
August	11,501	10,230	7,440	7,192	5,084	8,742	9,765	12,462
September	20,940	12,390	7,380	7,800	12,390	8,820	12,540	13,800
October	19,530	7,688	6,417	7,905	13,330	10,850	13,888	13,330
November	27,390	10,260	6,960	11,160	8,940	11,610	14,280	14,550
December	27,590	9,207	9,269	11,532	14,105	12,586	13,020	13,888
Total Year	204,425	138,539	80,842	8,3969	128,385	146,475	136,745	153,716

Source: OMBEVI (Annual Reports, 1980-87)

Table C4
Monthly Index of Cattle Presented
in the Bamako Market (1980-87)

Month	1980	1981	1982	1983	1984	1985	1986	1987	Average Index
January	97	162	123	105	101	182	106	118	124
February	75	171	113	77	107	101	102	97	105
March	95	214	80	78	118	107	100	111	113
April	71	57	62	73	101	111	93	84	81
May	59	57	78	66	93	89	95	101	80
June	86	43	97	63	82	74	64	76	73
July	79	64	91	85	95	104	83	88	86
August	67	89	110	103	47	72	86	97	84
September	123	107	109	111	116	72	110	108	107
October	115	67	95	113	125	89	122	104	104
November	161	89	103	159	84	95	125	114	116
December	162	80	138	165	132	103	114	108	125

Source: Table C3

Table C5

Cattle Sold Monthly in Kati Market

1980-87

Month	1980	1981	1982	1983	1984	1985	1986	1987
January	2388	4090	3936	2041	4522	3076	3033	2670
February	1981	4211	4239	2993	2852	2486	3135	2652
March	3071	7578	4477	2772	3096	3206	3103	2376
April	2556	2802	4301	2043	2533	3041	3557	2433
May	2467	3482	3423	1955	2932	4784	3033	2338
June	3276	5891	3249	1580	2834	3923	1751	1608
July	1797	4434	1616	1395	2347	1922	1281	1541
August	2581	3709	2093	1807	2935	2570	2178	1605
September	3956	3885	3333	2170	3785	4039	3139	1980
October	3108	2697	2111	2724	3342	3379	2906	2305
November	3798	4702	2663	3180	2629	3956	2590	2498
December	5457	4772	3811	3413	4040	4076	1999	2309
Total Year	36436	52253	39252	28073	37847	40458	31705	26315

Source: OMBEVI (Annual Reports 1980-87)

Table C6

Cattle Sold Monthly in the
Market of Bamako (1980-87)

Month	1980	1981	1982	1983	1984	1985	1986	1987
January	7643	4868	3807	4922	6365	7769	8321	6198
February	7469	3942	3187	3567	5841	6283	7669	5458
March	7644	4453	2628	3731	6561	7064	7757	6673
April	5468	2785	3360	3672	6281	7865	7392	6804
May	5255	2443	3900	3534	6089	7202	7573	6593
June	5292	2956	3859	3641	5587	3352	5467	6415
July	5542	4335	3990	4404	5575	7645	6735	6284
August	4715	4808	3794	5178	3457	6294	6048	6106
September	5235	5050	3690	5772	5947	6615	7273	6624
October	5273	4228	3979	4032	5865	7487	8333	6398
November	4930	3591	4315	6584	4738	8475	7568	6547
December	4966	4880	5747	7380	7899	8433	6901	6666
Total	69432	48369	46256	56417	70205	84484	87037	76766

Source: OMBEVI (Annual Reports 1980-87)
Year