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SUGGESTED GUIDELINES FOR IMPROVING
THE LIVESTOCK MARKETING INFORMATION SERVICE OF MALI

Prepared by
United States Agency for International Development
Office of Food and Agriculture

In cooperation with

Ministry de la Production
Office Malien du Betail et de la Viande

Bamako, Republic of Mali

January 1974

FOREWORD

This report results from thirty days of temporary duty (15 December 1973 - 14 January 1974), including international travel, by Dr. George B. McLeroy, Agricultural Marketing and Processing Advisor (Livestock), USAID/ADEA/South Vietnam. Apart from the three weeks spent in Mali (19 December 1973 - 10 January 1974), the incumbent had previously served 12 years in Sub-Sahara Africa (1959-1971).

Since the Office Malien du Betail et de la Viande (OMBEVI) has the responsibility for information gathering and maintaining the official files of statistical data respecting the national livestock industry, advisory service to the Government of Mali was tendered through this organization.

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SUGGESTED GUIDELINES FOR IMPROVING

THE LIVESTOCK MARKETING INFORMATION SERVICE OF MALI

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INTRODUCTION

The primary purpose of this report is in furtherance of improving the livestock marketing information service of the Republic of Mali.

The restricted time element involved and specific terms of reference for the present undertaking, dictated the exigency of limiting coverage to fundamentally relevant issues.

To this end, a rather careful review was first made of the organizational structure of OMBEVI, its present status, accomplishments to date, and future plans. Although a relatively new entity (officially established in 1969) and still suffering from normal growing pains, OMBEVI has an energetic, open minded staff that is proceeding along logical lines. For example, efforts are being made to get at production coefficients, mortality rates and national herd composition. Markets throughout the country have been listed, and are in the process of being classified as to importance and primary function. Once OMBEVI's personnel roster is brought up to strength and additional experience gained, there is reasonable expectation that it will be able to fulfill assigned responsibilities concerning industry surveillance, developmental planning and general leadership.

Thus it follows that suggestions for improving the livestock marketing information service are all complimentary to OMBEVI efforts already underway, planned for the future, or logical extensions of both. In brief, suggestions are primarily directed at basic data collection, analysis, interpretation, use methodologies, and dissemination.

Proposed National Livestock Classification System

It is particularly significant that no livestock industry can be modern and actively growing without the interest of the primary producer, essential middleman and consumer being taken into account. Otherwise returns to the industry will never justify improvement costs necessary in keeping pace with rising demand. Moreover, such returns must be equitably shared among all those constructively involved in the total process of production and marketing. This requires that those concerned, including the consumer, have access to basic information about the industry.

Since the traditional marketing system for livestock in Mali evolved over the centuries in keeping with local requirements, and operates under a virtual shroud of secrecy, it is expedient to penetrate this curtain in connection with planning for development and generally improving marketing efficiency. However, it is important that improvement efforts be directed at correcting weaknesses in, yet not destroying per se, the basic marketing structure. Constructive change can only be effected after careful study of the overall system.

Needful information includes a reasonable, current estimate of total livestock numbers, factual information about the national herd composition, annual mortality rates, and records of the number and nature of herd extractions. Such data is required to determine livestock production trends and appraise the effectiveness of improvement programs. It also would make it possible to determine where and to what extent marketable surpluses

(or deficiencies) exist and to where they move, decide what market installations and facilities would be useful, and where they can best be sited, and finally what additional transport services are required to best move surpluses from producing to consuming areas. The foregoing is apart from needed cost data, marketing margins and basic prices.

One of the avenues through which facts can be obtained to assess the livestock industry is through the formulation and application of standard market classes and grades, eventually culminating in a market news service to further enhance marketing efficiency. Where such a system has been generally utilized, competition is largely centered on price, marketing is cheaper and total production more efficient. However, for market standards to have meaning, they must be carefully tailored to fit the peculiar requirements of a given industry with respect to stage of development and other special characteristics. A complete system to meet Mali's long-term needs would require that the various species entering trade channels be sorted according to several categories. Since cattle dominate the livestock scene, this species will serve as the prototype for detailing a proposed classification system.

Market Cattle Classification Standards

The classification and grading of cattle for market purposes requires a measure of expertise, time, and of course expense. Thus, it is desirable that only pertinent data be collected according to feasibility.

The act of classification and grading is simply the sorting or dividing of animals into specific groups according to natural characteristics. Such animals are further divided and subdivided into smaller groups with each subsequent division being based on one or more fundamental principles. Hence, with each additional division the individual animals included in a group show progressively increasing similarity in all essential respects concerning their value as to purpose or expected use. The rationale is that standards effectively divide the animals on the market into groups of equal value. Thus it follows that the prime factor determining sale price within a given group or market category is competition, providing scales or used, since all animals therein are of about the same unit value.

Market Classes

The market class for a given animal is determined by its sex or sex condition and by the expression of the secondary sexual characteristics. Therefore, a standard class includes all animals on the market that are of the same general age group and sex (or sex condition).

The classes for slaughter cattle are: steer, heifer, cow, bull, stag or ox and calf. Definitions of these classes are as follows:

1. Steer - a steer is a male bovine animal that was castrated at an early age, prior to the development of the secondary sexual characteristics peculiar to mature bulls.
2. Heifer - a heifer is a female bovine animal that has not had a calf or has not reached an evident stage of pregnancy, provided it has not developed with age the predominating physical characteristics peculiar to mature cows.
3. Cow - a cow is a female bovine animal that has produced a calf or reached an evident stage of pregnancy, or has not had a calf but has attained sufficient age to exhibit the predominating physical characteristics peculiar to mature female bovines.

4. Bull - a bull is an uncastrated male bovine of any age.
5. Stag or ox - a stag or ox is a male bovine animal that was castrated after developing at least some of the secondary sexual characteristics of a mature bull. The main distinction to be made between a stag and ox is that oxen are normally kept for draft purposes; whereas, stags are bulls whose prior use was presumably breeding.
6. Calf - a calf is a young bovine animal of either sex, but not over about 18 months of age.

Market Grades

A market grade is a division of market class that includes all cattle on the market of about the same value per kilogram liveweight. The slaughter grade of an animal is determined by a composite evaluation of the factors which influence carcass excellence and/or the total sales value of the animal when slaughtered.

Three broad classical factors normally form the basis for grading slaughter cattle (and their carcasses): 1) conformation, which has to do with the shape of the animal; 2) finish, condition or degree of fatness, which has to do with the quality and distribution of subcutaneous fat; and 3) quality, which relates to the age of the animal, the firmness and texture of the muscle or meat, and the distribution of intra-muscular fats (marbling). To the more discriminating consumer, the most critical test applied to beef in assessing meat quality is tenderness, juiciness and flavor. The first two of these traits are usually associated with relatively young, fat animals; whereas, flavor is most frequently associated with somewhat older specimens.

Here in Mali, grades have meaning largely to the more sophisticated consumer, but are vital in the economical production and marketing of better grade cattle. The crux of the matter is that the local cattle industry cannot be transformed from a subsistence entity to a more commercial state without automatically making for greater numbers of higher grade animals, the average consumer's preference notwithstanding.

Observations made at abattoirs and central markets indicate that three basic grades are rather commonly recognized in the cattle trade. These are good, average and low. While many outright cull animals exist, most would normally be disposed of outside official channels. In anticipation of planned fattening schemes to be undertaken in the future, a special grade will be needed to cover marketing of high quality throughput. This suggests the need for a minimum of four standard slaughter cattle grades (i.e.: special, good, average and low) with the understanding that few cull animals will be seen in the major markets and the special grade is a quality designation chiefly reserved for the future. Thus, for the present at least, the good, average and low grades will effectively accommodate all cattle in the market place. While the special grade connotes quality and involves assessments of conformation, finish and quality, the three regular grades are primarily based on degree of fatness and/or general condition.

Special: only steers and heifers are eligible for the special or top grade, which stresses quality and conformation along with optimum fatness or condition. Since this grade is included in anticipation of organized cattle fattening, few such animals would presently be found on the market. Likewise, general female shortages preclude the slaughter of heifers except when judged sterile or otherwise considered unfit for breeding purposes. The usual age range for this grade is about 2 to 5 years. Special grade animals will be of good beef type with considerable natural fleshing, carrying a thick coat of fat over back, ribs and rump, and exhibit refinement of head, hide and bone. Such animals are expected to yield carcasses of export quality, dressing out within the range of 50-55%.

Good: Animals grading good will be fat but lacking the conformation, age and quality requirements of the special grade. Cattle in this grade will vary in appearance due to a wide range of maturity, but will exhibit reasonable natural fleshing, smoothness, and fullness of body. Relatively young animals in this grade will normally have a limited fat cover over the back, loin and rib, but older cattle will show a high degree of condition throughout, especially among aged steers, bulls and work oxen. The dressing (carcass) % of good grade animals is expected to approach 50, giving a carcass with good fat cover.

Average: Cattle in this grade will lack the degree of finish common to the good grade, but will be in considerably better condition than the next lower grade. In practice, both good and low grade animals are readily identifiable and anything in between automatically falls in this, the average grade. Younger animals in this grade will be lacking somewhat in condition, and older ones will in addition be rangy and exhibit general coarseness of bone, head and hide. Dressing percentages are expected to center on 45. Since this grade encompasses the entire range of market classes and ages, they can be expected to vary widely in general appearance.

Low: Animals in this grade are thin with little if any fat cover or finish. They will be rough, coarse, and wasty, giving an average dressing % of about 40. They will be decidedly angular in appearance, narrow over the back and loin, and prominence of bones will be evident over most areas of the body. The poorest specimens in this grade will be outright culls, unthrifty, usually emaciated and frequently diseased.

Implementing Standard Classes and Grades

Attempts to initiate a program for the standardized classing and grading of market animals inevitably face a number of obstacles. Some trade groups may have reasons for resisting standards even though it can be shown to give long run benefits to the industry as a whole. Even if the full and immediate backing of the trade can be obtained, there is still the problem of training personnel to properly classify and grade and finding money to pay for such service.

At the outset, it is neither feasible nor desirable that government undertake to impose obligatory standards. Rather, a step-wise approach would be much more appropriate. First and immediate concern would be given to simply recording the classes and grades of cattle at selected points in the marketing chain on a continuing basis. This would in due time supply the necessary background information for a market news service. Concurrently, government would be in possession of valid data for sound development planning, and be able to maintain general surveillance of the industry, including assessment of any improvement programs. Such an approach is unlikely to arouse any serious antagonism in the industry and should eventually lead producers, traders and butchers to use standards as a basis for sales negotiations.

Since for practical reasons, recording can only be effected at readily accessible locations, the following sites are suggested:

1. Major points of controlled cattle slaughter with representation in each of the six administrative regions.
2. Selected markets to assure a representative sample of cattle from major producing areas.
3. Control posts or other locations where trail herds are assembled for export, or movement to distant markets.

It is rather apparent that no one recording form would be fully satisfactory for use at all of the above locations. Thus, three different forms have been developed and appended to this report (appendix I, II and III) for use at points of slaughter, for cattle arriving at selected markets, and where large trail herds are assembled.

Steps in Completing Cattle Classification Forms

It is suggested that routine classification of slaughter cattle be initiated at the Bamako abattoir, using appendix I as a basic format. Although appendix II and III differ somewhat from appendix I, an explanation of how to complete No. I should also suffice for the other two forms.

It requires seven entries on appendix I to classify a given animal and involves determinations relative to butcher or owner identification, region or area of origin, breeding, sex, age, grade and size or weight. This means that one line on the form is reserved for each individual animal, and said animal can have only one owner, be from a single area, of one breed, one sex, one age, one grade and one size or weight. With experience, these evaluations should take no more than a few seconds per animal, and can be accomplished as the animals are being brought into or held at the abattoir lairage. Thus recorders can be individuals with other duties, such as officials collecting slaughter fees, those concerned with sanitary inspection, etc... However, recorders must be responsible individuals and have undergone a brief period of on-the-job instruction to assure standardization and correctness of collected data.

The first step in completing the classification form is for the recorder to fill in the abattoir name or location, the date and his own name in the appropriate blanks at the top of the form.

It is to be noted that the classification form has a total of 21 columns and 25 serially numbered lines, plus a bottom line for office use when totting up the observations. The 21 columns are grouped into eight major divisions [i.e.; (1) number; (2) butcher identification; (3) origin; (4) breeding; (5) sex; (6) age; (7) grade; and (8) size/weight]. These divisions are in most cases further subdivided into as many as four different sections. Each of these major divisions and associated subdivisions will be discussed separately, column by column:

1. Number: this is a serial numbering from 1 to 25, representing the maximum number of animals that can be classified on a single sheet.
2. Butcher Identification - In most cases butchers are assigned numbers under which they pay slaughter fees, etc... This number will serve to identify the cattle belonging to a given butcher. Since one line should be reserved for each animal, all the animals belonging to a given butcher will have the same owner identification number. The serial numbers at the left of the page will differentiate between cattle belonging to the same butcher. In cases where owner identification is not readily available, this column can be left blank.
3. Origin - To the extent that it is possible to ascertain the region or geographical area of origin of an animal, a check mark should be made under either local or other.
4. Breeding - Information respecting breed characteristics is far from complete on cattle in Mali, but they can all be broadly designated as belonging to one or the other of the following primary breeds:

Zebu (humped)

Peulh
Maure
Toaureg

Taurine (humpless)

Ndama
Mere (result of crossing between Taurine and Zebu, especially Peulh)

For purposes of recording in this major column, once breed determination is made, a simple check mark in the relevant subdivision will suffice.

5. Sex - A check mark in either the male or female subdivision will suffice in this instance. In case it is desirable to record the incidence of castration, a letter "c" can be used in lieu of a check mark under male.

6. Age - This determination requires studying an animal and deciding the approximate or relative age, and thereafter checking the appropriate subdivision (i.e.; young, mature or aged). Young animals can be taken as less than three to four years of age, or have not reached the prime of life. Mature animals are those reckoned to be between three to four and eight to ten years of age, or are in their prime. Aged animals will tend to be over ten years of age, and obviously past the prime of life. While an inspection of the dental pattern might be helpful in making these determinations, this is not necessary in arriving at the required age approximation.

7. Grade - Reference should be made to the above specifications for standard grades in making grade evaluations, after which the results should be indicated by a check mark. In practice, fat and thin animals are easily identified and anything in between would naturally fall in the average grade. However, note is made of the conformation, sex, age and quality requirements of high or special grade animals.

8. Size/weight - Where livestock scales are available, the actual liveweight should be recorded. In the absence of scales, a subjective evaluation of size should be made and duly recorded. In time it should be possible to formulate weight standards for the various breeds with established ranges corresponding to the subjective evaluation of big, average and small.

Disposition of Completed Cattle Classification Forms

Completed classification forms should be despatched weekly to OMREVI for summation, tabulation and analysis.

Individual files should be maintained of data from each reporting installation, and summaries made by months and years. At periodic intervals all classification data should be combined to draw conclusions about the national herd. Appendix IV depicts a suggested format for summarizing yearly classification data from a given abattoir.

Cattle Population Dynamics and Herd Projection Techniques

Cattle production is a biological process and subject to a wide range of unpredictable environmental influences and vagaries such as drought and disease, all apart from numerous economic and socio-political forces. The potential for increasing productivity is related to the reproductive rate, mortality, age at first calving, generation interval, and productive life of breeding animals. A number of these parameters or dynamic forces are controllable, at a price at least, while others are inherent to the species and unalterable.

Due to the subsistence nature of the Malian cattle industry, reasonably precise production coefficients, and herd composition estimates are not available. Moreover, price inducement and the emergence of a sellers market for cattle in recent years, when combined with the ravages of drought conditions, leave existing statistical data almost useless as a base for making future herd projections and marketable offtake estimates. Unfortunately, the lack of factual statistical data to the contrary, decisions about the national cattle industry must and are being made.

As an aid to rationalization of productive and reproductive guesses, appendix V has been compiled as a guide in setting limits to such conjectures. This table was assembled from the analysis of many different cattle herds in both developed and emerging countries and reflects average dynamic parameters, and their relationships, in a constant sized cattle population at different stages of commercialization or development. It also has a number of other important uses. For example, by observing the classification (i.e.; age, sex, etc.) of marketed herd offtake, especially at the point of slaughter over a period of time, it is possible to draw rather exact inferences about a given national breeding herd as to composition and production coefficients. In turn, if a reasonable estimate of effective calving rate is at hand for a given herd, say 40%, reading across appendix V to the right, it can be seen that the required annual herd offtake or extraction rate is 10% (assuming herd size is to remain constant).

Appendix VI presents the step by step projection of a simulated cattle herd from one year (or period) to another. Although the table is more or less self-explanatory, a number of comments are judged appropriate. The main left hand column of the table lists the various stock variables, classes or herd composition along with annual mortality rates. The five columns repeated under each year or period depicts inventory flow during said time frame. That is, an opening inventory, additions during the year through births and/or purchases, outright losses due to death or other causes, sales or herd extractions, and finally a closing inventory for the year. The closing inventory for any period becomes the opening inventory for the immediate succeeding period. However, it should be noted that with the exception of mature animals, all classes are advanced in age by one year as they proceed from year to year. In practice opening inventories should include animals of 0-1 year of age, but for the sake of simplicity in the present exercise, all such animals have been advanced in age by a year in passing from the previous closing inventory.

Attention is also called to production coefficients at the bottom of appendix VI. These and other pertinent calculations can be made from the herd projection, such as total herd mortality. Programs to improve productive and reproductive efficiency could be incorporated into such an analysis and successes measured in terms of effect on coefficients influencing herd composition and offtake rates.

CONCLUSIONS AND RECOMMENDATIONS

At the outset note is made of the budgetary and staffing problems of OMBEVI, the inadequacy of livestock statistics collected in past years and lastly the adverse effect of the recent drought on the livestock industry. These issues are well known and have been more than amply documented in other reports. Thus, there is no reason to further belabor the point.

It is readily apparent that much has already been accomplished in terms of establishing a solid foundation for a viable program of livestock statistics in the Republic of Mali. In particular it is significant that OMBEVI has been formed and charged with this specific responsibility. Perhaps OMBEVI's greatest accomplishment to date is the extent to which it has been able to get the confidence of both the commercial sector and other government agencies.

Within manpower and budgetary limits, OMBEVI should continue with present marketing surveys, updating production coefficients and herd composition studies. In all cases it should be kept in mind that relevancy and accuracy of data are much more important than quantity.

The classification of market cattle should be undertaken with the greatest despatch. This should be started at the Bamako abattoir and extended step-wise to other slaughter points in every region. Appendix VII presents a listing of possible sites, but further survey will be required to settle upon the more promising locations. Also consideration should be given to the collection of herd composition data in connection with routine vaccination campaigns conducted by the veterinary service. At the earliest possible moment, efforts should be made to prepare herd projections using the technique demonstrated in appendix VI.

The summation and analysis of collected statistics in general should always be handled expeditiously, and every effort made to reduce such data to a readily usable form. This might well involve charts, maps, graphs and other illustrative presentations, all apart from regular tabulated summaries.

Once statistical observations have been collected, tabulated, analyzed and put into presentable form, dissemination must be made to would be users if constructive value is to be realized. As a matter of policy for routine data, monthly summaries should be struck, followed by bi-annual and finally annual compilations. Annual reports should also include outlook forecasts for the coming year, where at all feasible. Price data and cattle supplies on selected markets lend themselves to daily or at least weekly news spots on the radio. However, this will most likely have to wait for the future. In any event, such price quotations should be in relation to specific classes and grades of market cattle.

Although OMBEVI has made commendable advances in terms of establishing good rapport with the commercial sector, by the very nature of assigned responsibilities, much more remains to be done in promoting and maintaining a good public image. The present newsletter (OMBEVI flashes), is a good beginning in this direction. Another possible approach to reaching the public might be the development of an annual calendar that included pertinent details about the livestock industry of Mali (and of course OMBEVI).

Time and a sustained educational effort will be required to raise the traditional livestock industry from its present subsistence level to a more commercial state. Programs for needed development can hardly be better than the background information upon which they were originally based. Thus, it is hoped that the foregoing suggestions will be of value to OMBEVI in efforts to improve its livestock marketing information service, thereby adding substance to development planning, execution and

Finally it is suggested that the Director of OMBEVI make contact with his counterpart in Nigeria, S. Hamisu Kano, Director, Livestock and Meat Authority, P. O. Box 479, Kaduna, Nigeria. These two organizations have similar roles to play in their respective countries, face many of the same problems and could no doubt benefit from a mutual exchange of information, ideas, experiences and aspirations.

In closing, note is made of the inadequate physical facilities at most livestock markets visited. Improvement in these facilities would enhance marketing efficiency in general and the collection of livestock statistical data in particular.

APPENDIX I.

CLASSIFICATION OF CATTLE AT MAJOR POINTS OF SLAUGHTER

Office Malien du Betail et de la Vlande

Abattoir Name or Location: _____ Recorder: _____ Date: _____

(1) No.	(2) Butcher Identif- ication	(3) Origin		(4) Breeding				(5) Sex		(6) Age			(7) Grade			(8) Size/Weight				
		Local	Other	Peulh	Maure	Touareg	Taurine	Male	Female	Young	Mature	Aged	Special	Good	Ave.	Top	Big	Ave.	Small	Actual
1																				
2																				
3																				
4																				
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25																				

APPENDIX II

CLASSIFICATION OF CATTLE ARRIVING AT SELECTED MARKETS

Office Malien du Betail et de la Viande

Region: _____ Cercle: _____ Arrond: _____ Recorder: _____ Date: _____

Name of Market: _____ Nature of Market: _____ Total Cattle: _____ No. Sold: _____

No	Brand No. or Owner Identification	ORIGIN						BREEDING				SEX		AGE			GRADE			SIZE		SPECIAL OBSERVATIONS							
		1	2	3	4	5	6	Import	Poult	Mauré	Touareg	Taurine	Male	Female	Young	Mature	Aged	Special	Good	Average	Low	Big	Average	Small	Work Oxen	From Feed Lot	OTHER		
1																													
2																													
3																													
4																													
5																													
6																													
7																													
8																													
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15																													
16																													
17																													
18																													
19																													
20																													
TOTAL																													

51

APPENDIX

CLASSIFICATION OF MAJOR CATTLE HERDS LEAVING SELECTED MARKETS OR EXIT POINTS
Office National du Bétail et de la Viande

Region: _____ Cercle: _____ Arrond.: _____ Recorder: _____ Date: _____ Name of Market: _____

No	Owner Identification	BREEDING				SEX		AGE			GRADE				SIZE OR WEIGHT				DISPOSITION AND/OR DESTINATION					Sale Price			
		Peuh	Meure	Touarek	Taurine	Male	Female	Young	Mature	Adult	Special	Good	Ave.	Low	High	Ave.	Small	Actual	Local Slaughter	Export	Breeding	To Feed Lot	Draft		Trade		
1																											
2																											
3																											
4																											
5																											
6																											
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17																											
18																											
19																											
20																											
TOTAL:																											

APPENDIX IV

SLAUGHTER CATTLE CLASSIFICATION AND GRADING SUMMARY FORMAT

CLASSIFICATION		TOTAL		Y E A R												
		Number	%	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
ORIGIN	Local															
	Other															
BREEDING	Fulh															
	Maure															
	Touareg															
	Taurine															
SEX	Male															
	Female															
AGE	Young															
	Mature															
	Aged															
GRADE	High															
	Good															
	Average															
	Low															

APPENDIX IV

SLAUGHTER CATTLE CLASSIFICATION AND GRADING SUMMARY FORMAT (continued)

CLASSIFICATION		TOTAL		Y E A R											
		Number	%	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
SIZE	Big														
	Average														
	Small														
TOTAL															

APPENDIX V

KEY PARAMETERS IN A CONSTANT SIZED CATTLE POPULATION
UNDER VARYING REPRODUCTIVE RATES AND STAGE OF COMMERCIALIZATION

Stage of Development	Reproductive Rate-%			Offspring Needed as Replacements %		Age at First Breeding in Years	1/ Generation Interval in Years	2/ Required Annual Offtake %	% of Total Required Annual Offtake by Sex and Age					
	Calf Drop	Calf Mortality	Effective Rate	Male	Female				Male			Female		
									Young	Old	Total	Young	Old	Total
Developed	93	3.5	97	3.5	47	1.50	4.5	37	57	3	57	20	20	40
	84	4.5	80	4.0	53	2.00	5.0	28	31	31	52	19	20	32
Developing	75	8.0	70	5.0	60	2.50	5.5	21	21	44	65	16	19	35
	68	12.0	60	5.0	70	3.00	6.0	16	13	55	69	13	15	31
Subsistence	60	17.0	50	7.0	80	3.25	6.5	12	8	55	74	9	17	26
	55	28.0	40	9.0	90	3.50	7.0	10	4	75	80	5	15	20
	45	35.0	29	12.0	100	4.00	7.5	8	1	85	87	0	13	13

1/ Generation interval defined as the average age of the parents when their offspring are born.

2/ Required annual offtake or extraction rate if herd size is to remain constant.

APPENDIX VI

SIMULATED CATTLE HERD PROJECTION (NO. OF HEAD AND %)

HERD COMPOSITION			YEAR OR PERIOD-1					YEAR OR PERIOD-2				
SEX	Age	Mortality %	Opening Inventory	Additions During Year	Losses During Year	Sales Offtake	Closing Inventory	Opening Inventory	Additions During Year	Losses During Year	Sales Offtake	Closing Inventory
FEMALES	Brood Cows	10	1,000	0	100	80	820	1,000	0	100	42	858
	0-1 year	25	0	300	75	0	225	0	300	75	0	225
	1-2 year	15	225	0	0	0	191	225	0	34	0	191
	2-3 year	7	100	0	13	0	177	100	0	13	0	178
	3-4 year	5	170	0	8	10	152	149	0	7	0	142
MALES	Stud Bulls	3	50	0	2	10	38	50	0	2	10	38
	0-1 year	25	0	300	75	0	225	0	300	75	0	225
	1-2 year	15	225	0	34	0	191	225	0	34	0	191
	2-3 year	7	100	0	13	0	177	100	0	13	0	178
	3-4 year	5	170	0	8	25	137	177	0	9	35	133
	4-5 year	3	145	0	4	75	66	137	0	4	80	53
	5 + year	3	75	0	2	35	38	92	0	3	55	24
TOTAL			2,440	600	358	235	2,437	2,437	600	369	232	2,436
Production Coefficients:												
Calf Drop - %				60				60				
Bull to Cow Ratio-1:				20								
Cow Culling Rate - %								8				4.2
Herd Extraction (offtake) - %								9.6				9.5
Herd Inventory Change - %								- 0				+ 0

APPENDIX VII

LISTING OF POSSIBLE SELECTED SITES FOR
UNDERTAKING THE CLASSIFICATION OF MARKET CATTLE

I. ABATTOIRS

<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>
Kayes Nioro	Bamako Kati Koulikoro Nara	Sikasso Bougouni
<u>Region 4</u>	<u>Region 5</u>	<u>Region 6</u>
Seigou Niono San	Mopti	Gao Tombouctou

II. CATTLE MARKETS

<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>
Kayes Nioro	Bamako Nara Kati	Sikasso Sikorole
<u>Region 4</u>	<u>Region 5</u>	<u>Region 6</u>
Seigou Niono	Mopti Sevare Fatoma Fona Korientze Lere Ngourma	Gao Tonka Assongho Gossi Bambara Maounde Sareya Mou

III. EXPORT CONTROL POSTS

<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>
Kayes Kenieba Kita	Banankore Kouremale Kolohani Kadia	Badoga Filamara Manankere Kadiana Zegoua Keuri Molobala
<u>Region 4</u>	<u>Region 5</u>	<u>Region 6</u>
Benena	Douenza Hombori Dinangoureau Kore Ouenkoro Bai	Tessalit Andaraboukano Ndaki Intellit Tessit Labbezenga