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FINANCING RECURRENT GOVERNMENT EXPENDITURES FOR LIVESTOCK DEVELOPMENT IN MALI

William F. Beazer
J. Dirck Stryker

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FINANCING RECURRENT GOVERNMENT EXPENDITURES

FOR

LIVESTOCK DEVELOPMENT IN MALI

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Report Prepared for the
Government of Mali

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TABLES

Summary and Principal Conclusions

This report is based on information collected by the authors while working as consultants to the Office Malien du Betail et de la Viande (OMBEVI) in January, 1976. They were assisted in this effort by Kolado Bocoum of OMBEVI during their stay in Mali. A preliminary version of the report was written, translated into French, and circulated in Mali. The authors returned in May, 1976 to collect additional information and to obtain comments on the preliminary version of the report. These were subsequently incorporated into the present version.

The report begins with a review of the current precarious budgetary situation in Mali and the need to find new fiscal resources to finance recurrent operating expenses being generated by investment projects which are often financed with foreign assistance (pp. 1-3). The magnitude of tax receipts from and government expenditures on livestock for the years 1972 to 1976 is indicated (pp. 3-4) While receipts exceeded current expenditures, except during the drought when the livestock tax was suspended, there has been a significant deterioration during this period of the real value of these expenditures, especially for materials. The result has been a significant decline in the quality of livestock services.

The tax system and government regulations affecting the livestock sector are described in detail (pp. 4-7). Special attention is paid to the taxes and complex procedures required to export cattle, which, together with a limited capacity for the enforcement of customs regulations, lead to widespread smuggling.

Projections of livestock revenues and expenditures are shown for 1978 and 1988 (pp. 7-10). The revenue forecasts allow for estimated rates of tax evasion, and projected expenditures are made under alternative assumptions concerning the rate of expansion of government services to the livestock sector. It is concluded that existing taxes assessed directly on the sector will be more than sufficient to pay for all the recurrent expenditures of the sector, but that the surplus of revenues over expenditures will be progressively reduced. Second, export receipts will replace those from the livestock tax as the single most important source of public revenue from the sector. Third, expenditures on materials could be increased to adequate levels without putting an enormous strain on the budget. Finally, recurrent expenditures for extensive livestock projects will become an increasing proportion of total expenditures, amounting to 60 percent in 1988.

The current tax system as it relates to livestock is analyzed with respect to 1) its effects on incentives and the distribution of income and wealth, 2) the costs of collection and administration and how these might be reduced to yield more net revenue, 3) the tax base and how it is likely to change, 4) the level of government at

which revenue collection and expenditure decisions might best be made, including earmarking of taxes for specific purposes and the decentralization of the collection and use of public funds (pp. 11-18). It is concluded that the livestock tax is administratively a relatively efficient way of taxing herdsmen under conditions which make any kind of tax enforcement difficult, but that is likely to decrease in relative importance unless use of the funds resulting from this tax is controlled more by the people upon whom the tax is assessed. The export tax on livestock, on the other hand, will be an increasingly important source of revenue, especially if export procedures are simplified and if enforcement is made more effective. Perhaps the easiest way to tax the livestock sector, however, is not directly, but rather indirectly through import duties and other taxes assessed on the goods and services which herdsmen buy.

The possibility of raising revenue by the use of parafiscal charges is assessed both for veterinary services and for livestock development projects (pp. 19-36). The evidence indicates that a very substantial contribution could be made if a fee were assessed for livestock services, but that a period of experimentation is required on a pilot basis to judge the responsiveness of herdsmen to different fee levels. In addition, the cost of producing, transporting, and administering vaccines needs to be investigated so that a rational pricing system can be set up. With respect to development projects, it is concluded that fees paid for the use of water and grazing land could serve a useful purpose in both helping to finance government livestock activities and in reducing the problem of overgrazing. The major requirement is that of again learning more about herdsmen responsiveness and of developing an effective institutional means of establishing such a system. This applies only to extensive rangeland activities, however, since both intensive and extensive fattening operations should be self-financing.

The possibility of obtaining additional resources from indirect revenue and from credit programs is also discussed (pp. 36-38). Rough estimates indicate that the total amount of revenue derived from import duties as a result of the anticipated expansion of livestock exports is far greater than projected government expenditures on livestock activities. Thus it is imperative, for the government sector as well as for the economy as a whole, that short-term budgetary problems are not permitted to slow the development of the sector. Private credit, too, could contribute in an important way to livestock development. This will require, however, the development of effective financial intermediaries in rural areas.

Finally, a concluding section offers a note of caution concerning the precise validity of the quantitative projections but also asserts that the orders of magnitude are such that the major conclusions appear to be reasonably reliable (p. 39). Specific recommendations for future action are then listed (pp. 40-42).

GENERAL FISCAL SITUATION

Since 1970 the government's financial situation has deteriorated, as seen in Table 1, with the annual deficit rising from approximately 2,000 million MF in 1970 and 1971 to over 7,700 million MF in 1974. Part of this growth in the deficit is attributable to the drought conditions of 1972 to 1974, which increased government expenditures for drought relief and adversely affected the domestic tax base. Also significant was the sustained growth in current expenditures from MF 21,792 million in 1970 to approximately MF 33,500 in 1974.

This growth, at an average annual rate of more than 11 percent was in some measure due to price increases for materials. A more important cause was the growth in numbers of and salaries paid to civil servants in 1973 and 1974.

Table 1

Consolidated Operations of the Government, 1970-74.

(000,000 MF)

	1970	1971	1972	1973	1974 (estimated)
Current revenue	21,726	23,471	24,711	26,921	28,700
Current Expenditures	21,792	23,174	27,491	30,478	33,475
Current surplus/ deficit (-)	-66	297	-2,780	-3,557	-4,775
Capital expenditure	2,104	2,326	3,014	2,692	2,925
Overall surplus/ deficit (-)	-2,170	-2,029	-5,794	-6,249	-7,700
Financing					
External sources	2,220	2,000	2,038	5,127	3,540
Domestic sources	-50	29	3,756	1,122	4,160
Banking system	-100	570	722	-875	690
Treasury operations	50	-541	3,034	1,997	3,470

Source: International Monetary Fund.

Compared with this expenditure increase of 11 percent, tax receipts, which account for approximately 90 percent of government revenue, rose at a rate of less than 8 percent from 19,402 million MF in 1970 to approximately 25,900 million MF in 1974. Collections of income and profit taxes and of taxes on goods and services grew faster than the average, while tax revenue from international trade, which normally accounts for around half of total tax receipts, grew much more slowly. In 1974 and 1975 the government suspended the livestock tax, which had brought in 1,700 and 1,200 million MF in 1972 and 1973 respectively. An exceptional grant from the FED was provided, however, as compensation for the lost tax.

For the entire period 1970-74 more than 60 percent of the cumulative deficit was financed from external grants, with the French supplying most of this Much of the 1974 deficit was also financed with increases in the money supply, which rose 41 percent during the year.

As the effects of the drought gradually recede and the tax base is improved, the deficit may be reduced, but it is unlikely that the fiscal problem can be brought entirely under control in the near future without considerable reduction in expenditure. Rather than being reduced or even stabilized, however, expenditures are likely to rise significantly because of important investments currently being financed with foreign assistance,[1] the operating costs of which must ultimately be met by the government

Given the already large size of the budget deficit and the uncertainty which exists concerning how long France will continue to fill the gap, it is essential that additional means be found to finance these operating costs if the promise of these projects is to be realized.

THE LIVESTOCK SECTOR AND ITS TAXATION

Although it is currently one of the poorest countries of the world in terms of per capita income, Mali has a considerable potential for agriculture and livestock production This potential has assumed increasing importance within the past few years because of the rapidly rising price of meat in West Africa as increased demand in the coastal countries to the south has not been matched by expanded production,a situation accentuated by the recent drought. Furthermore, Mali appears to be in a very strong position to take advantage of the higher prices. Most of the country is free of the tsetse fly, and it is only by increasing the already large number of zebu cattle found in the fly-free area that this rapidly growing demand for meat can possibly be satisfied.[2] Mali not only has the land, but it also has an enormous skill resource consisting of the knowledge of nomadic and semi-nomadic herders, who have developed an efficient means of exploiting the harsh environmental conditions of the Sahelian rangeland.

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1. Much of this aid has resulted from publicity concerning the drought and the suffering it caused.

2. This assumes that West African meat prices remain in the long run below world market levels. If African and world prices were equalized, imports would fill any gap between demand and supply at CIF prices. This occurred in 1975, primarily because of temporarily depressed world prices.

Although the potential is great, its realization will require modification of the current system of production The recent drought has amply demonstrated the limits to which the rangeland can be stocked without running the risk of large-scale losses when weather conditions are adverse In addition to the immediate catastrophic effects of drought, there is also evidence of steady deterioration of the land in some areas due the inability of traditional political authorities to deal with the problem of overgrazing under the pressure of expanding numbers of cattle.

A potential solution to the overstocking problem has been developed which would still allow beef production to increase, but it is as yet in the incipient stage. The Sahelian range would continue to be used for breeding young stock, but an increasing proportion of the herd would be withdrawn from that land for further growth and fattening in the agricultural zone to the south The realization of this concept will require a series of actions expansion of livestock production by sedentary farmers, provision of cattle feeding and holding facilities and services, improvement of forage and augmentation of the carrying capacity of selected areas, provision of credit, upgrading of the Malian Veterinary Service, expansion of water availability, introduction of range management techniques, improvement of transportation and marketing of cattle, and provision of various types of training and research. Although a major part of the initial costs for these activities will be provided by overseas donors, the Malian government must find ways of financing, at a minimum, their continuing recurrent expenses.

Recent revenue collections from the sector do not offer much encouragement. Government revenues derived directly from livestock are given in Table 2 together with expenditures. These revenues have declined steadily during the past four years, even allowing for the temporary suspension of the cattle tax in 1974 and 1975. Prospects for 1976 are somewhat more encouraging, though it is unlikely that revenues will attain the levels of 1972 and 1973. This decline undoubtedly reflects the effects of the drought, as well as the nature of the taxes. The taxes are specific, i.e., are assessed on quantity rather than value. Thus they reflect only changes in the numbers of cattle, not changes in value. In addition, there is the major problem of tax evasion, made particularly acute by the extensive nature of production and distribution. These matters are discussed later in greater detail

The relationship between total revenue and total expenditure is more encouraging. It is clear from the table that the former has far exceeded the latter, except for 1974 and 1975 when the livestock tax was suspended. Total expenditures during the four years were relatively constant(probably declining in real terms), though there was an earlier increase of about 50 perc it from 1970 to 1972. More important, while expenditures for personnel increased by 61 percent

Table 2
Government Revenue from and Expenditures on Livestock, 1972-76
(MF)

	1972	1973	1974	1975	1976 (provisional)
Revenue					
Taxe sur le Betail	1,248,047	1,223,653	--	--	1,007,526
Taxe d' Exportation	402,800	336,200	327,600	n.a.	n.a.
Taxes Received by the					
Service de l'Elevage	111,248	114,572	47,606	30,330	n.a.
of which Abattage	(63,029)	(68,307)	(12,558)	(16,412)	(n.a.)
Exportation	(44,084)	(40,612)	(29,481)	(12,333)	(n.a.)
Other	(4,135)	(5,653)	(5,567)	(1,585)	(n.a.)
Redevance à l'OMBEVI	--	--	4,071	--	n.a.
Total	1,762,095	1,674,425	379,277		
Expenditures					
Personnel					
Direction Elevage	34,425	40,153	42,839	52,596	58,987
Région Elevage	221,562	257,420	277,124	302,043	316,139
Laboratoire Central	25,719	30,369	29,289	30,252	29,846
Research Stations, Schools	43,511	76,104	85,137	109,684	123,374
Centre Avicole de Sotuba	--	12,770	14,696	20,675	23,246
OMBEVI	6,625	9,641	8,516	18,177	36,686
Total	331,842	426,457	457,601	533,176	588,278
Material					
Direction Elevage	42,186	42,386	20,000	32,178	27,600
Région Elevage	13,509	14,536	21,961	20,809	23,876
Laboratoire Central	35,642	35,642	21,000	18, 414	30,000
Research Stations, Schools	74,283	74,283	47,000	52, 556	39,962
Centre Avicole de Sotuba	5,305	5,305	3,500	4,650	50,000
OMBEVI	1,673	1,850	2,500	4,901	6,431
Total	172,598	174,002	115,961	132,755	177,869
Total	504,440	600,459	573,562	665,931	766,147

Source: *Budget d'Etat* _____; Service de l'Elevage

Notes: Figures for 1972-74 are official authorizations; those for 1975 are provisional estimates. The *redevance à l'OMBEVI* was estimated by multiplying the tax rate times the number of authorized cattle exports.

n.a. Not available.

from 1972 to 1975, those for material were reduced by 23 percent, though the budget calls for a restoration to their 1972-73 level this year. With costs of transportation and prices of supplies rising very rapidly over this period, moreover, any reduction in expenditure implied a severe deterioration in the quality of livestock services This was offset to some extent by emergency contributions of supplies from external donors during the drought, but restoring the effectiveness of service delivery to even its pre-drought level is likely to require a rather sizeable budget increase.

THE TAX SYSTEM AND REGULATIONS

The livestock tax

The system used to raise revenue from the livestock sector is complex.[1] The major source of revenue is the direct tax on cattle (400 MF-this rate is less in some regions where the sector is not very commercialized or where there are not many cattle), horses (1,300 MF), camels (500 MF), donkeys (150 MF), and sheep and goats (70 MF).[2] All taxes are collected locally by the Chef de Village or Chef de Faction, who turns the revenue over to the Chef d'Arrondissement, who, in turn, sends the livestock tax on to the Treasury The Chef d'Arrondissement maintains a file of *cartes de famille* which provides the information upon which these taxes are based, and the effectiveness of collection depends largely on his relations with the taxpayers Less than half the total estimated head of cattle are actually taxed; the percentage is even smaller for other animals.

Commercial taxes and fees.

The *taxe d'abattage* is collected by the Service de l'Elevage at the point of slaughter at the rate of 300 MF for adult cattle, 160 MF for pigs and calves, and 60 MF for sheep and goats A higher fee of 2,685 MF for cattle, pigs and horses and 225 MF for sheep and goats must be paid at the Bamako slaughter house in return for the slaughter, refrigeration, and transportation services provided. It is probable that a large amount of slaughtering is done throughout the country without payment of this tax. It is, in any case, a fairly unimportant source of revenue

Other taxes on marketed livestock include a *patente* paid by all cattle merchants of 15,000 MF for each 50 animals traded and a *contribution forfaitaire sur les bénéfices industriels et commerciaux* (BIC) equal to the same amount Since it is very difficult to verify the total activity of a domestic trader, the minimum of 30,000 per year is usually the amount paid. Furthermore, there is a great deal of small-

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1. An important source of information on this system is Société d'Etudes Pour le Développement Economique et Social (SEDES), *Approvisionnement en Viandes de l'Afrique de l'Ouest*, Paris: 1973, Deuxième Partie, pp. 206-16.

2. In the 6th region a development tax is added to the livestock tax for cattle (100 MF), camels (100 MF), donkeys (30 MF), and sheep and goats (10 MF).

scale trading activity for which no *patente* is obtained. Butchers must also purchase a *patente*, which may cost between 12,000 MF and 625,000 MF, depending upon the number of animals processed and the place of operation In addition, they must pay the *impot sur les BIC*. Finally, traders transiting Mali from Mauritania must pay 150 MF per head for cattle and 100 MF for sheep and goats to offset part of the cost of health inspection, control, marking, etc.

Export Taxes and fees.

The most important revenue source, other than the livestock tax, is the *taxe d' exportation* which has been unified and raised since 1970 to the current levels of 4000 MF per head for cattle, 1500 MF for sheep and goats, 8000 MF for horses and donkeys, 5000 MF for camels, and 5 percent of the FOB value for pigs In addition to the export tax, there is a *contribution spéciale pour les services rendues* of 3 percent of the *valeur mercuriale*[1] Finally, there is a *taxe sanitaire* of 300 MF for cattle and 150 MF for sheep and goats and a special tax of 100 MF on cattle and 60 MF on sheep and goats which helps pay for the operations of OMBEVI

In addition to paying the taxes, an exporter must purchase a *patente* which costs 200,000 to 800,000 MF, depending upon his total volume of export and import activity, plus 10 percent of the *valeur locative.*[2] For each head of animals exported, a *licence d'exportation* must also be obtained from the Direction des Affairs Economique, which could cost close to 600 MF for a head of cattle Finally, there is the *impôt sur les BIC* which could amount to 3000 MF per head and is due on both locally marketed and exported cattle[3] In reality it is more likely to be paid on cattle which are exported because funds are blocked for this purpose at the banks prior to the issuance of the export license.

An estimate of the total cost of these various taxes and fees per head of cattle exported is given in Table 3. Not included in the table is the cost of *patentes*, which are not directly related to the number of animals exported.

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1. In March, 1976, the *valeur mercuriale* was fixed at 100,000 MF for cattle, 15,000 MF for sheep and goats, 150,000 MF for horses, and 20,000 MF for donkeys.

2. In some areas, this *patente* is not required if all foreign exchange earnings are repatriated. The *patente* covers both export and import activity so that an individual engaged in both may purchase a single *patente*.

3. This assumes that the exporter earns a profit of 10 percent of the *valeur mercuriale* of 100,000 MF and pays a tax of 30 percent on that profit.

Table 3

Estimated Value of Taxes and Fees Paid on Exported Cattle, 1976

(MF/head)

Type of Tax or Fee	Value of Tax or Fee
Export tax	4,000
Contribution spécial (3% of valeur mercurial)	3,000
Health tax	300
Rédevance à l'OMBEVI	100
License d'exportation	600
Impôt sur les BIC	3,000
Total	11,000

Source. SEDES, *Approvisionnement en Viandes de l'Afrique de l'Ouest*, Paris, 1973; interviews with Malian officials.

Export procedures.

In addition to the financial burdens imposed by the fragmented tax system, Malian herders face a complex set of procedures if they wish to export. In Bamako an exporter must go to at least six different physical locations to have his animals vaccinated, pay his taxes, and obtain a license and other papers necessary for the trip. Then there are other delays at the border, both on leaving Mali and on entering the neighboring country.

Another important requirement in the export procedure is repatriation of a certain amount of foreign exchange Repatriation is enforced through the system of export licensing There are two types of export licenses, a simple export license and a combination export-import license (EXIC) which includes the right to import using some of the foreign exchange earned. Both licenses require the exporter to repatriate currently 100 percent of the *valeur mercuriale* for each head of cattle exported Combination exporter-importers have an automatic right to use 75 percent of this value for the purchase of imports (EXIC procedure). The attractiveness of these import rights often induces small importers to join with cattle exporters as a means of obtaining import licenses Utilizing EXIC in this way also has the advantage of increasing the volume of sales covered by a single trading *patente* and thus reducing its effective cost, which can be very high for a small trader In return, it appears, the importers act as bankers to the system, helping to finance livestock exports. The value of EXIC import licenses is indicated by the fact that exporter-importers will sometimes pay all taxes and go through all the export formalities without actually exporting the animals merely to obtain

the license.[1]

The complicated procedures involved in exporting livestock, coupled with the tax levies, result in large-scale smuggling. Although it is estimated that up to 200,000 head of cattle are exported annually from Mali, fewer than one half of these pass legally by the frontier Customs officials have the right to seize herds within 50 km of the border for which export papers are not in order Enforcement is weak, however, since livestock movements take place over an extended area and the service is severly handicapped by a lack of transportation equipment and gasoline Although fines of three times the value of animals seized can legally be imposed for smuggling, in practice the fine rarely exceeds the value of the herd Even this penalty would impose high costs on smugglers in relation to taxes saved if enforcement were at all effective. Because so much smuggling does take place, one must conclude that the potential penalty for smuggling is small relative to the bureaucratic and monetary cost of going through the official export process Smuggling would probably be even more widespread were it not for the EXIC procedure which makes it more worthwhile to struggle through all the steps necessary to obtain export papers

In sum, the livestock sector in Mali is subject to a complex system of taxation and regulation, which, while not necessarily an oppressive financial burden, is nevertheless widely evaded. This may be as much because of the cumbersome nature of the payment procedures as because of the amounts which have to be paid In addition, enforcement seems weak and severely handicapped by lack of mobility. There is a clear need, therefore, to evaluate the tax system to see how it might be simplified and collection improved.

PROJECTIONS OF LIVESTOCK REVENUES AND EXPENDITURES

In this section we project total revenues and recurrent expenditures for the livestock sector in 1978 and 1988 based on the 1974-78 Plan.[2] The expenditure forecasts incorporate our best estimates of the level of recurrent expenditures implicit in various development projects

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1. This is possible because of the convertability of the Malian franc, implying that traders have no difficulty acquiring the foreign exchange needed to purchase imports. There is also a substantial illegal market in import licenses. One must conclude, therefore, that the system which otherwise exists for allocating import licenses is somewhat restrictive, especially in so far as the smaller importers, accounting for about one third of the total market, are concerned.

2. *Rapport Final de la Commission Nationale de Planification de l'Economie Rural pour l'Elaboration de Plan Quinquennal*, 1974-78.

included in the Plan The forecasts are made under two alternative hypotheses about veterinary services· (1) that expenditures for the services expand with the size of the herd but remain at their current level per head and (2) that expenditures per head for the services increase to enable the veterinary agents in the field to be more fully effective in delivering their services. On the revenue side, our forecasts make allowance for tax evasion In what follows, we first describe how the forecasts were made and then present and discuss them

Assumptions Underlying the Projections

Revenue Revenue projections were made by applying existing tax rates to Plan projections of herd size and composition, the value and number of animals exported, and the number of animals slaughtered domestically.[1] Projected revenues were then adjusted for the same degree of tax evasion as occurred in 1970. This year was chosen rather than a more recent period because estimated rates of tax evasion are based on a comparison of the number of animals actually taxed with estimates of actual herd size and composition, exports and domestic slaughter, and the latter estimates are more reliable for 1970 than for the years during and immediately after the drought[2] Estimated tax evasion rates are included in notes to Table 4, which shows the revenue forecasts.

Expenditures Estimates were made of recurring costs in two different areas, government services and project operating expenses. The resources used in the provision of government services were divided into two categories, personnel and material. Expenditures on personnel for the Service de l'Elevage and OMBEVI were assumed to expand proportionately with the total size of the herd since these are agencies responsible for working with animals and their owners in the field. Other central government expenditures, both for personnel and for material, were assumed to remain constant in real terms.[3]

Material expenditures for the Service de l'Elevage and OMBEVI, on the other hand, were estimated using two alternative hypotheses. The first was that the 1974 ratio of personnel to material expenses would remain constant and that material costs would rise in proportion

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1. Data were sufficient to do this only for cattle, sheep, and goats. These account for 95 percent of the total number of domestic animals in Mali and an even greater proportion of total public revenue.

2. The 1970 estimates of these variables were made by the Societe d'Etudes pour le Développement Economique et Social (SEDES) and are believed to be reasonably accurate. SEDES, *Approvisionnement en Viandes de l'Afrique de l'Ouest*, Paris· 1973

3. This does not imply that budget allocations for other government agencies, such as the Central Veterinary Laboratory, are adequate at existing levels, but rather that they are not as clearly related to livestock numbers.

Table 4

Projected Revenue and Recurrent Expenditures for the Livestock Sector, 1978 and 1988

(000,000 MF in 1975 prices)

	1978	1988
Revenue[a]		
Taxe sur le Betail	966	1,990
Taxe d'Exportation, etc.[b]	813	2,680
Taxe d'Abattage	23	56
Taxe Sanitaire[c]	93	246
Redevance à l'OMBEVI	9	34
Total	1,904	5,006
Expenditure		
Personnel		
Service de l'Elevage, OMBEVI	432	919
Laboratoire Central, Research Stations, Centre Avicole	160	160
Total	592	1,080
Material[d]		
Service de l'Elevage, OMBEVI		
Hypothesis No. 1	67	143
Hypothesis No. 2	432	919
Laboratoire Central, Research Stations, Centre Avicole	75	75
Total[d]		
Hypothesis No. 1	142	218
Hypothesis No. 2	507	994
Zone Pasturale		
Operating Costs	481	1,540
Amortization and Interest	512	1,639
Total	992	3,179
Total Expenditur		
Hypothesis No 1 plus Zone Pasturale Operating Cost	1,215	2,838
Hypothesis No. 1 plus Zone Pasturale Total Costs	1,727	4,477
Hypothesis No. 2 plus Zone Pasturale Operating Cost	1,580	3,614
Hypothesis No. 2 plus Zone Pasturale Total Cost	2,092	5,253

Source: Mali Rapport Final de la Commission Nationale de Planification de l'Economie Rurale pour l'Elaboration du Plan Quenquennal 1974-78; SEDES, Approvisionnement en Viandes de l'Afrique de l'Ouest, Paris: 1973.

Table 4:

Notes:

[a]Assumes the following rates of tax evasion:
livestock tax - 57% (cattle) and 49% (sheep and goats)
export tax - 62% (cattle) and 72% (sheep and goats)
slaughter tax - 82% (cattle) and 97% (sheep and goats)

[b]Includes *taxe d'exportation*, *license d'exportation*, and *impot sur les BIC*.

[c]Health tax assessed at the time of export.

[d]Hypothesis 1: expenditures on material increase in proportion with size of the herd.

Hypothesis 2: expenditures on material equal those on personnel.

to the size of the herd at the same rate as the cost of personnel. The second was that material expenditures would be increased to the level of personnel expenditures by 1978 and would remain at that level thereafter. This latter hypothesis is consistent with a recent evaluation of veterinary activities in Niger which found that if permanent personnel in activities related to the field are to be fully employed, expenditures for supplies, maintenance, and travel expenses should approximate total salary expenses.[1]

The second area in which expenditure estimates were made was that associated with the ongoing costs of extensive livestock projects. As seen later in this report, our judgement is that all fattening operations in the agricultural zone can and should ultimately be self-financing, that is the owners of animals which are fattened either in feedlots or on farms should pay fully for any services or materials provided by the government. Extensive range management and water development (*zone pastorale*) projects, on the other hand, are not so easily financed in this way.[2] We have assumed, therefore, that these projects generate expenditure requirements without providing any directly offsetting revenue. Estimates of these expenditures were obtained by multiplying the project cost per animal anticipated in the Mopti Region[3] by the total number of cattle estimated to be included in *zone pastorale* projects in 1978 and 1988. This total was obtained by adding together the numbers of all cattle projected by the 1974-78 Plan for the 5th Region, Seno, Sahel, Lacustre and 6th Region in 1978 and 1988 and multiplying

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1. France, Secrétariat d'Etat aux Affaires Etrangères, Fonds d'Aide et de Coopération, *French Aid to the Sahel Countries Stricken by the Drought*, February 1974, translated from the French, p. 26.

2. Later in the report we discuss the advisability of attempting to collect revenue from these projects, but we have no estimates of how much might be collected.

3. Taken from International Bank for Reconstruction and Development, *Appraisal of a Livestock Project, Mali*, January 10, 1975. See p. 33 of this report for a more detailed discussion of this cost estimate.

by the percentage of cattle to be covered by projects in the Sahel.[1] Cost estimates are given both for current operating costs and for the cost of capital, defined as amortization and interest.

The projections.

The projected revenues and expenditures, shown in Table 4, provide some interesting insights. First, taxes assessed directly on the livestock sector should be sufficient to pay for the recurrent expenditures (including capital costs) of that sector, even without modification of the tax system The surplus of revenues over expenditures would in most cases, however, be substantially less than in 1972, the last year of relatively normal conditions.

Second, export receipts (defined to include the cost of a license and the *impôt sur les BIC* paid on export profits) become the most important single source of revenue and furnish over one half of the total by 1988. This is attributable both to the important growth of anticipated exports and to the fact that the tax collections are in part a function of rising prices of livestock Should those prices increase even further, the tax should bring in correspondingly greater revenue [2]

Third, the assumption that material expenditures by the livestock services are expanded to equal salaries increases the level of total expenditures (including all project costs) by 21 percent in 1978 and 17 percent in 1988. While this increase is important, it is not overwhelming, especially in view of the vital significance of effective delivery of those services.

Finally, recurrent expenditures for extensive projects can be expected to become an increasing proportion of total expenditures, amounting to fully 60 percent in 1988 when all project costs are included.[3] The growing importance of these project expenditure requirements in the face of a generally tight overall budgetary situation implies that new sources of revenue must be found if development of the sector is not to be impeded.

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1 These percentages are not given in the Plan for other regions.

2. The relationship between tax collection and prices is discussed in detail later in the paper.

3. It is evident that although initial investment costs may be paid by external donors, continued operation of these projects requires that funds be set aside for replacement of that capital in the future.

THE TAX SYSTEM: STRUCTURE AND POTENTIAL CHANGES

Any discussion of the options available for increasing public resources allocated to the livestock sector must consider several aspects: 1) effects on incentives and the distribution of income and wealth, 2) the costs of collection and administration and how these might be reduced to yield more net revenue, 3) the tax base and how it is likely to change, 4) the level of government at which revenue collection and expenditure decisions might best be made, including earnmarking of taxes for specific purposes and the decentralization of the collection and use of public funds. In this section we consider only the tax system. Later sections are directed to parafiscal charges and indirect sources of revenue

Incidence.

To analyze the effects of a tax on incentives and the distribution of income and wealth, it is necessary first to determine its incidence, or the extent to which it is passed forward or backward away from the subject of taxation Incidence depends upon the relative ease with which buyers or sellers are able to avoid the tax by altering their levels of output, input or consumption. If the demand for Malian cattle were perfectly elastic, for example, no tax could be passed on to foreign consumers since they would simply shift to other sources of supply, On the other hand, if the supply of cattle were insensitive to the price received, a tax on highly competitive commercial operations would be passed back to the original producers in the form of decreased cattle prices. Available information indicates that the distribution system for Malian livestock is, in fact, quite competitive.[1] As a result, any taxes assessed at this stage are, for the most part, borne by producers and consumers with the relative shares depending upon the demand and supply elasticities.

The fact that Mali supplies over half the total imports of the Ivory Coast, the most important market in West Africa outside of Nigeria, suggests that the demand for Malian cattle is not perfectly elastic.[2]

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1. J. Dirck Stryker, "The Marketing of Malian Cattle," October 15, 1975.

2. J. Dirck Stryker, *Livestock Production and Distribution in the Malian Economy*, Supplementary Report Prepared for the U.S. Agency for International Development, August 20, 1973.

There is some basis for presuming, then, that part of the taxes assessed on livestock in Mali, particularly the export tax, is passed on to foreign consumers. The extent to which this occurs cannot be determined, however, without careful statistical estimates of this demand function.[1]

The price elasticity of demand by domestic consumers for Malian meat may differ from that of foreign consumers. Meat is a more important item in the Malian budget and per capita incomes are lower in Mali than in the richer consuming countries to the south. A given price change for meat thus affects individual real income relatively more in Mali than in the other countries. This larger effect on real income would lead one to predict that the price elasticity would be greater as well. On the other hand, Malians have fewer alternative sources of supply, which would imply a lower demand elasticity Given the dominance of Mali as a supplying country in the region, however, the price elasticity of domestic demand is probably at least as high as that of foreign demand [2]

Measurements of supply elasticity are even more scarce than those for demand elasticity There are valid reasons for believing, however, that the supply of cattle to the market by herders is quite inelastic with respect to price, especially in the short run. First, the total size of the herd can only be adjusted relatively slowly, especially in the upward direction. Second, it is not clear precisely what motivates herdsmen to build up herd size. The desire to own animals is deeply ingrained, perhaps due to their important function as security against the risk of drought or other misfortune and the absence of alternative ways in which to hold wealth. Not all animals, however, are equally valuable to the herdsmen. Males and cull or sterile cows neither reproduce nor yield milk, and available evidence on herd composition indicates that few are in fact retained. In addition, many people argue that the herdsman is essentially a target income seeker and that he will sell only as many animals as required to pay taxes and other essential expenses, such as purchased food or a bride price. If cattle prices rise more than the prices of these essentials, he will sell fewer animals--supply is a negative function of price. Thus, short-run decisions regarding the sale of cattle may take into account a number of things besides current price, including herd composition, expected future livestock prices, prices of other goods and services, the immediate need for cash, and alternative sources of income.

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1. The only estimate of the price elasticity of demand for meat in West Africa has been made for Abidjan by Roger Montgomery, *Declining Demand for Beef in Abidjan: Little Aid-Cum-Trade for the Sahel*, 1975. He estimates this elasticity to be -.324. Since Mali is only one supplier to this market, albeit a very important one, the demand elasticity of Abidjan consumers for Malian beef is undoubtedly higher.

2. See Appendix A, however, for some fairly weak but contrary evidence.

In the long run, however, the number of items included in the category of "essential expenses" tends to expand as herders are exposed to a wider variety of consumer goods. There is already evidence that these expenditures now include such items as tea, sugar, cloth, transitor radios, watches, flashlights, kerosene lamps, etc.. In the aggregate, therefore, it seems likely that the number of animals supplied is positively related to price, but that the elasticity of response is relatively low in the short run, when it is only the offtake rate which can be varied ,and somewhat higher in the long run as herders tastes change and herd size can be adjusted.

If the supply elasticity is, in fact, lower than the demand elasticity, the incidence of livestock taxes will fall relatively more heavily on producers in the short run. The long run supply elasticity, however, may be somewhat higher and a smaller proportion of the taxes will be paid by the producer because he has the option of increasing his participation in other activities, such as agriculture. In addition, as fattening operations on feedlots and farms becomes a greater part of total production, the elasticity of supply can be expected to increase.

Incentive Effects.

The effect on incentives of a tax is closely related to its incidence since the degree of responsiveness corresponds directly to the ability to avoid the burden. In so far as the supply elasticity of herdsmen is very low, most of the return to them is an economic rent. A tax which is assessed on, or passed back to, the herdsmen will capture part of this rent without substantially altering the number of cattle coming onto the market.

The livestock tax, for example, probably has very little effect on production. In addition, since it is assessed on all animals, whether marketed or not, it tends to encourage their sale relative to a tax on marketing receipts. The head tax also encourages marketing of cattle at an earlier age. It is collected annually,and once it is paid, the herdsman's decision on when to market will be based on his assessment of the relationship between the prices he receives and at various times and the real marginal cost of adding weight to the cattle. If he contemplates holding an animal for an additional year, his marginal costs include the tax. The higher the tax, therefore, the greater must be the incremental value he envisions from holding for at least a full year. Overall, the livestock tax is probably very similar to a land tax, commonly recommended for less developed countries because of the incentive which it gives to agricultural development by making costly the unproductive use of land.

Part of the export tax, as well as of various taxes and fees assessed during marketing, is also probably felt by producers in the form of lower prices. The effect differs from that of the livestock tax, however, in that these taxes are applied only to marketed animals and

thus tend to discourage their sale. If the supply elasticity of marketed animals is relatively low, however, this disincentive effect is not great, though it may be more important in discouraging fattening operations. To the extent that the quantity demanded by both foreign and domestic consumers is sensitive to price, these taxes also tend to decrease the consumption of meat.

Effects on the distribution of wealth and income.

A full discussion of the effects of a tax on the distribution of income and wealth requires some mention of the shape of that distribution, of the incidence of other taxes in the economy, and of the distribution of benefits from government expenditures. Evidence on all of this is quite scanty That which exists indicates that nomadic and semi-nomadic herders, with a few exceptions, are at the bottom of the per capita income scale In addition, they probably benefit less from government expenditures than any group in Mali, for reasons which have already been discussed. Finally, the share of their income which goes to taxes on the goods they consume and the livestock they own and sell, plus the head tax they pay directly, is probably at least as great as for most other socio-economic groups. As a result, the public revenue and expenditure system appears on average to be highly regressive as far as this group is concerned

On the other hand, when one considers marginal changes in income, tax burden, and benefits from government expenditures, the picture changes markedly. Because of the inelasticity of supply, most of the current increases in meat prices are being passed back to the producer at the same time that incomes elsewhere in Mali are relatively stagnant. In addition, the inelastic nature of the livestock tax base implies that most of this increased income will not be taxed unless the tax rate is changed. Finally, while government services provided to these herdsmen, have, in the past, been meager, there is a concerted effort underway to find means by which these services can be improved. As a result of these three factors, the system should become less regressive over the next few years.

Costs of Collection.

Frequently a tax which appears ideal for many reasons proves to be very difficult to implement because of high costs of administration and collection. This is sometimes true, for example, of land taxes in less developed countries. The fact that both the livestock tax and the export tax are widely evaded in Mali indicates that problems definitely exist

Even if collection costs are not high, evasion may be encouraged if the taxpayer sees no benefits accruing from the taxes he pays. The low population density and the extensive nature of cattle movements make the provision of government services very costly, especially to widely dispersed migratory or semi-migratory herdsmen. In addition, the precarious government budget situation severely impedes efforts to

improve those services. As a result, taxpayers see little relation between taxes paid and services received. There is a great reluctance to pay, therefore, and evasion is widespread.

The livestock tax. The livestock tax is particularly strongly resented in most areas of West Africa. From an administrative viewpoint, however, this tax has obvious advantages when compared with other taxes on income or wealth. Chief among these is the fact that the animals can be phsyically observed and ownership usually identified. In addition, there is minimal record keeping and no problem of imputing value for the purpose of estimating the tax base, as is often true of land taxes. It is, in fact, hard to imagine an administratively more efficient way of taxing the wealth of this group of people. It therefore appears highly desirable to investigate ways of improving collection. Success will require, though, a change in people's attitudes towards this form of taxation. This could cocur if tax collection were made more efficient so that the burden would not be felt disproportionately by the relatively few who pay the tax. It also might result from increasing the amount of government services going to the sector and more closely identify ng them with tax collection--possibly through regional decentralization. This will be discussed in more detail later.

Export taxes. As far as the export tax is concerned, it appears that a relatively costless way of reducing evasion would be to simplify the export procedures. As described earlier, these procedures are both complex and time consuming. The system should be examined carefully to find ways in which it might be simplified, e.g., by collecting all taxes in a single location.[1]

In addition, collection of the export tax can undoubtedly be increased by improving the efficiency and mobility of the customs service.[2] As a general principle, with a fixed FOB export price and given tax rate, government revenue can be maximized by increasing expenditure on enforcement up to the point where the marginal franc brought in as revenue just equals the marginal cost of acquiring that revenue. If, on the other hand, expenditure on enforcement is

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1. This might be done at the Parc d'Exportation de Bamako, recommended for construction by OMBEVI, *Promotion d'Un Circuit Pilote d'Exportation du Betail sur Pied*, August 1974.

2. One very simple and relatively inexpensive option would be to purchase a fleet of motorcycles especially adapted for desert and off road travel. There are a number of Japanese and American makes that would be very suitable.

predetermined, the tax rate can be varied to accomplish the same goal. When variation in enforcement and the tax rate also effect the FOB price, as is true in the case of Malian livestock, the problem is more complicated. It is clear, however, that a study should be undertaken to see how export tax revenues might be increased.

Other commercial taxes and fees. As for other types of marketing and slaughter taxes and fees, the costs of collection are generally low because of the fixed location in which these commercial activities take place. The advantages of allowing markets to develop, however, are large. They encourage competition, permit the exploitation of economies of scale, and lower the costs of acquiring information. It is therefore highly desirable that these taxes not be increased to the point where they discourage buyers and sellers from coming to organized markets and slaughter houses.

Indirect taxation. As far as collection costs are concerned, it may be that the most efficient way to tax the sector is not directly with livestock, export, and marketing taxes, but indirectly with taxes assessed on goods and services purchased by cattle owners In particular, income earned from the expanding value of livestock production is likely to be spent in large part on imported goods such as tea, cloth, radios, and flashlights. These items are already taxed by the government through import duties, the IAS, and SOMIEX profits. Since the importation of these goods is often more easily controlled and taxed than is the livestock sector, it might relatively efficient to increase revenue from this source. The question of indirect taxation is discussed at more length later.

The Tax Base

In order to avoid the administrative and evasion problems that usually accompany the process of making adjustments in tax rates, it is usually desirable to have a system where the rate remains fixed while the tax base increases with the growth of the economy. In this respect the Malian tax system is deficient since most of the taxes are specific (per unit of quantity) rather than ad volorem (per unit of value) in nature. These taxes do not permit the government automatically to share with herders the benefits from rising meat prices. Instead, there have been occasional increases in the tax rate, as when the cattle tax was raised from 300 to 400 MF in 1973, or the proliferation of new taxes, which further complicates the tax system.

As far as export taxes are concerned, the solution seems simple, All these taxes are collected on cattle that are marketed. The *contribution spéciale* is already an ad volorem tax assessed on the basis of the *valeur mercuriale*. There seems no reason why all export taxes cannot be assessed in the same way. To the extent that

the *valeur mercuriale* is adjusted as actual FOB prices rise, the tax base will expand. Higher taxes might tend to cause somewhat greater evasion, but if enforcement were improved this could be limited.

The conditions surrounding the livestock tax are much different. This tax is collected on animals whether marketed or not. An ad valorem tax would require valuing the entire herd each time the tax was collected Seasonal fluctuations and spacial variation in prices, coupled with a complicated price structure resulting from differences in age, sex, and weight, would make this a very complex task. A specific tax is thus much more manageable than an ad valorem tax. Keeping a specific tax means, however, that the only increase in the tax base comes from an enlargement of herd size. Since the objective of the Malian government policy is to increase production efficiency by increasing the rate of turnover of animals on the range, rather than simply increasing their numbers (except for reconsitution of herds following the drought), the tax base will remain fairly constant This relative stagnancy in the tax base can be offset by raising the rate, but, even though rising meat prices and greater output will give the owners greater capacity to pay, increases in the tax rate are likely to be strongly resented unless clearly linked with more government services at the local level.

Other sources of revenue, such as slaughter and health taxes, are more directly associated with the provision of specific services. As a result, even though these are specific taxes, the rates can probably be raised without difficulty periodically as costs in general rise.

Level of Control.

Most of the taxes assessed on the livestock sector are collected either by the customs service or by the Chefs d'Arrondissement, who surrender them to the Treasury. Expenditure allocations to the sector are, in turn, determined by the general government budget established at the beginning of each year. While this is in accordance with the principle of budgetary unity, there may be reasons for decentralizing to a greater extent the collection and expenditure of public resources.

A major risk with complete centralization of expenditure decisions is that in times of overall budgetary strigency, such as exists in Mali at present, government activities which have large potential for contributing to economic development may be severely handicapped by a shortage of funds with which to assure the exploitation of that potential. Such appears to be the case with the livestock sector in Mali today. Unless a minimum level of effectiveness can be achieved in the delivery of veterinary and other services, investment in livestock development will not yield the results it should. To the extent that this investment succeeds in expanding production, moreover, an ever increasing quantity of recurrent expenditures will be required to maintain this minimum level of effectiveness As indicated earlier, tax revenues will also grow, but the central budgetary process of allocating public resources may not be sufficiently flexible to avoid chocking off the expansion of the sector

Earmarking. One way of assuring an adequate growth of resources devoted to the delivery of livestock services is to earmark certain sources of revenue for this purpose. This might be done, for example, with a portion of the export tax on livestock, the base of which should grow substantially in the future as prices rise and increased numbers of animals are exported A particular advantage of earmarking part of this tax for livestock services is that it is associated with the most advanced and commercialized part of the sector. To the extent that government agencies succeed in developing livestock production and exports, therefore, they can expect to see their revenue from this source increase. Traders are those most likely to be aware of successful policies, moreover, and to identify to some extent the tax they pay with the benefits they receive.

Local control of the livestock tax. The principle of relating taxes closely to services received suggests that some decentralization of control over the use of livestock tax revenues might be beneficial as well. As noted earlier, this tax has many desirable characteristics, but its major disadvantage is that it is strongly resented and widely evaded, at least partly because taxpayers see no return on the taxes paid. If this tax were both collected and spent locally, revenue in rural areas might be increased since farmers and herdsmen would be more willing to pay for public goods and services which they want. This would also help to develop a tradition of voluntary support of government and to decrease distrust and fear of tax collectors.[1] In the absence of some decentralization, it is likely that the livestock tax, the base of which is relatively constant and the rate difficult to raise without encouraging greater evasion, will become decreasingly important as a source of revenue.

The health tax. Finally, there is one tax which should clearly be retained by the Service de l'Elevage. This is the health tax paid for inspection and vaccination of animals prior to slaughter and export. The tax is closely identified with the service provided, even though this service is administratively imposed on the owner rather than voluntarily sought by him. The tax, therefore, is really a parafiscal user charge and should be kept by the Service to help defray the cost of this service rather than turned over to the Treasury, as is apparently the case at present.

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1. This argument is made rather forcefully for land taxation in less developed countries by Richard M. Bird, *Taxing Agricultural Land in Developing Countries*, Cambridge, Massachusetts Harvard University Press, 1974.

THE USE OF PARAFISCAL CHARGES

In addition to altering the tax structure, there is the possibility of imposing various parafiscal charges which would at least help to pay for specific materials and services provided by the government agencies concerned with livestock. The current health tax collected by the Service de l'Elevage is really a form of parafiscal charge. There is also an informal fee charged for vaccination in some areas by veterinary agents part of which frequently goes for the purchase of supplies without which the vaccinations could not be given.

The kinds of charges which might be imposed for materials and services fall into two broad catagories. On one hand, there are those which could finance general veterinary services. On the other, there are charges which could be used to pay for recurrent government expenditures arising out of development projects.

Veterinary Services.

The main activities of the Service d'Elevage are the veterinary services offered throughout the country. Such services are indispensable to a healthy, growing livestock industry. Provision of these services can be broken down into three separate activities (1) on-site functions of the veterinarians in the field, including vaccinations and other health care, (2) transport of vaccines and other supplies between Bamako and the field stations and (3) production in Bamako and procurement from outside Mali of the vaccines and supplies. Currently all of these activities are funded on an annual basis through the central budget.

Expenditures for veterinary services. Total expenditures authorized for vaccines and veterinary services in 1975 were 456,292,000 MF. It would be desirable to have a complete functional breakdown of these expenditures in order to estimate the marginal and average costs of providing services in various parts of the country, as well as to be able to allocate costs accurately among the three divisions outlined above. The most complete breakdown we have, however, is shown in Table 5 for the years 1972-75. The increase in total nominal expenditures during this period of about 22 percent implies that the real value of these expenditures actually fell by 20 percent because of inflation. As noted earlier, the decline was especially severe for material expenditures, though some of this was offset by foreign assistance.

Table 5

Expenditures for Vaccines and Veterinary Services, 1972-75.

(000 MF)

	1972	1973	1974	1975
Personnel				
Service de l'Elevage	255,987	297,573	319,963	354,639
Laboratoire Central	25,719	30,369	29,289	30,252
Total	281,706	327,942	349,252	384,891
Material				
Service de l'Elevage	55,695	56,922	41,961	52,989
Laboratoire Central	35,642	35,642	21,000	18,414
Total	91,337	92,564	62,961	71,401
Total	373,043	420,506	412,213	456,292

Source: Table 2

Anticipated expenditure requirements for 1978 and 1988 in 1975 prices were estimated using the two alternative hypotheses discussed earlier; (1) that the ratio of personnel to material expenditures of the Service de l'Elevage remains at its current figure and that both are increased in proportion to herd size and (2) that material expenditures are expanded to equal personnel expenditures of the Service de l'Elevage by 1978 and both are increased in proportion to herd size thereafter. Expenditures of the Laboratoire Central are assumed to remain at their 1975 levels.[1] These projections are shown in Table 6.

Table 6

Projected Recurrent Expenditure Requirements for Veterinary Services, 1978 and 1988

(000,000 MF in 1975 prices)

	1978	1988
Personnel		
Service de l'Elevage	411	875
Laboratoire Central	30	30
Total	441	905
Material		
Service de l'Elevage		
Hypothesis No. 1	61	131
Hypothesis No. 2	411	875
Laboratoire Central	18	18
Total		
Hypothesis No. 1	79	149
Hypothesis No. 2	429	893

Table 6 (cont.)

	1978	1988
Total		
Hypothesis No. 1	520	1,054
Hypothesis No 2	870	1,798

Source: Tables 2 and 4

Even using the conservative hypothesis (No. 1) concerning material expenditures, the total level of public resources going to the veterinary services must more than double by 1988. If delivery is to be made fully effective, moreover, this level should increase by nearly four times during the next twelve years.

Existing sources of revenue. Over the past 4 years the real value of public resources devoted to livestock has actually declined. Unless budgetary priorities are changed or some earmarking occurs, the 1975 level of expenditures is probably as good a figure as any to use in estimating future allocations from the general budget. To this we can probably add the receipts from animal health taxes collected by the Service de l'Elevage. These are effectively parafiscal in nature and there appears to be agreement, in principle at least, that they should be retained by the Service. The resulting potential receipts from current revenue sources are shown in Table 7. If the Service d'Elevage keeps the health tax and the amount of veterinary services expands only in proportion to herd size, expenses can be covered into 1978 but not beyond. Any further expansion of services, and in particular the growth envisioned in hypothesis 2, generates a substantial net deficit even by 1978. User charges might, then, assume an important role in generating funds to cover these deficits.

The demand for veterinary services and establishment of user charges. There are three separate points in the maturation cycle when veterinarians are likely to come in contact with herdsmen: when the animals are immunized against *peste* and other diseases, when they get sick and need special treatment, and when they are to be exported or slaughtered domestically. The first two are purely health-related contacts, where the herdsman is presumably capable of making his own estimate of the value of the service rendered. The third is statutory. If a herdsman wishes to market cattle officially, he must have them vaccinated and inspected, whether he feels it is

necessary or not. The first two kinds of contact are thus voluntary while the third involves a degree of coercion. The character of these contacts will influence both the value the herdsman places on services and the ease with which collections can be made. The herdsman will value the first two contacts more, but collection will in some cases be easier to impose at the third.

Table 7

Projected Recurrent Expenditure Requirements and Sources of Funds for Veterinary Services, 1978 and 1988

(000,000 MF in 1975 prices)

	1978	1988
Total Recurrent Expenditures		
Hypothesis No. 1	520	1,054
Hypothesis No. 2	870	1,798
Receipts		
General Government Budget	456	456
Animal Health Tax	93	246
Total	549	702
Net Surplus/Deficit		
Hypothesis No. 1	29	-352
Hypothesis No. 2	-321	-1,096

Source: Tables 3, 4, and 5.

A policy of charging officially for veterinary services has yet to be applied in Mali. Other countries in West Africa, however, have experimented with service charges, apparently successfully,and evidence on unofficial charges in Mali indicates that herdsmen are in fact willing to pay for vaccinations and other treatment.[1] Estimates on what herdsmen actually pay and would be willing to pay for reliable vaccination service vary widely from a low of 25 MF per vaccination to a high of 150 MF.[2]

In order to estimate potential revenue from service charges, it is necessary to have an estimate of the annual use rate of veterinary services. Vaccinations and treatment given by the Service

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1. In Upper Volta herdsmen pay 10 CFAF per vaccination against *peste* and 15 CFAF per vaccination against *peripneumonie*. In addition, treatment for trypanosomiasis costs 30 CFAF per animal. There appears to be no reluctance to pay these charges as the value of the service is well understood. Communauté Economique du Betail et de la Viande, *Projet Conjoint de Lutte contre les Epizooties*, July 1973.

2. Sources of these estimates are officials in the Service de l'Elevage and rural sociologists.

d'Elevage during 1973 and 1974 are shown in Table 8.

Table 8

Interventions of the Service de l'Elevage, 1973 and 1974

(head)

	1973	1974
Animals Visited		
Cattle	4,587,459	5,389,854
Sheep-goats	2,463,722	3,729,534
Vaccinations		
Peste bovine	2,248,408	1,874,385
Peripneumonie bovine	542,587	370,039
Charbone symptomatique	261,604	511,129
Pasteurellose	136,139	4,698
Charbone bacteridien	112,938	4,698
Rage	97	9
Peste aviaire	4,897	5,086
Diphtero-variole-aviaire	2,223	4,079
Cholera-aviaire	615	2,379
Divers	1,665	1,604
Total	3,311,173	3,056,807
Treatments		
Trypanosomiase	112,926	135,062
Ectoparasite	5,046	6,678
Endoparasite	7,942	63,386
Total	125,914	205,126

Source: Service de l'Elevage

The number of caccinations against rinderpest during these two years averaged close to two million. Assuming that each young animal should be vaccinated in three successive years to ensure complete immunization and assuming that the proportion of animals in the herd of less than three years of age was less during these years than the approximately 50 percent characteristic of the pre-drought period,[1] vaccination against *peste* appears to have been rather complete. The same is undoubtedly less true of other diseases, especially *peripneumonie* which has become an increasingly important problem in recent years. It is more difficult to determine what constitutes an adequate program against these diseases, however, since animals are usually vaccinated against them only when and where each disease breaks out.

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1. Stryker, *Livestock Production and Distribution in the Malian Economy*, Table A-2.

It is also useful to compare the number of vaccines given with the number which are available. In 1974 the Laboratoire Centrale delivered 5,396,030 doses of vaccine, of which only about 57 percent appear to have been actually administered. The rest were probably lost due to spoilage and the desirability of maintaining inventories somewhat in excess of actual requirements. In estimating the cost of vaccine production in relation to the number of vaccinations given, we assume this ratio of administered to total vaccines to be maintained, though development of more effective delivery would probably cause it to be increased

Fees could probably be most easily assessed for vaccination against *peste*. The worth of this precautionary measure is well understood and it is for this service that informal charges are probably most often made. In addition, the severity of the disease is such that the demand for vaccination against it is probably quite inelastic with respect to price. This inelasticity is reinforced by enforcement of manditory vaccination. Nevertheless, the severity of the disease and the speed with which it spreads implies that considerable experimentation is necessary to determine this elasticity before fees are introduced on a large scale

Fees charged for vaccination against other diseases could vary with the cost of those vaccinations, the severity of the disease, and the risk of contagion by animals not vaccinated. In some cases a polyvalent vaccine can be given which will cover more than one disease. Furthermore, animals can be vaccinated and treated for several diseases during a single visit, and one may want to charge only the marginal cost of these additional animal health services. Thus a fixed fee might be charged to cover the cost of a visit and vaccination against rinderpest, with a variable fee being added to cover the marginal cost of additional treatment adjusted, perhaps, to take into account the severity of the disease and risk of contagion. Fees charged for vaccination against *peripneumonie*, for example, might be reduced below marginal cost, whereas the full cost of parasite treatment would be borne by the owner.

In deciding what fees to charge, we must also take into account the shape of the demand curve for veterinary services as well as the cost of supplying them. It is possible that there are economic rents accruing to the monopoly supply of these services if the demand for vaccinations is quite inelastic over a rather large range of prices.[1]

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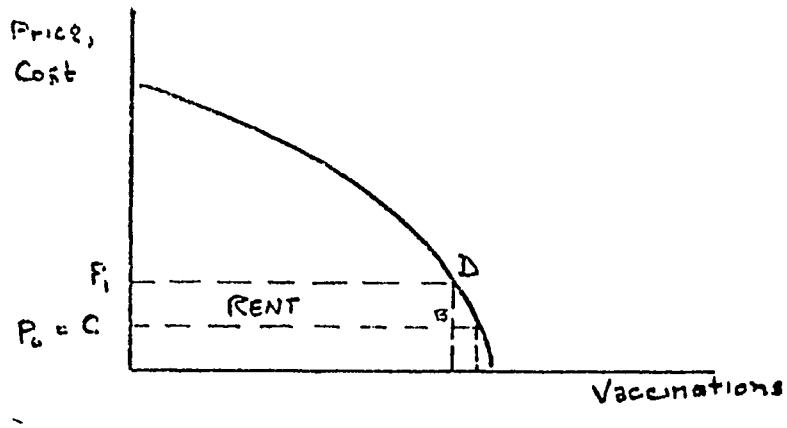
1. Our inquiries about the potential level of charges for vaccinations could be interpreted as indicating this since each figure people gave us was based on an implicit assumption that virtually all herders would find it economic to pay.

If the cost of providing the vaccination is at the lower end of this range, rents could be generated and be used to expand other services to and activities in the livestock sector. Choosing a level at which to set service charges thus would be a function of desired revenue over and above the direct cost of providing the service. Figure I illustrates these possibilities.

FIGURE I



If the cost of providing services is equal to C and the price charged is chosen so that P_0=C, there will be no rents and costs will be exactly covered by revenues The price, however, could be raised to P_1 without significently affecting the number of vaccinations purchased. In this case, revenue equal to the area P_1DBP_0 would be accumulated in addition to that which would be necessary to cover costs.[1] This revenue could be used to pay for other services and activities in the livestock sector. To the extent that these public activities were valued more highly than the private income foregone, this could be an economically efficient fund raising policy.[2]

It is also possible (though less likely) that the demand for veterinary services is price elastic. If this were the case, there would be little scope for raising excess revenue. In addition, it

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1. This possibility exists, of course, only to the extent that the provision of veterinary services is a government monopoly.

2. Such a policy would, of course, have to be compared with alternative means of raising revenue before it could be recommended unequivocally.

would also be necessary to consider externalities associated with vaccinations. It is often claimed that vaccinations have a social value that greatly exceeds their value to individual herdsmen and that they should therefore be provided free of charge. Although it probably is true that when the technique of vaccination is first inroduced a certain learning period is necessary before cattle raisers come to appreciate its value, there is little basis for believing vaccinations should be free once that value is recognized. An individual herdsmen can protect himself completely by having his whole herd vaccinated. Should he do so, he would never be willing to contribute money to assure that his neighbor's herd is vaccinated as well.

This does not, of course, mean that consumers of beef should necessarily be indifferent about whether the herds are vaccinated or not. A loss of cattle to disease means higher meat prices and lower consumption. But willingness on the part of consumers to subsidize vaccination comes not from the fact there are associated externalities but from the consumer's surplus that measures the value of beef to consumers over the price they actually must pay for it. This is a much weaker rationale for subsidizing vaccinations than the externality argument, however, since there is consumer's surplus attached to virtually every consumption good.

Costs of providing vaccinations and veterinary services. To effeciently choose a policy for establishing prices and allocating revenue, one must know the costs of the various functions involved. Unfortunately, there is very little information available on either the average or the marginal cost of producing,delivering, and administering vaccines. The only figures we have are total budgets for a limited number of years, and these cannot be broken down well according to function since the cost of transporting vaccine is included in the budgets of both the Laboratoire Central and the Service d'Elevage.[1] Using these total budgets, it is possible to estimate the average cost of vaccine per dose delivered as well as the average cost of veterinary services under different assumptions.

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1. Vaccines are delivered by the Laboratoire Central to the regional storage facilities of the Service de l'Elevage, but there is no separate allowance in the budget for this.

In 1974, the operating budget for the Central Laboratory totaled 50,289,000 MF, of which 29,289,000 MF was for personnel and 21,000,000 MF was for supplies. It is not possible to ascertain how much of this went for transport to the regions, nor is it evident whether other items such as electricity or other goods and services provided by the government are included in the budget. Assuming this figure is representative of actual operating costs, the average cost of each of the 5,396,030 doses of vaccine delivered was 9.3 MF and of each of the 3,056,809 doses administered was 16.5 MF.

This figure includes no contribution to capital investment-(205,000,000 MF in 1974, all paid for with foreign aid), nor does it include any depreciation or reserve for replacement of capital. As a result, it clearly understates the actual average cost. On the other hand, it seems likely that the marginal cost of increasing production is considerably below the actual average cost. The Laboratory could probably double or triple its vaccine output without increasing its personnel and with added expenditures only on some relatively inexpensive supplies. Thus a figure of between 16 and 24 MF, with an average of 20 MF, per dose administered may well be a reasonable estimate of future average costs as demand and output increase.[1] This, of course, is an average figure for all vaccines and does not permit us to differentiate price based on variations in marginal cost.

We can also estimate the average cost of a veterinary visit to an animal in the field, based on personnel and material expenditures of the regional offices. These totaled 299,085,000 MF in 1974. Dividing by the total number of animals visited (including sheep and goats), the average cost per visit was 32.8 MF.[2] Since it is difficult to interpret precisely what constitutes a "visit" to an animal and probably more difficult to charge for one if no vaccination or treatment were given, the average cost per vaccination or treatment of 91.7 MF is interesting as a meaningful measure of cost. Many of these vaccinations or treatments, however, are given at the same time that cattle are vaccinated against rinderpest. Average veterinary cost per rinderpest vaccination administered was 159.6 MF.

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1. In terms of 1974 prices. When the Laboratory buys vaccine from the Veterinary Laboratory in Dakar, it pays between 10 and 20 MF per dose. This price is unreliable as an estimate of cost, however, since it is a negociated price and the Dakar Laboratory is no more likely to have an idea of its true cost than the Bamako Laboratory.

2. See Table 8 for figures on total animals visited, total vaccinations given, and numbers of vaccinations for rinderpest.

Estimated receipts from user charges. Although an accurate analysis of the value of receipts obtainable from user charges for vaccination and treatment depends on further studies of both the demand for and cost of providing those services, we can employ sensitivity analysis to provide some appreciation of the orders of magnitude involved. For this purpose we do not distinguish between charges made for various vaccines or treatments but simply assume that alternative fees of 25, 50, 100, or 150 MF are charged for each visit during which some service is performed. The number of visits is assumed to equal that required to vaccinate each calf against rinderpest for three successive years if 50 percent of the total herd fell within this 3-year age group.[1] Estimated receipts for each of these alternative fees are given in Table 9 for 1978 and 1988. The net deficit of the Service de l'Elevage from Table 7 is also shown for comparison.

Table 9

Potential Receipts from Vaccination Payments, 1978 and 1988

(000,000 MF)

Receipts	1978	1988
25 MF	59	125
50 MF	118	250
100 MF	237	500
150 MF	355	750
Net Surplus/Deficit (from Table 7)		
Hypothesis No. 1	29	-352
Hypothesis No. 2	-321	-1,096

Source: see text

It appears that a service charge of about 100 MF per animal vaccinated against rinderpest would cover much of the gap between anticipated expenditure requirements and the availability of funds to meet those requirements, even if material expenditures were raised to the level of salaries for personnel. If, in addition, there were charges for supplementary vaccination or treatment, the deficit could be even further reduced.

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1. See p. 23 for reference to the age composition of the Malian herd.

The distribution of receipts from user charges. If a service charge is to be instituted for vaccinations, funds must be collected, accounted for, and allocated among the activities that comprise the service in such a way as to ensure efficient and effective delivery of that service. This implies that funding should be dependable and respond to shifts in demand for the service. The best way in which this can be accomplished is to let the organization providing the services retain the revenue raised.

If this principle is accepted, it would be economically efficient to allocate receipts from service payments to various activities within the organization in proportion to their costs. As was mentioned earlier, there are three fundamental functions. production or acquisition of supplies, delivery of supplies, and contact with the herders. At least two of these activities, production and delivery of supplies, are very well suited to being funded through some form of market sales system

As Laboratory output increases, costs increase as well, so it is sensible to make expenditures a function of output.[1] The same is also true with respect to delivery since as the number of doses delivered rises, delivery costs increase Many of the costs faced by veterinarians in the field are also related to the number of vaccinations given, although not in so clearly a linear fashion as with production and delivery. If a veterinary agent is visiting herders, for example, his transportation costs increase with the number of visits.

In any case, it would be preferable that each of the three functional areas has a budget that depends at least partially upon the level of activity rather than having expenditures fixed annually. A precise linkage of expenditures with level of activity requires a careful analysis of the costs of each function, but using our earlier hypothetical estimates, the allocation might be similar to that shown in Table 10 if a 100 MF charge were levied for each rinderpest vaccination in 1978. As the number of vaccinations rises, the revenue would increase as well to compensate for the increased cost of providing them.

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1. It is very likely, given the size and productive capacity of the Lab, that over any feasible range of production its marginal costs are less than its average costs. Economic efficiency would require that it be given a lump sum budget to pay its overhead and that it then be paid at marginal cost for its output. A study would have to be done to determine the Lab's cost function.

Table 10

Allocation of Vaccination Revenue

	Per Vaccination (MF)	Total Revenue (000,000 MF)
To Central Lab for vaccine	20	47.4
For transport of vaccine	30	71.1
Service d'Elevage	50	118.5
Total	100	237.0

There are a number of institutional alternatives that might be considered in implementing such an allocation of revenue. One extreme would be to have the entire system operate somewhat as it does now with all the revenue going to a central source which makes decisions about allocation.

Another extreme alternative might be to decentralize the system almost completely, turning the transportation function over to the private sector (with Air Mali as the only available air service), and making Laboratory vaccine production depend solely on revenue from its sales. The veterinarians could also be given a large degree of autonomy, being required to buy the vaccine f om the Lab and pay for its transportation and for their own operating expenses from the fees they collect. Some fraction of their compensation could also be made a function of the number of vaccinations.

A third alternative might be some combination of these two extremes with the government retaining control over all three functions but making budgets depend sufficiently upon output to provide incentives for efficiency as well as assuring adequate funds to provide for a high quality of services. This is extremely important since the whole concept of charging for vaccinations and other services depends fundamentally upon maintaining a high level of service quality [1]

Development Projects.

The Government of Mali is currently undertaking a number of important development projects in the livestock sector. These range from well-identified intensive fattening operations, such as the Tienfalla Forest Cattle Holding and Feeding Station, to more vaguely defined animal health care and range management projects, frequently pilot in nature, which may be extended over large areas. For the former, both the costs and benefits and the people to whom these apply are well known; for the latter, economic analysis is much more difficult because of their experimental nature and because of important externalities which may exist. In either case, though, there will be substantial demands for recurrent expenditures. It is mainly with respect to the revenue sources for these expenditures that these types of projects differ.

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1. As noted before, animal health taxes have some of the characteristics of service charges. To the extent that exports expand, for example, tax

Intensive Fattening Operations. Intensive operations by definition are highly concentrated within limited spacial locations. As long as private returns exceed the costs of fattening animals in holding areas and feedlots, these costs can be easily collected and should be borne by the owners of the cattle. If a project has some demonstration value, all or part of the initial investment and perhaps some operating costs might be subsidized for a time by the government. Eventually, however, the fees paid by owners must cover amortization and interest charges, as well as the cost of personnel, feed, and other operating expenses. Since, on balance, these projects should ultimately cost the government nothing in the way of recurrent operating expenditures, they are not considered further here.

Extensive Fattening Operations. The most important of these is the *embouche paysanne*, though supplemental feeding operations on the open range might also be included in this category. Fattening of cattle by sedentary farmers involves their purchase at the beginning and sale at the end of the dry season, when the price per kilogram of carcass weight has increased considerably. At current prices, an animal could be purchased for 60,000 MF, held for 90 days, and sold at the end of that period for a profit of almost 20,000 MF after paying all interest charges and the cost of supplementary feed estimated at 120 MF per day. The government intends, at least initially, to provide insurance, extension services, and some materials without charge.[1] ECIBEV, the responsible government agency, will therefore have to receive a recurrent subsidy to cover the cost of these services This subsidy may be justified for a time by the demonstration value which the project has, benefitting not only participants but other farmers as well. Eventually, too, extension costs should fall as farmers become familiar with the fattening operation, and it is probably only the indefinitely continuing cost of extension services which should be considered as a recurrent cost to the government agencies responsible for livestock.

Given the margin of profit, this cost can probably be recovered in the repayment made by farmers to ECIBEV at the time the animals are sold. The major problem, however, is ensuring that repayment is made. ECIBEV hopes initially to accomplish this by starting the program with the best farmers and obtaining from them a personal guarantee of timely repayment. Since these farmers are also heavily involved

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revenues increase concurrently with demand for services. Thus expenditures could be made to depend to some extent upon output. This tax would not, however, permit the kind of decentralization of pricing and output decisions used with service charges.

1. In addition, the interest charge of 6 percent appears to be subsidized since exporters have to pay 12 percent for their borrowed capital. Cotton seed is also subsidized in so far as the domestic price (FOB minus the export tax) rather than the FOB price is charged, with an adjustment for transportation costs. Neither of these subsidies, however, must be financed by the government livestock agencies.

with the program of Opération Arachide, they may have a great deal to lose by defaulting on their payments to ECIBEV. In addition, ECIBEV will assist with cattle marketing, which should help improve repayment though it will presumably raise ECIBEV's costs somewhat as well. In any event, given the fundamental profitability of this type of operation the major problem lies in developing a system that will ensure repayment of credit, where that repayment is adjusted to include all relevant recurrent government expenditures

Extensive animal health and range management operations. It is this category of project that poses the greatest problem in devising revenue collection policies that permit recurrent expenditures to be covered. In part, the difficulty results from the extensive nature of the operation, which makes effective administrative and financial control elusive; in part, it is because the benefits are hard to quantify and may involve substantial externalities, as, for example, when proper range management helps to preserve or restore the natural environment. The only project in this category which has been fully evaluated from an economic and financial point of view is the Mopti Livestock project being financed by the World Bank. Other projects are similar in many respects, but will differ somewhat in emphasis. The Kayes-Nord project, for example, will involve more intensive range management and supplemental feeding; the Nara-Est project will call for substantial resettlement on open land; the Zone Pasturale project south of Dilly will extend the results of the sociological and technical pilot work being undertaken in that area.

The Mopti project principally involves the construction of permanent watering facilities,which opens up new land for grazing, and the provision of animal health and extension services. An important component of the project will be the establishment of effective grazing control through a combination of incentives, regulation, and education. In return for their cooperation in limiting herd size, herdsmen will be granted user rights to the water and new grazing land. These rights will be valuable and one must consider whether or not a charge could be made for them to help finance the recurrent costs of the project and how much that charge might be in relation to those costs.

We roughly estimate the upper limits of what a herder might be willing to pay for such rights using figures obtained from the Bank's appraisal report of the project.[1] The calculations are necessarily crude but offer some insights into the possibilities and problems involved in instituting user charges. The Bank's report contains estimates of the value of incremental output due to adoption of the project. If this increased output could be obtained by the herders with

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1. International Bank for Reconstruction and Development, *Appraisal of a Livestock Project, Mali*, January 10, 1975.

no increase in cost or effort to themselves, it would measure the value to them of the project and would be the upper limit they would be willing to pay as a group to have the project undertaken. To convert the aggregate incremental value to a figure meaningful to the individual herdsman, it is necessary to divide by the total projected herd size under project conditions. Table 11 gives the estimates over a 20 year period for total annual incremental value of output, herd size, and annual incremental value per animal.

The figures shown in Table 11 are, of course, upper limits to the value per head of cattle that a herder would assign to having the project, assuming all herders benefit equally. One must subtract from these the cost of time, vaccinations, and other inputs that are required to produce the increment. If we assume that 30 percent of the incremental value is absorbed by these kinds of implicit costs, the figures in Row 4 of Table 11 represent net incremental value per head [1]

In order to compare the incremental value per head with similar figures for continuing operating costs, we must convert the latter to a per head basis as well We assumed that operating costs in the 5th year of the project, totaling 548,300,000 MF per year, represent an equilibrium level. Dividing by herd size for each year, we arrive at the annual contribution per animal that must be made if all operating costs are to be covered by a charge on cattle raisers. With the exception of the first five years, the costs (and assumed contribution) are well below the average increase in value per head.

Capital costs per head were also estimated to evaluate the possibility of recouping total costs so as to have a fund available for reinvestment at the end of the 20 year project life. These costs are shown in Row 6 and the total of capital and operating costs in Row 7. It is evident that there would be difficulty covering total costs before year 7, and even after that the margin of estimated incremental value per head is greatly reduced if total costs are collected.

Throughout this discussion, we have implicitly assumed that all herders in the area affected by the project benefit equally from it and that the institutional arrangements permit charges to be assessed on all. Other outcomes where only some of the herders actually participate in the project, however, are more likely. One possibility, would be if the herders who participate and those who do not benefit equally because the project not only creates new water and grazing areas but also relieves pressure on old ones. If this were to occur,

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1. If there were an opportunity cost to the capital involved in investment in the increased herd, this would also need to be subtracted, but, given the paucity of alternative investments, this cost is probably close to zero and would be a function more of consumption than of investment opportunities.

Table 11

Value of the Incremental Production from the Cattle Herd

Year of Project	1	2	3	4	5	6	7	8	9	10	11	12	13	14-20
Incremental Beef and Milk Production (Million MF)	0	1,292	1,058	988	1,725	2,175	3,023	3,499	4,326	4,055	3,627	3,305	3,294	3,168
Herd Size (thousands)	1,556	1,624	1,714	1,815	1,897	1,955	1,991	2,014	2,001	1,989	1,892	1,980	1,980	1,980
Value of Increment/ Animal (MF)	0	795	617	544	909	1,112	1,518	1,737	2,162	2,288	1,745	1,669	1,640	1,600
70% of Incremental Value/ animal (MF)	0	556	432	381	636	778	1,063	1,216	1,513	1,602	1,222	1,168	1,148	1,120
Operating costs/ head [a]	352	338	320	302	289	280	275	272	274	277	280	280	280	280
Capital Costs/ herd [b]	375	360	341	322	308	298	293	289	292	295	298	298	298	298
Total Costs/herd	727	698	661	624	597	578	568	561	566	572	578	578	578	578

Source: International Bank for Reconstruction and Development, Appraisal of a Livestock Project, Mali, January 10, 1975

Notes: [a] Based on costs in the fifth year of project.

[b] Five years of average operating costs were subtracted from total expenditures during the first five years to obtain an estimate of total investment. This was amortized over 20 years using a 10 percent rate of interest. Annual amortization was then divided by projected herd size to obtain an estimate of the capital cost per head.

it could be argued that collections should be made in the form of a universal tax since it would be inequitable to assess fees against only those participating directly in the project while others benefit equally and pay nothing. If both benefit, but not equally. assessing appropriate charges becomes more complicated.

Another possible situation is one in which access to the project area is limited so that belonging has a greater value than not belonging. Here a charge for the use of the area or for the water that makes that use possible could be adjusted in such a way as to regulate grazing in accordance with desirable range management practices. The two goals of user charges, i e., to cover costs and to control grazing, may or may not be consistent, depending in part on the responsiveness of herdsmen to the rate charged Little is known, at present, concerning the degree of this responsiveness and the conditions upon which it might depend. There is, therefore, a need for further study and, more importantly, for a series of pilot experiments to see the effects of varying charges on the use of pasture and water. These should be combined together in different ways with techniques of education and enforcement to see which is the most effective, overall combination.

What has been said about fees charged for the use of pasture and water also applies to other services and materials provided within project areas These might include special health services, material inputs such as mineral supplements and feed, physical infrastructure such as markets and abattoirs, and extension services related to animal husbandry and range management In general, the livestock owner will be more willing to pay for the cost of these inputs the greater and more obvious is the relation between the service or material provided and the resulting gain in production. Most herdsmen, for example, are aware of the value of salt blocks for their animals and are willing to pay for these. They may, on the other hand, be less knowledgeable concerning the value of such inputs as internal parasite treatment. In this case, there is a strong argument for subsidizing the input as a form of education. Once the process of education has ended, however, the subsidy should be discontinued In addition, to the extent that the herdsman is able to internalize all the gains resulting from that education, i.e., there is no demonstration effect on others, he should eventually be required to pay back to the state the amount of subsidy he received Although this requirement may administratively be quite difficult to impose on individuals, it is a principle which can perhaps more easily be applied to groups of owners.

Another aspect of grazing control which might be relevant for other development inputs is the importance of externalities. To the extent that the actions of one producer cause others to incur benefits or costs directly and continuously, there is an argument for the government to intervene with a recurrent subsidy or tax so as to cause the marginal social benefit to equal the marginal social cost. This was mentioned in conjunction with the problem of contagious disease in the

previous discussion of payments for veterinary services.] It is also the major reason why the problem of overgrazing exists, i.e., individual herdsmen do not take into account the effect which their animals' grazing has on the pasture left for others. Where livestock might contract and pass on contagious diseases if not vaccinated, the payment made for vaccination should probably be less than the marginal cost of providing that service. Where overgrazing exists a pasture or water use charge may be imposed which will create a sufficient disincentive to eliminate that problem. In general, however, externalities are probably less important for other activities associated with development projects. In addition, they are usually difficult to quantify. As a result, although one should attempt to identify externalities where possible and take them into account in establishing a system of incentives, the guiding principle in the absence of evidence to the contrary should be that services and materials provided by the government must eventually be paid for by the owners who benefit.

On balance extensive development projects should ultimately pay for themselves since the major externality, overgrazing, is a negative one and should be offset by a tax or user charge sufficient to cause the marginal private cost to the herdsman to equal the marginal social cost, including both the marginal cost of government activity and the marginal cost to other herdsman of reduced pasture. As long as the cost of government participation in the project is relatively constant, so that marginal cost approximates average cost, all recurrent expenditures should be covered.

The major problem as far as extensive development projects are concerned is not that user charges would create a system of adverse incentives--on the contrary, they would be favorable--but that collection costs are likely to be high. An important reason for this is that much of the land may be already used--and overgrazed--by herdsmen who participate in the project. Where this is true, a charge for the use of the land or water on it is likely to be strongly resisted since the incidence of the charge is probably very similar to that of the livestock tax, i.e., the burden falls almost completely on the producer. In addition, the charge tends to be regressive, increasing the inequality of wealth and income distribution. As noted earlier, however, this tends to offset the trend towards less regressivity of the tax structure caused by the rise of West African meat prices. On the whole, in any case, the advantageous incentives which are created by these user charges probably outweigh the disadvantageous wealth and income effects, especially in view of the severity of overgrazing.

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1. Equating marginal social cost with marginal social benefit can only be done in a probablistic sense when vaccinations are considered.

To solve the problem of collection it will probably be necessary to concentrate first on areas where the land is underutilized, in most cases because of lack of adequate water. Here the government's action will be seen as increasing the value of the land, and herdsmen should be willing to pay something for the right to its use. In other areas, the government may be able to work with the traditional political authorities in a process of mutual education to improve range management practices and possibly limit the use of the land by outsiders by imposing a charge on their use of water or pasture. This approach has been suggested for testing at Dilly, where it apparently was the practice in pre-colonial times.

INDIRECT SOURCES OF REVENUE AND CREDIT

Indirect sources of revenue.

There are two potential indirect sources of taxation that derive from increased output in the livestock sector: import duties and taxes on domestic production. Each of these occurs because additional income and foreign exchange from increments of livestock production are spent in part on goods and services which are taxed in this way. As mentioned earlier, these indirect sources of revenue are interesting because the cost of collection is probably lower than for taxes and fees assessed directly on the sector.

Unless the country is accumulating foreign exchange reserves, which is unlikely for Mali today, each unit of foreign exchange earned from exports eventually is spent on imports. In most instances, these are subject to the payment of duty In 1970, the average tax rate on imports was 28 percent. In 1973 as a result of numerous exemptions for essential goods, it was 20 percent. If one assumes that these exemptions will be diminished now that the drought is over, it seems likely that the average rate should return to at least 25 percent. Using the 1974-78 Plan estimates for the numbers of animals exported in 1978 and 1988, and applying 1975 prices (*valeurs mercuriales*) to these, we estimate that livestock exports will earn 23,390 million MF in 1978 and 76,000 million MF in 1988. With a 25 percent average import duty government revenues from this source would equal 5,847 million MF in 1978 and 19,000 million MF in 1988. Even if a substantial percentage of imports is smuggled into Mali without paying duty, government receipts from this source should still be far greater than the total government expenditures for livestock projected in Table 4.

The same sort of rationale applies to the consumption by herders of internally produced goods and services as a result of their increased, project-generated income. To the extent that domestic production of these goods and services is taxed, the government derives revenues indirectly via this source from the livestock sector. These domestic expenditures and taxes are much more difficult to identify, however, so we have not estimated their possible magnitude.

The revenue potential from both these sources is such that if the government is unable to raise sufficient revenue directly from the livestock sector to support the operating costs of its projects, it should not hesitate to consider paying these costs out of the general budget, which would surely benefit from the increased output they generate.

Financial Markets.

One of the major problem areas in the livestock sector is that of credit. The 1975-78 Plan projects a need for approximately 850 million MF of credit to be administered under the direction of OMBEVI. The credit is to be issued primarily in connection with feed lots and *embouches paysanne* to purchase cattle and pay other expenses.

These credit projects are a logical part of the general problem examined in this study since if credit is to continue to be available to the livestock sector in increasing amounts, it is clearly the Malians who must provide it. In this sense it can be considered as involving recurring expenditures, with the recurring portions being equal to the annual increase in capital being turned over plus any default that occurs. Successful projects involving extension of credit are obviously self-financing over the long term since the money is paid back as they come to fruition. The problem is thus not one of fashioning a method to collect revenue to pay for real resources but of finding means to expand and make available to a wider range of people an increasingly greater stock of revolving credit.

Because of this functional difference between the provision of credit and other projects where access to and payment for some particular good or service is involved, it seems useful to consider the provision of credit and establishment of financial markets separately from the other projects discussed earlier. Perhaps it would be well to emphasize at the outset the distinction that must be drawn between the terms "provision of credit" and "establishment of financial markets" for they are indeed two quite different things.

Provision of credit is the more limited, and in the long run, probably the least useful, of the two. It implies that the government is undertaking one of the functions of a financial intermediary and using government revenue (presumably obtained from taxation) to make loans to the livestock sector. This is a useful activity, as far as it goes, but it means that credit to the livestock sector is competing with all the other capital and consumption expenditures the government undertakes with its limited budget. More importantly, provision of credit in this fashion shifts emphasis away from the need to establish truly functional financial institutions and financial markets.

A financial intermediary serves the needs of both savers and investors. It provides a means for channeling funds from individuals who desire to postpone consumption or wish to hold some form of wealth other than cattle to individuals needing credit to buy cattle or pay for current expenses. Numerous writers have commented on the behavior of herdsmen, with the usual observation being that they sell cattle only when they need money to purchase necessary consumption goods, pay for a wedding, or pay taxes. The nearly universal conclusion is that their primary goal is the accumulation of cattle and that one of the essential functions of taxes is in fact to force them to market their animals.

Without attempting to judge the validity of this interpretation of herdsman behavior, one can find an alternative interpretation that seems equally plausible and yet does not require a belief that these people are insensitive to market forces. Presently herdsmen have virtually no ways of nolding wealth other than in cattle or in cash. For nearly all of them non-interest bearing cash, given problems of security and inflation, is almost certainly inferior as a protfolio asset, even over a relatively short period, to cattle. Thus it would be surprising if they ever sold cattle except when they needed to pay for some consumption item.

If the second interpretation of herdsmen behavior is correct, the establishment of financial intermediaries, in addition to providing a source of credit, would also lead to a greater monetization of the economy and permit more rational and price-responsive marketing behavior. With access to interest-bearing, secure (perhaps guaranteed) deposits, they could both diversify their portfolios and alter their marketing and production behavior, selling when they think prices are high, investing in a financial asset, and repurchasing later when they believe prices are low.

These opportunities for portfolio diversification into financial assets are important if financial institutions are to function. And the financial institution themselves are essential if increasing amounts of credit are to be provided to the livestock sector in a reliable way. Unlike range management projects and veterinary services, for which charges can be levied, the provision of growing amounts of credit cannot be accomplished except through the creation of financial institutions. The government budget cannot be relied upon as a source. Finally, the more monetized and financially oriented herdsmen become, the more feasible it is to institute and collect charges for services and access to projects.

CONCLUSIONS AND RECOMMENDATIONS

The analysis contained in the preceding section has revealed at least as much ignorance as knowledge about the problems of funding the recurring expenses of activities in the livestock sector. As a result, many of our recommendations are passive in the sense that although they point toward a particular action, they suggest that much more information needs to be gathered in order to arrive at definite policy decisions.

Before outlining these recommendations, however, we should make explicit the potential magnitude of error in certain of the computations and the degree of confidence we place in the numbers obtained.

The expenses involved in servicing the livestock sector and the revenues that can be obtained from it are both direct functions of the size of the herd and the number of animals marketed for export and domestic consumption. Thus most of the forecasts of expenses and revenues are based on the projections of herd size, exports and domestic slaughter that are contained in the 1974-78 Plan. To the extent that the Plan forecasts are not realized, our forecasts will also be in error. The magnitude and direction of error will be the same for both revenues and expenses, however, so the differences between the two will be less affected than the individual figures. The error thus becomes more one of timing than anything else. If the herd increases less rapidly than projected, our figures apply to a date further in the future than actually indicated; if it increases more rapidly, they apply to an earlier date.

Nearly all of the assumptions underlying the cost projections for providing services to the livestock sector are tentative. A major objective in presenting them in this form is to elicit comments and discussion which will provide a basis for making a more accurate assessment of the level of services necessary and the costs of providing them in the future. In most instances we have used alternative assumptions in making the forecasts and thus have bracketed the range we consider to be desireable or feasible.

Our estimates of indirect revenue from imports financed with livestock exports are based on total exports of animals and assume an average import duty of 25 percent. The estimated indirect revenues are approximately 2.5 times the maximum total government expenditures on the livestock sector in 1978 and nearly 4 times the projected maximum expenditures in 1988. As stated earlier, these projections are both based on herd size and both vary in the same direction if herd size varies. We thus have much more confidence in the relative magnitudes than we do in the absolute size of the figures. These relative magnitudes support our general conclusion that the livestock sector is capable of generating very large revenues, both directly and indirectly, relative to the costs involved in developing and sustaining it. As a result, it is important that short-term budgetary problems not be permitted to hinder the realization of this potential.

Specific recommendations that follow from our analysis are listed below. Support for the recommendations can be found in the body of the report and is not repeated here.

1. We recommend that the following steps to be taken with respect to the livestock tax system and that a study be undertaken to determine practical means of implementing them (see Annex B for an outline Scope of Work of such a study).

a. The procedures required of livestock exporters to obtain the necessary documentation and pay the taxes and fees should be simplified so that all payments and paperwork, with the possible exception of inspection of animals, can be taken care of at one location.

b. Collection of the export tax should be improved. Consideration should be given simultaneously to two kinds of policies: (1) Improved enforcement capability for the Douane, particularly more mobility for control of frontiers. Consideration should be given to the purchase of motorcycles specially designed for desert and off-road travel. (2) Variation of the tax rate to better meet certain objectives such as maximizing net revenue, increasing the FOB price, and maintaining a reasonable price to domestic consumers.

c. Means should be found to improve the assessment of the livestock tax, possibly by relating this assessment more closely at the local level to decisions regarding expenditures

2. The health taxes collected by the Service d'Elevage on exported animals should be retained by them as payments for the inspection services provided. The same might also apply to the *Taxe d' Abattage*, also collected by the Service.

3. A program of charging for Veterinary services should be instituted on a pilot basis in areas where the veterinarians are already well established and the value of vaccinations and other health services is appreciated by the herdsmen. Different fee scales might be set for different areas in order to judge the responsiveness of the herders to the pricing policy. One possible fee structure might involve a fixed fee per animal paid for the visit and a rinderpest vaccination plus an additional small charge for materials used in any additional treatment. Once such a pilot program is established, it should be carefully monitored on a statistically sound basis to ensure that information is reliably gathered and processed so that the program can be successfully replicated on a more widespread basis.

4. The cost structure of providing veterinary service should be studied from the manufacture of vaccines, through their transport, to the delivery of vaccinations and other services to the herdsman. Included in the study should be an analysis of the cost of materials used by the veterinary agent and the extra living expenses he faces while living in the field and supporting a family which may be located elsewhere. The study should have two objectives. One would be to analyze the efficiency with which veterinary services are currently provided compared with alternatives such as having the Laboratoire Central furnish all vaccine transport or distributing vaccines at cost through a system of animal drug pharmacies. The second would be to develop a rational internal pricing structure for the various functions in order to determine how revenues should be allocated among these functions. Particular attention should be paid to the compensation structure for veterinary agents in the field.

5. Socio-economic structures should be developed which permit the establishment of control systems limiting access to water and grazing areas developed by new projects. Charges should be levied both on nomads and permanent residents for the right to use these new facilities. At a minimum, the charges should be sufficient to cover the recurring costs of management of the project. If possible, charges should also cover part, if not all, capital expenditures so as to provide for the financing of new projects and the replacement of capital equipment in old ones.

The control systems and user charges should be instituted on a pilot basis as soon as possible in areas where the response to these charges can be observed and analyzed by sociologists and economists-perhaps at Dily where a large amount of sociological work has already been done. Since the objectives of the control systems include both range management and revenue collections, their establishment must be well planned and involve a mixture of education, enforcement and incentives.

6. The possibility should be explored of earmarking a portion of the export tax for the Service d'Elevage and enlarging the amount going to OMBEVI as its responsibility for development projects increases. The export tax is a desirable vehicle for financing livestock activities because its base increases as the sector expands, and income of the livestock agencies would be related to their performance.

7. In order to better estimate the net benefits accruing to herdsmen from livestock projects and thus improve the basis for setting user fees, a study should be done of the actual and implicit costs the herdsmen incurs in raising and marketing an animal. Only the difference between these costs and the market value should be considered a rent due the project. The study should cover both extensive projects and *embouche paysanne*.

8. Projection of potential export earnings, government revenues and incidence of taxation requires knowledge of demand and supply conditions. A study should be undertaken and updated periodically of demand and supply functions for livestock. Annex A of this report discusses recent attempts to estimate demand functions for Malian cattle.

9. Information on the level and timing of recurrent expenditures for projects and services is an essential input to decisions on user charges and budget projections. Projection and aggregation of these expenditures should be undertaken as part of the original planning and evaluation process for projects done by the Institute d'Economie Rurale. These should be readily accessible and made available to the Ministry of Finance.

10. Profitable livestock projects are frequently long term in nature and do not result in increased direct income in the early years. Operating costs during this period could thus be considered an investment in the form of working capital. If the government is not capable of meeting these costs, a good case can be made for requesting foreign assistance to cover this working capital requirement since such an investment is essential to the success of the projects.

11. Consideration should be given to expanding and liberalizing the EXIC procedure to make it legal and easy for commodity importers and livestock exporters to form partnerships which take advantage of the use of EXIC. This would encourage legal exporting and thus generate government revenue. It should also help make exporting of livestock easier and more efficient by opening up sources of financing that would otherwise not be available.

12. An extensive study should be undertaken of the feasibility of establishing some form of financial intermediary system to facilitate both saving and credit in the livestock sector. The study should include an analysis of acceptable institutional arrangements as well as policies with respect to interest rates, loan requirements and deposit guarantees. (See Annex C for an outline Scope of Work.)

ANNEXES

Annex A

Estimation of the Price Elasticity of Demand for Beef in Abidjan and Bamako

Recently there have been several estimates of the price elasticity of demand for beef in West Africa. Although the estimates are still tentative and must be verified using additional data, they probably indicate the orders of magnitude involved, at least for the Abidjan market Given recent marked increases in beef prices, some notion of price elasticity is essential in making projections of the demand for Malian cattle.

The first of these estimates was made by Roger Montgomery using quarterly data for Abidjan for the years 1967-74. Employing single-equation, least-squares regression analysis, the following equation was estimated:

$$Q_B = \underset{}{6.1708} - \underset{(0.0029)}{0.0067}\, P_B - \underset{(0.0101)}{0.0548}\, P_R + \underset{(0.0036)}{0.0051}\, P_F + \underset{(0.1741)}{0.3292}\, D_1 + \underset{(0.1712)}{0.2285}\, D_2$$

Q_B is beef consumption per capita
P_B is price of beef
P_R is mean price of yams, manioc, and plantain (unweighted)
P_F is price of fresh fish
D_1 is seasonal dummy variable for months of April, May, and June
D_2 is seasonal dummy variable for months of October, November, and December.

Standard errors are shown in parentheses below the regression coefficients, all of which are significant at the .05 level of confidence except for those relating to P_F and D_3; and these are significant at the .10 level. The coefficient of determination, R^2 = 0 7999, is significant at the .01 level.

A word of explanation concerning several of the variables. The quantity of beef consumed in Abidjan is assumed to equal that resulting from cattle slaughtered at the local abattoir plus imports of beef meat from other countries. Prices are collected by the Directon de la Statistique in African markets. The dummy variables are introduced to take into account seasonal factors and to indicate primarily the

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1. Roger Montgomery, *Declining Demand for Beef in Abidjan. Little Aid-Cum-Trade for the Sahel*, CRED, University of Michigan and CIRES, University of Abidjan, 1975

decline of consumption during the summer when many Europeans are on vacation. Real per capita income was excluded as an independent variable because there is evidence of little change during the period considered.

The results strongly indicate the importance of relative prices in influencing the demand for beef The coefficients are all in the expected direction That of P_B is negative indicating a decline in its consumption as the price of beef rises. The coefficient of the price of starchy staples is also negative, since these are complements of beef, e.g., as the price of these staples increases and less is consumed, there is less demand for beef used in sauces. It may also be that variation in P_R is related to a decline in real income, given the importance of these staples in the diet, and it is this income effect which predominates. Fish is generally assumed to be a substitute for beef, and its coefficient is correspondingly positive.

The equation was estimated in linear form. To convert the coefficients to elasticities, we multiply by price/quantity to obtain:

	E_{Q_B, P_B}	E_{Q_B, P_R}	E_{Q_B, P_F}
Mean	-0.324	-0.420	+0.148
Most Recent	-0.789	-0.917	+0.264

These elasticities indicate the percentage change in quantity demanded of beef for a given percentage change in price. They vary according to whether they are calculated for the mean or for the most recent price and quantity. In general, there is a tendency for the elasticities to increase in absolute terms over time, as prices have increased relative to the quantity of beef consumed. The assumption of a linear form for the demand equation, however, may not be justified If the equation were estimated in logarithmic form instead, the regression coefficients would be estimates of elasticities which are assumed to be constant over time.

In addition, there are several other changes which might be made to the preceeding analysis. Rice, for example, should probably be included along with the other starchy staples as a complement of beef, and a weighted rather than unweighted average price should be used, where weights are the proportion of each food consumed. The price of poultry might also be included as an additional substitute for beef. Furthermore, most of the price variations has taken place during the past five or six years, and it is this rather than a longer period which is probably most relevant to future trends. We might also make use of monthly, rather than quarterly, data to see if the estimates are changed or can be improved. Finally, the general level of prices should be included as an independent variable, either separately or as a denominator for the other viariables, converting them to relative prices.

A modified demand function was estimated incorporating these changes for the period 1970-75. The results are as follows:

$$Q_B = \underset{}{5\ 724} - \underset{(0.240)}{0.283\ P_B} - \underset{(0.079)}{0.294\ P_R} + \underset{(0.107)}{0.166\ P_F} + \underset{(0.243)}{0.318\ P_C} - \underset{(0.019)}{0.063\ SUM}$$

where all variables take the log form and where, in addition to the variables previously listed, P_C is the price of chicken and SUM is a dummy variable taking into account the effect of Europeans leaving Abidjan during the summer. The coefficient of determination, $R^2 = 0.358$, is lower than before, probably because we have taken out the trend due to the effect of inflation, but it is nonetheless significant at the .01 level of confidence. None of the price variables except P_F are significant, but all have the correct sign, and in each case the regression coefficient is greater than the standard error. Given the number of variables involved, this is a reasonably good result. It might be improved, however, if a lag structure were specified.

In any case, the revised results generally confirm those earlier presented, except that they indicate the existence of elasticities which are lower in absolute magnitude, especially when compared with these calculated for the most recent time period, i.e., the last quarter of 1974. In either case the price elasticity of demand for beef appears to be about - 3. A 10 percent increase in the price of beef, therefore, should lead to approximately a 3 percent decline in beef consumption.

The price elasticity of demand for Malian beef in Abidjan will, of course, be somewhat greater than this. It is estimated, however, that over one half of Abidjan's beef comes from Mali. Consequently, it is likely that this elasticity will still be relatively low.

Data available for estimating the demand function for beef within Mali are much less complete. Carefully specified price observations on cattle in the Kati market and on beef in Bamako have been gathered by OMBEVI only since early 1974. These, together with information on the quantity of beef obtained, from animals slaughtered at the abattoir in Bamako[1] do give us 23 monthly observations for 1975 and part of 1974. Market price data on substitutes and complements for beef were not available for the same time period, so these variables could not be included in the estimating equation.

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1 It has been estimated that only about two-thirds of the beef consumed in Bamako is slaughtered at the abbatoir, (OMBEVI, *Habitudes et Niveaux de Consommation de Produits d'Origine animale a Bamako Decembre 1974 - Septembre 1975, Projet FAO/PNUD Mali 71/523, Document No. 68, February 1976*). Whether this leads to biased results is not known.

Although the equation is incompletely specified and the number of observations is quite limited, an attempt was nevertheless made to estimate the price elasticity of demand

$$Q_B = 2.744 - 0.032\ P_B + 0.089\ RAM$$
$$\qquad\qquad (0\ 014) \qquad (0\ 047)$$

Q_B and P_B are both expressed in logarithmic form and P_B is deflated by a general food price index. RAM is a dummy variable introduced to take into account any shifts in consumption at the time of Ramadan. All coefficients are significant at the .10 confidence level and that of P_B at the .05 level The coefficient of determination, $R^2 = 0\ 275$, is significant at the 05 level

The surprising thing about this estimate of the price elasticy of demand for beef is that it is so low, equal to about .03. This implies that a 10 percent increase in price would result in only a .3 percent decline in consumption One reason that this is surprising is that beef is usually assumed to be a commodity with a relatively high income elasticity of demand, and this should result in its price elasticity being fairly great because of the effect on real income of a change in the price of beef. This is especially true since beef is relatively important item in total household expenditures, amounting to about 19 percent in Bamako compared with less than 8 percent in Abidjan.[1]

One possible explanation relates to the finding of the study by OMBEVI of meat consumption in Bamako that the income elasticity of demand for meat varies positively with income from a low of about .12 for an annual income of 12,000 MF per consumption unit to a high of about .8 for an income of 360,000 MF.[2] This indicates that the income elasticity in Bamako, where incomes average about 76,000 MF, may be much lower than in Abidjan - about 5 instead of close to 1.0. If this is true, it might account at least partly for the low value of the price elasticity On the other hand, we should recognize that the estimation of price elasticity is very crude and based on few observations More statistical work and longer time series are required before we can have much confidence in this result.

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1. OMBEVI, pp. 25,39 and Montgomery, p. 7.

2. OMBEVI, p. 34.

Annex B

Outline Scope of Work for a Study of the Livestock Tax System in Mali

Objectives

1. To study in detail the existing system for taxing the livestock sector, including

   a. existing procedures and institutions responsible for collection;
   b. differences between the value of taxes assessed and the amounts actually received;
   c. existing costs of collection in relation to amounts received.

2. To recommend ways of modifying the tax system so as to achieve various objectives such as maximizing net revenue, maintaining desireable price levels both internally and at the borders, relating in the minds of the taxpayers the collection of revenue more closely to decisions regarding expenditures, and increasing the equity of actual tax payment. Means for doing this might include for each type of tax

   a. changing the tax rate or base upon which this tax is assessed;
   b. altering collection procedures,
   c. providing greater means for the enforcement of tax laws;
   d. changing the institutions responsible for collection, especially in so far as this might achieve greater decentralization;
   e. eliminating or combining existing taxes or creating new taxes.

Methodology

This study should require about six man-months and should be undertaken by one or two experts in tax administration. In addition to consulting relevant documents and talking with officials in the government, both in Bamako and in the Regions, the team should visit the mos important customs posts, health control stations, livestock markets, and the abattoir. A preliminary report should be prepared and circulated within the Malian government for comment before the final report is written.

Estimated Cost

The study is estimated to cost about $75,000.

Annex C

Outline Scope of Work for a Study of the Development of Rural Financial Institutions

Objectives

1. To study the current rural credit system and financial institutions related to rural areas, such as the commercial banking system, government financial institutions and supervisory agencies, the Societe de Crédit Agricole et d'Equipement Rural (SCAER), the credit systems of the Opérations, and informal rural credit arrangements. This will require understanding how existing financial institutions relate to the monetary and financial systems of Mali and the France Zone.

2. To investigate how and when wealth is held and disposed of and how credit needs are satisfied by farmers and herdsmen at present. This will require substantial micro-level work.

3. To estimate the amount of resources which could be mobilized and channelled through a rural credit system and the benefits which farmers and herdsmen would receive by having access to alternative means of saving and borrowing.

4. To identify policy constraints hindering the development of rural credit institutions and to recommend specific projects which might be urdertaken to promote that development.

Methodology

The study would require the services of a rural sociologist, a rural credit economist, and a financial economist. Roughly twelve man-months would be required altogether. Primary data would be collected in the field during much of the study by interviewing farmers, herdsmen, and traditional money lenders. Government officials would also be visited both in Bamako and in the Regions, and relevant literature would be reviewed. A preliminary report should be prepared and circulated within the Malian government for comment before the final report is written.

Estimated Cost

The study is estimated to cost about $150,000.