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MALI LIVESTOCK SECTOR
A CONCEPT PAPER

Prepared for:

**The U.S. Agency For International Development
Bamako, Mali**

by

John A. Lichte

and

Scotty Deffendol

Under

**REDSO/WCA Indefinite Quantity Contract
No. 624-0510-I-00-9039-00
Delivery Order No. 10**

NOVEMBER 1990

EXPERIENCE inc.

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ACRONYMS/ABBREVIATIONS

| | |
|---------|---|
| ABH | Aliment HUICOMA (commercial feed mix) |
| AMERA | Association Malien d'Exportation des Ressources Animales |
| BNDA | Banque Nationale du Developpement Agricole National Agricultural Development Bank |
| CEBV | Livestock Marketing Agency in West Africa |
| CEAO | West African Economic Community |
| CMDT | Malian Textile Parastatal |
| CNRZ | Centre Nationale de Recherches Zootechniques National Center for Animal Science Research |
| CVL | Central Veterinary Laboratory |
| DNE | Direction Natinal de l'Elevage National Livestock Directorate |
| DRSPR | Division de la Recherche les Systemes de Production Rural Farming Systems Research Division |
| ECIBEV | Etablissement de Credits et d'Investiissement du Betail-Viande Office of Credit and Investment in Livestock/Meat |
| EIV | Ecoles des Infirmiers Veterinaires |
| EOPBMs | End of Project Bench Marks |
| FCFA | Franc de la Commuanaute Financiere Africaine (cfa) West African Franc |
| FN | Fane de Niebe (cow pea hay) |
| FSR | Farming Systems Research |
| GRM | Gouvernement de la Republique due Mali Government of the Republic of Mali |
| HUICOMA | Huilerie et Cotonnerie Malienne Malian Cotton Gin and Oil Extraction Plant |
| IER | Institut d'Economy Rural Institute for Rural Economy |

| | |
|--------|---|
| ILCA | International Livestock Center for Africa Regional Offices in Bamako (forage research) |
| INRZFH | Institut National de la Recherche Zootechnique, Forestiere et Hydrobiologique National Institute for Animal Science, Forestry and Hydrobiology |
| IPR | Institut Polytechnique Rural |
| ISNAR | International Service for National Agricultural Research |
| JMC | Joint Management Committee |
| MDST | Management Development Support Team |
| MEE | Ministry of Environment and Livestock Production |
| MIS | Management Information Service |
| MRNE | Ministry of Natural Resources and Livestock (was changed to MEE) |
| NGO | Non Governmental Organization |
| ODEM | Operation De Developpement de L'Eleavage A Mopti Mopti Livestock Developmrent Agency |
| OHV | Operation Haute Vallee Office for the Development of the Upper Valley of the Niger River |
| OMBEVI | Office Malien du Betail et de la Viande Malian Office of Livestock and Meat |
| PP | Division of Projects and Planning (in DNE) |
| PIDEB | Programme Integre de Deveoppement Economique de Bafaulabe Integrated Program for Economic Development of Bafaulabe |
| RAC | Radio Communication System |
| TA | Technical Assistance |
| TNP | Tilems Natural Rock Phosphate |
| USAID | United States Agency for International Development |
| VTM | Village Territory Management |

Executive Summary

Introduction

In order to contribute to economic growth, livestock sector programs in Mali need a stronger orientation towards animal production and commercialization. Animal health remains important as a means of reducing constraints to increased productivity. Poultry and small ruminant production and commercialization, which have been largely ignored in recent years, have the potential for important gains in productivity, and thus for economic growth. Poultry and small ruminants are consumed more regularly than beef by much of the rural Malian population; increasing their productivity would also contribute to achieving nutrition/consumption objectives. Cattle make up 70 percent of the biomass in Mali, and the majority of the livestock sector's 22 percent contribution to GDP and 36 percent contribution to export earnings. Given this importance, even small increases in cattle productivity can have a positive impact on the national economy.

Policy Issues for Consideration and Action

There are a range of policy issues related to agriculture in general and livestock more specifically which need to be supported in this sector. These include:

Land Tenure/Use

- Responsibility for and control of village land use by the village
- Progress on the establishment of more appropriate land tenure code(s).
- Policy formulation regarding the relationship between livestock and cropping, geographic location of livestock production and patterns of animal movement between populated areas, specifically the likelihood of survival of a livestock production system based on transhumance.
- Establishment of permanent marked trekking routes. Protection of established routes by the Government of the Republic of Mali (GRM).

Privatization

- Privatization of animal health services and slaughter houses.
- Recovery of the full cost of vaccines by the Central Veterinary Laboratory (CVL) and of vaccines and health service delivery by the National Livestock Directorate (DNE).

Trade

- Successful implementation of simplified export licensing procedures and the elimination of export and custom taxes on livestock exports.
- Elimination of barriers to the free flow of trade and rapid transport of animals and/or perishable products, particularly the multitude of police and customs stops which foster illicit rent-seeking behavior.
- Establishment of regular reporting and dissemination of livestock prices in order to make this information available country-wide.

Technical Improvement/Practices

- Processing of agro-industrial by-products for livestock feeding.

Women's Issues

- Emphasis on women as participants and direct beneficiaries of extension and project activities.

Recommendations for Livestock Commercialization

Private sector marketing of livestock and livestock products should be encouraged and promoted.

Regional West Africa

- An information system which would provide for the timely exchange of marketing information between Coastal and Sahelian countries should be developed. Information on other markets of interest (Near East) or that affect West African markets (Europe, Argentina, Australia etc.) needs to be available to livestock sector. Ideally, this should be a function of the West African Livestock Marketing Agency (CEBV). If not feasible, an organization such as the West African Economic Community (CEAO) might serve as a base.

- Trekking routes, other forms of animal transportation, export/import regulations, etc. must be improved. Customs and police stops which hinder the transit of animals and products should be reduced and regulated.

Domestic

The strategy proposed for the improvement of domestic commercialization both by this team and the Malian Office of Livestock and Meat (OMBEVI) is crucially dependent on organizing market professionals and producers. Antagonism between market professionals and OMBEVI threatens its abilities to successfully implement its own commercialization strategy. Credit should be made available to successful associations through the banking system, with USAID providing a matching guarantee fund. Market infrastructure should be financed only when a local association has taken the initiative.

Strategy components include the following:

Institutional/Organizational.

- Help livestock professionals and livestock producers to organize in associations. Work through these associations to provide credit via matching guarantee funds deposited in the banking system. Help butchers, through the association, establish insurance against the seizure of (diseased) animals through their association. Limit assistance for improvement of market infrastructure to support for activities of organized associations.
- Train professionals in areas to include business skills, management and accounting, meat cutting techniques to improve meat quality, butchering techniques to produce hides of maximum quality.
- Publish and broadcast new customs and export licensing regulations for Mali and important foreign markets. Support workshops for the same purpose.
- Regularly publish and broadcast information on quantities and prices in major domestic and coastal markets including information on small ruminants and poultry. Publish information on potential markets and announce via broadcasts where and how entrepreneurs can obtain this information.
- Work with the Mali Chamber of Commerce and associations such as the *Association Malien d'Exportation des Ressources Animales* (AMERA) to help the private sector identify and penetrate promising export markets and to improve the organization and efficiency of domestic markets.
- Establish permanent protected trekking routes among important markets for transhumance and export. When necessary, provide infrastructure to make

routes functional. Determine priority routes, exact locations, and infrastructure needs.

- Organize and train National Livestock Directorate (DNE) agents to improve data collection for local markets. Create DNE Statistics Office in conjunction with DNE Office of Monitoring and Evaluation. Integrate OMBEVI market survey personnel into DNE Statistics Office. Expand collection of statistics to include small ruminants and poultry.

Recommended Studies.

- Conduct a study to investigate why only 65 to 75 percent of the animals presented in markets are actually sold.
- Study costs of production and livestock valuation.
- Study the financing of sales and purchases within the livestock marketing system. The role of credit should be carefully considered.
- Study private sector marketing of sheep in domestic and export markets at Tabaski. Investigate potential export markets, particularly those in Senegal, North Africa, Nigeria. Assuming that the potential can be identified, expand small ruminant marketing as a major project component.
- Study potential for improved poultry and egg marketing in urban areas and advise private sector.
- Study animal product processing, including those for cheese, pasteurization of fresh milk using small pasteurization units; production of dried meat, chipped beef, corned beef, sausage, etc.; processing hides and furs; artisan activities using animal products. Promote where appropriate.

Animal Health

A recent study shows that 97 percent of vaccine costs are indirect costs. Increased use of existing capacity will lower the cost per dose.

Other recommendations include:

- Expand production of small ruminant vaccines.
- Support development and production of necessary poultry vaccines.
- Market vaccines for export, emphasizing quality control. Compare pricing to that of foreign competitors.

- Determine costs of vaccine production and quality control. Charge prices which will, at minimum, cover full costs. Maintain price per dose as production moves towards capacity in order to cover partial costs of diagnostic activities.

Animal Health Delivery System

- Determine costs of health delivery services and encourage DNE/GRM to move rapidly to full cost recovery, particularly with regard to vaccines.
- Encourage reorientation of DNE as a regulatory agency. Provide support and training for regulatory activities.
- Encourage and support privatization of health care delivery.
- Establish system for rapid response of mobile teams to outbreaks of contagious diseases. Set up emergency system to contract private sector veterinary health professionals under supervision of DNE.
- Encourage RDOs to contract directly with private sector for veterinary services.
- Encourage village associations and cooperatives to contract directly with private sector for veterinarian services.
- Provide sufficient logistical support to DNE to provide animal health care in Regions I and II during transition to private sector health delivery. Use same equipment for rapid response mobile teams.

Institutions

- Support move towards integrated agricultural, livestock and forestry extension service. Support cooperation with other donors such as World Bank, *Caisse Centrale*, etc. when possible.
- Support the integration of OMBEVI into DNE and the subsequent need to rationalize the resulting structure. Examples of rationalization include the reduction of duplicate efforts in market statistics; and recommending that the Division of Animal Production deal with animal production as well as statistics.
- Prepare the DNE to become a) a regulatory agency responsible for meat inspection, inspection of (private sector) slaughter facilities, supervision of private sector veterinarians, etc. and b) a livestock production extension service responsible for animal production, pasture management, forage production, commercialization, etc.

- Support institutionalization of private sector veterinary health delivery.
- Support private sector activities in livestock sector. These include privatization of slaughter facilities, private sector commercialization, organization of private commercial and professional organizations. Support selected initiatives of *Chambre de Commerce, Chambre d'Agriculture, Affaires Economique*, etc. which would benefit private sector.

Training

Reorganize the *Ecoles des Infirmiers Veterinaires* (EIV) to become a Livestock Extension School to provide short courses for DNE staff in animal production and extension and group organization techniques. Use school staff to establish curriculum and content of training sessions to be held for field staff, and the training of trainers within DNE.

Credit

Help professional associations in livestock marketing sector to establish guarantee fund at BNDA, and if feasible, an insurance fund for butchers. Consider a form of matching fund approach whereby associations are required to make a serious contribution to a guarantee fund which would then be supplemented by USAID matching guarantee funds. Consider collaboration with the *Caisse Centrale initiative*.

Research

Encourage farmer and extension service interaction with newly integrated agricultural, livestock and forestry research institution. Consider establishing a liaison unit within DNE to do pre-extension work and to interact with researchers.

Pilot Project

The team recommends small-scale testing of concepts and issues discussed within the scope of this study. These could be operationalized in one or two villages with emphases and direction as discussed below.

Natural Resource Management

There are five important factors which should be addressed in a new livestock project which will contribute to sustainable agricultural systems and improved natural resource management:

1. A shift in focus from increasing cattle and animal numbers to increasing productivity of the existing national herd.
2. A focus on commercialization activities which help increase offtake and stabilize or reduce livestock numbers by providing attractive marketing opportunities.
3. An orientation towards encouraging livestock activities within the context of integrated mixed farming systems. Within such systems, cash income from livestock can provide an incentive for improving the productivity of both the livestock and the natural resource base.
4. Support improved rural/pastoral land use activities and the development of new rural/pastoral codes which institutionalize this improved land use. Support for a village Territory Management (VTM) pilot project in Regions I and/or II would support such activities. A model is needed that reduces the heavy community development orientation to a level which can be replicated that specifically includes consideration of transhumance in determining village land use.
5. Improved animal health care will result, long term, in increased productivity of the national herd, and will serve to convince farmers and herders that their animals will survive. Although a short-term effect may be an increase in animal numbers competing for available resources, in the long-term perspective this is a move towards systems of higher offtake and increased productivity of the national herd.

Village Territory Management (VTM)

- Establish a VTM type pilot project for an *arrondissement* sized area in an area where compatible interaction between sedentary farming and transhumant herding exists. Consider close collaboration with *Operation Haute Vallée* (OHV) and the *Division de la Recherche les Systemes de Production Rural* (DRSPR) to provide an integrated extension approach. Consider animal production, commercialization and health care efforts as the potential "carrot" of activity. Ideally the model would:
 - ▶ Require less intense community development input.
 - ▶ Consider needs of transhumants in village land use planning, possibly using grazing and manuring contracts to identify the value of services exchanged.

- ▶ Establish multi-village management councils to consider land use questions which cross village borders.
- Promote linkages to and mutual feedback with agricultural and livestock research to provide supporting technical packages.

Animal Production

- Promote local village poultry (meat) production projects for women and women's associations. Structure interventions to improve, in relative order of importance; health, feeding, habitat, and cross breeding.
- Where technically and economically feasible, promote sheep fattening for Tabaski in mixed farming context of increasing forage production. Target women and women's associations as priority participants and direct beneficiaries. Encourage access to BNDA credit fund.
- Promote cattle fattening in mixed farming context of increasing forage production where technically and economically feasible. Encourage access to BNDA credit fund.
- Promote production of N'Dama - Zebu (or Asawak) crosses for sale as oxen. Study feasibility of breeding Zebu cows with N'Dama bulls.
- Promote the development of alternative forage crops and forage crop production, particularly in the context of improving mixed farming.
- Promote the preservation and use of crop residues as livestock feeds.
- Promote the culling of non-productive animals. Promote a system of identification (eg. special eartags) and expedient marketing.
- Promote show fairs for livestock in pilot projects.

Project Configuration

Experience from prior projects indicates that a proposed studies office must have high level entry into the Ministry in order to have input into and impact on DNE and MEE policy. Consequently, a new project must take into account the level at which activities will be carried out.

The Management Development Support Team (MDST) has apparently been effective in managing project activities, but is not integrated into the Ministry to help

improve general Ministry management. It has also been very expensive. A more efficient management system should be sought and integrated into the Ministry or at the least, DNE.

Potential project components include:

1. **Project Management** - Management Office including Chief of Party, perhaps at level of DNE Director.
2. **Policy - Studies Office** at level of DNE Director or more likely at MEE cabinet level to be staffed by highly qualified Malians supported by technical assistance.
3. **Commercialization** - Supervised by Studies Office, activities to be implemented by the Commercialization Division within DNE.
4. **Pilot Project** - To include local NRM, animal production and organization of local associations - to be supervised by Livestock Extension Division with support of technical assistance and implemented by staff assigned from Livestock Extension Division.
5. **Training** - To be supervised by Livestock Extension Training School and Livestock Extension Division and implemented by the Livestock Extension Training School staff and supported by technical assistance.
6. **Animal Health** - CVL and any support to DNE health delivery should be through non-project funding.

MALI LIVESTOCK SECTOR

A CONCEPT PAPER

Introduction

To effect economic growth, livestock sector programs in Mali require an increased orientation toward animal production and commercialization. Animal health remains important as a means of reducing the risks of animal production and increasing productivity. Poultry and small ruminants are consumed more regularly than beef by much of the Malian population; therefore increasing their productivity would also contribute to achieving nutrition/consumption objectives. Cattle make up 70 percent of the livestock biomass in Mali, and the majority of the livestock sector's 22 percent contribution to GDP and 36 percent contribution to export earnings.

Key Institutions

There are several key institutions that are involved with the livestock sector in Mali. They are discussed in the scope of this paper in their present and potential roles. Briefly, these institutions are identified as follows.

National Livestock Service (DNE)

The DNE (*Direction Nationale de l'Élevage*), under the Ministry of Environment and Livestock, is currently responsible for policy formulation and implementation of livestock policies and programs throughout Mali. DNE has eight regional offices plus the National Headquarters Office and, according to the Annual Report (1988), is furnishing personnel to five research and development projects: EIV, PRODESO, TONKA ZONDY, and the National Youth Service. The DNE is comprised of five divisions: Animal Production, Animal Health, Program and Projects, Management and Improvement of Natural Pastures and Water Resources, and Personnel and Materials.

Malian Office of Livestock and Meat (OMBEVI)

The OMBEVI began operations in 1969, with USAID assistance. Responsibilities include efforts towards the commercialization of animals and animal by-products activities, to produce technical and scientific bulletins, to make available market prices for livestock, to provide a documentation center. Recently, OMBEVI has acquired responsibility for evaluating projects.

The Central Veterinary Laboratory (CVL)

The CVL is producing vaccines and serums and has initiated an effective quality control monitoring on all vaccines. These vaccines are exported, sold to development projects in Mali as well as sold directly to the DNE. The CVL was intended to produce vaccines for regional West Africa, but has only recently begun to fulfill this role. It is also intended to serve as a diagnostic agency for livestock. Currently the CVL is undertaking studies on identifying viruses in small ruminants, the prevalence of brucellosis in dairy herds, and a sero-surveillance program to identify cattle immune to rinderpest after vaccination. They are also developing new vaccines for poultry.

Policy Issues

The livestock sector in Mali requires a series of both general and specific policy changes which can be promoted in a livestock project. Policies which support improved natural resource management through returned control of natural resource management to local communities have the potential for far reaching effects. Other policy matters could have implications for the enhancement of the livestock sector as well, and are discussed subsequently.

Land Use/National Resource Management

Traditional land use in Mali was based on tribal rules and regulations. Land was held in common but with specific usufruct rights granted and strictly regulated by the tribal hierarchy of chiefs and elders. This regulation began to disintegrate when the state decreed that all land was state property and that state regulations would take precedent over tribal practice. In effect, this left land use in most areas unregulated and unprotected and has left the natural resource base vulnerable. To address this situation, changes must be made, including the return of control and responsibility of land use to local rural populations.

At the same time, rural communities need to become more aware of the problems which result from increasing human and livestock populations, the need for sustainable agricultural development and maintenance of the natural resource base. To deal with these problems rural communities require organizational help, assistance with land use planning, and technical assistance to improve the productivity of their resources.

Mali needs a new rural code which returns control of, and responsibility for, land use to the local rural population, and which takes into account the multiple uses of natural resources for agriculture, livestock, and forestry. Issues to be addressed by the code include the needs and rights of transhumant herders and new land tenure policies which define and regulate the rights and responsibilities of individuals vis a vis the community with regard to land use.

Aménagement de terroir (territory management) is the approach that has been chosen to return control and responsibility of land use to rural communities. A livestock sector project should support these efforts, particularly in Regions I and II, recognizing that *aménagement de terroir* is a lengthy process and is still in a formative and experimental stage. The project should support or undertake pilot efforts specifically incorporating the issues related to transhumant herders.

Interventions initiated by villages to improve forests, soil erosion, and grazing resources through local management practices should be recognized and rewarded by the Malian Government (GRM). Management authority should be given to organized communal management committees to oversee their own territories. However, continuing extension support by government technical services would be necessary to monitor the resource base and to assist local management committees to formulate and implement management options.

Land use, particularly that concerning cultivation rights, is an issue that can be addressed on a local level within the *Cercles* and *Arrondissements* and on the village level.

Land Tenure

A livestock sector project should also encourage the GRM to move toward more appropriate land tenure policies and support studies or even pilot projects which serve to advance their formulation and introduction. Apparently a review of land tenure rules by administrative region found many differences among regions and groups within regions; therefore it is difficult to envision a single code which would effectively meet the diversity of needs.

USAID/Mali should consider allocating some components of aid to the livestock sector as non-project funding that could be used to encourage progress in land tenure policy formulation.

Livestock System Policy

An important livestock policy issue is the survival or demise of the transhumant livestock production system. Currently this system is in decline, although it is unclear how rapidly the process will proceed or whether its decline can or should be stopped. The destruction of this traditional Sahelian livestock production system and/or the speed at which it is eliminated will have important macro-economic consequences for Mali.

The GRM needs a livestock policy on issues such as relationships between livestock and cropping, location of livestock production and approved transhumance routes and mode of herd movement.

Privatization

A livestock project could also support continued Mission objectives in the area of privatization, particularly with regard to animal health delivery. Political statements assert that the National Livestock Directorate (DNE) will slowly disengage from the delivery of animal health services, but internally the DNE is hesitant to do this. A livestock project should encourage this disengagement and help orient the DNE towards the role of a regulatory agency. The DNE should not be allowed to contract with RDOs to provide livestock services after the *cadre organique* is implemented. Rather, these contracts should go to the private sector. USAID support for the privatization of animal health delivery in Region I and/or Region II would provide a model which DNE might be able to use in other regions.

The DNE and Central Veterinary Laboratory (CVL) must be encouraged to move rapidly towards full cost recovery of vaccines and animal health delivery goods and services to meet privatization objectives and support recurrent costs. However, the DNE appears to be moving slowly in this direction. Furthermore, the current market for animal health products and services is not well developed. In most areas, vaccinations comprise a majority of the services delivered. In many areas it is unlikely that private sector animal health delivery will be economically viable unless responsibility for vaccinations is transferred from the public sector to the private sector or the DNE operates on a more competitive basis. At minimum, the DNE must charge the full cost of delivery to enable viable private sector competition. Eventual DNE withdrawal from vaccination activities in those geographical areas where the private sector becomes active is also required to ensure sustainability of private enterprise in animal health delivery.

Although it is unlikely to become completely self-sufficient, the CVL could recover a large percentage of its expenses from the sale of vaccines at full cost. The CVL and GRM need to recognize that they are entering the weaning stage with regard to CVL. Cost accounting, cost studies and full cost pricing should be strongly encouraged and should be a condition of continued USAID funding.

The DNE should also reconsider its hesitancy to train villagers to vaccinate their own animals. Health regulations are easier to enforce when the same service controls vaccinations, but the DNE has not had in the past, nor is it likely to have the means to respond to the animal health needs of hundreds of villages and thousands of individual farmers across Mali. There are an estimated 20 million chickens which need vaccinating; a task which could be handled by farmers. Privatization of animal health services and/or training and supervising farmers to handle rudimentary animal health could address these needs, which are impossible to be met by public sector services. The DNE must also work out a system to report vaccinations by private veterinarians and farmers.

Export Barriers

Regulations have recently appeared which simplify the process of obtaining export permits and which suspend export taxes on livestock. However, it is not yet clear how these regulations will be applied. Neither livestock exporters nor the agencies involved in regulating exports agree on what the regulations are. The Ministry of Environment and Livestock Production (MEE), Malian Office of Livestock and Meat (OMBEVI) and *Affaires Economiques* have all presented slightly different interpretations of the regulations; merchants have another version of the manner in which they are being applied. One account is that the export taxes are scheduled to be suspended in January 1991. Another interpretation is that export taxes have been eliminated for Senegal, but not for Côte d'Ivoire. Merchants are pleased to be able to pay all the taxes, licenses, fees, etc. in one location. However, cattle exporters and regulating agency personnel need to know and better understand the new regulations. This could be accomplished by disseminating information through broadcasts on radio and TV, a published version made available to the public, and workshops held to inform exporters of what to expect. In particular, much of the confusion is about whether the 5000 FCFA per animal customs fee will be eliminated; a move which would help to make Malian cattle competitive in the Côte d'Ivoire market.

A more serious constraint to the export of livestock is the practice of *tax sauvage*. Livestock, particularly cattle, are both trekked and trucked to dispatch points in importing neighboring countries. Some animals are trekked all the way to final destinations. Trekked animals may avoid police, *Douane*, *Gendarme*, and veterinary posts and thus avoid paying many unofficial taxes imposed by tending government functionaries. However, trucked animals must pass through numerous control points at intervals along the roadway, lengthening the amount of time needed to get them to final markets. This reduces an animal's physical condition and consequently, sale value. Merchants complain that when they transport animals by truck they must pay *tax sauvage* at every police, *gendarme*, customs, and livestock health stop along the way, even when all their papers are in order.

This *tax sauvage* amounts to 100,000 to 150,000 FCFA per truck load (26 - 28 head) of cattle between Bamako and the Mali border, which is more than the transportation cost. Merchants also said the *tax sauvage* is even more costly in the Côte d'Ivoire. Reportedly, this practice has worsened recently; therefore many merchants are no longer shipping to Côte d'Ivoire. Several reports indicate that the problem has been serious for many years. Perhaps there is a correlation between the tightened credit situation and increased *tax sauvage*, i.e., the cash outlays for *tax sauvage* become particularly onerous when the merchant has to wait weeks or even months to get paid for his animals in Côte d'Ivoire.

Merchants in the Mopti region report the major advantage of moving cattle through Burkina Faso on the way to Côte d'Ivoire is that the Burkinabe government has largely eliminated the *tax sauvage* provided that papers are in order. This indicates that if the political will is found to eliminate this tax, it can be done. Towards this end, the GRM may find it useful to contact the Burkina authorities to see how the *tax sauvage* has been eliminated there. The GRM must eliminate the problem in Mali and work with the Côte d'Ivoire and other neighboring countries to eliminate the problem there as well.

Permanent Trekking Routes

There are two types of livestock routes: traditional routes used by slow-moving transhumant herds to reach dry season pastures and trekking routes used by faster moving market herds passing from one market to another. The same route sometimes serves both purposes.

Marked trekking routes are necessary for animals to pass harmoniously through villages and cultivated areas on their way to pastures or markets. Routes are usually established with assistance from local populations, and their locations are well known. Some are even marked with cement markers (bornes). Mali needs to establish permanent trekking routes to link markets, to link producing areas with urban consuming areas, to export animals, to cross heavily populated regions and to maintain important transhumant routes.

Occasionally a problem arises when officially marked trekking routes are used to grow crops, forcing trekking animals to abandon the marked route to avoid conflict. In some cases this prevents herds from reaching water and pasture. Government policy concerning the identification and marking of transhumant and commercial livestock routes should be clarified. Officially marked trekking routes should be publicly recognized, and their use assured by the authorities responsible for enforcement.

Application of User Fees/Cost Recovery

Traditionally, fees or revenue generated from any government agency activity has been deposited in the National Treasury. Frequently this is still required unless special arrangements are made. Under this system cost recovery has little meaning and user fees are just another form of tax with no direct benefits. Activities and programs which generate fees must in turn have access to those fees to improve the activity or program. Fees charged for vaccine and health delivery services should go to CVL for its vaccine production and related activities and to DNE to help pay for its health delivery system. Fees collected from the use of a specific market should be used to operate that market and to maintain and improve its infrastructure.

Technical Improvement/Animal Feeding Practices

It is almost universally agreed that animal feeding is a primary constraint to animal production. A recurrent issue which emerged from many interviews of livestock producers and agencies which deal with livestock production in Mali is the shortage of agro-industrial by-products for feeding out animals in preparation for marketing. Only members of cooperatives, who generally receive preferential treatment, report relative ease of access

to these by-products. Yet reportedly large quantities of cereal milling by-products are shipped to Senegal for sale at 15 FCFA/kg and the sugar mill has difficulty disposing of its molasses. Although these products are produced all year, demand is heaviest in the dry season. The problem appears to be their storage for periods of demand. A concerted effort is needed to resolve these storage, preservation, transportation and marketing problems so that animal feed products are readily available to the entire livestock sector.

Women

The role of women in livestock production has historically been ignored. Previous activities and interventions have assumed men to be the appropriate target clientele. Notwithstanding, this is contrary to fact. For example, village poultry production and care is almost entirely a female task. Extension activities which train men to feed and care for poultry are targeting the wrong clientele. Women and women's associations should be the target of village poultry activities, and should be given equal opportunity to participate in commercial poultry activities.

Women also own and care for a large percentage of the small ruminants in Mali. Small ruminant production and commercialization activities should target women and women's associations as equal, if not priority, participants and direct beneficiaries.

USAID should use whatever leverage it has with the BNDA to insure that loans for animal fattening activities are available to women from the *Embouche* Fund.

The DNE has 35 women extension agents in its 387-person field staff. The number of female extension agents should be increased and include additional training to support women's role in husbandry and commercialization. Women should also become more involved in poultry and livestock product transformation activities.

Additionally, women should be placed in responsible decision making positions. Government policy concerning women and their professional and business pursuits should be supportive and clearly stated.

Commercialization Issues

There are several areas in which the livestock sector could be improved through enhanced commercialization. This includes improving the performance of livestock markets domestically and within the West African region. A focus on commercialization activities could increase offtake and stabilize livestock numbers by providing attractive marketing opportunities.

Background

The low level of productivity of the national herd has often been blamed on what is termed "traditional attitudes of herders." Theory holds that herders sell only few animals because their herd is considered to be similar to a bank account rather than an economic investment. In addition, the size of the herd is considered an important source of status. But national statistics indicate that these herders, who supposedly do not want to sell their animals, present many more animals in the market than are actually sold. Both OMBEVI statistics for major markets and DNE statistics by region and sector confirm that only 65 to 75 percent of animals presented for sale are actually sold. Except for the gradual seasonal variation in price, it does not seem likely that prices would vary greatly from week to week in a given market. It also seems reasonable to assume that these producers would be willing to sell if they were offered a good price. It is not known why this occurs; regardless the reason, a marketing system which only purchases two thirds to three quarters of the animals offered is a constraint to offtake, not a means of encouraging it. This marketing system must be improved if we are to establish a better balance between animal numbers and the demands placed on the natural resource base.

The marketing process must be made less costly and more efficient. An obvious target would be the elimination of road barriers and accompanying *tax sauvage*. Eliminating these bribes would reduce the cost of the animals by 5 to 10 percent and facilitate exporters' use of trucking as a means of transportation. At present, Koutiala is as far north as animals can be loaded in a truck and arrive in Abidjan with the 48 hours maximum period that is considered safe to leave cattle in a truck without access to grazing and water. If road barriers were eliminated, livestock could be shipped all the way from Bamako.

Another area for improving market efficiency is credit. Merchants report that an animal which sells in Kati for a cash price of 75,000 FCFA, would sell on credit for 100,000 FCFA (This may run as much as 33 percent interest for one or two weeks credit, and perhaps several hundred percent on an annual basis). It is reported that many of the butchers, both in Bamako and Abidjan, buy on credit because they do not have the financial means to pay cash. If an organization of market professionals could provide access to credit, perhaps some portion of consequent savings would help reduce prices to consumers and increase demand for meat.

More information must be collected to analyze and determine why animals brought to market are not sold. Issues to be investigated include possible collusion by buyers to drive down prices, and constraints, either economic or cultural, which keep marketing professionals from taking advantage of market opportunities. Preliminary information indicates that in the Moptic Region markets of Fatoma and Sofara, where most producers insist on cash payment, merchants present on any given market day do not have enough cash among them to purchase all the animals presented for sale. This situation should be further investigated.

In a simplistic analysis, one might expect the prices of animals to fall until nearly all of the animals presented in the market are purchased. But this does not seem to happen. The number of animals exported and the number of animals butchered domestically have fallen significantly over the last four or five years. Although the effects of the 1983/84 drought reduced the national herd and thus the supply of animals, it appears that prices have not fallen as much as one might expect, given the significant decrease in the number of animals demanded. We still have only a partial understanding of how this market functions.

Conjectures for this market behavior include the following two hypotheses: 1) that herders compare the value of an animal to the number of sacks of cereal that the payment will purchase, or the portion of taxes which the payment will pay; 2) that herders do not really need the income and therefore have the leisure to play the market, selling only if they get the price they want. If they do not get the price they want they may wait for the seasonal price increase, or for a butcher to purchase the animal on credit for an additional 30 percent, or take the animals to a terminal market where the price is higher.

A related area which requires further study is that of livestock production costs relative to how and why producers set cash value on animals. Out-of-pocket expenses of raising animals are low in the traditional herding system. Estimates indicate the costs for raising a five to seven year old steer range from 5,000 to 25,000 FCFA. However, herders appear unwilling to sell these same animals for less than 65,000 to 100,000 FCFA. Why this is so is unknown. Perhaps they are aware of the price of cattle in Bamako or Abidjan, and hope to get a similar price in the local market. However, until further study is undertaken, this is merely conjecture.

Export Potential

Livestock Sector participants report that there are opportunities for an expansion of domestic and foreign marketing of livestock. However, there are few factual sources of information about these alleged demands for Mali livestock.

The Côte d'Ivoire/Abidjan market has historically been the most important for Malian cattle, and for which the most data exist. Even so, there are ambiguities. Recent analysis and projections indicate that demand for Sahelian animals has stabilized at about 24,000 tons carcass. It could be inferred that the future of Sahelian cattle sales to Côte d'Ivoire depend on the supply of CAPAs and other forms of subsidized European meat. Local opinion holds that European meat will soon be diverted to more profitable markets in Eastern Europe, leaving the Abidjan market open once more to Sahelian meat. On the other hand, sources indicate that much of the meat commonly called European meat in Abidjan actually comes from Argentina and South Africa. If this is the case, there is no reason to believe that supply will decrease, in fact the question is, rather, why more is not imported. The same source indicates that Argentine beef still arrives in Abidjan at a price of about 150 FCFA/kg carcass, while meat produced in Côte d'Ivoire or from the Sahel costs 1000 to 1200 FCFA/kg. If it is true that Argentine meat arrives at this price, the

marketing outlook for Malian meat in Abidjan is poor and there is little reason to expect an increased demand for Malian cattle. Even the proposed levy on non-West African meat would only bring the price up to about 700 FCFA/kg, which is still well below the cost of Sahelian meat. Given this uncertainty, Mali should explore new markets.

Liberia has also been an important market for Malian cattle. According to cattle merchants, shipments to Liberia largely ceased when Liberia replaced the dollar with another currency. (Reportedly, one Liberian individual was buying cattle in Kati for resale in Bamako.) It is unclear whether or not an end to the war will again make Liberia a viable market.

Ghana has also been a market for Malian cattle in the past, and as its economy improves cattle imports from Mali may slowly increase. Allegedly, there is a demand in Ghana for both a potential supply of animals for meat and for a source of trypano-tolerant oxen and/or trypano-tolerant breeding stock.

Nigeria is probably the only country in West Africa large enough to absorb large quantities of Malian beef. Previously, a lively trade existed in which merchants sent cattle and other livestock to Nigeria and returned with manufactured goods for sale in Sahelian countries. A cattle merchant in Mopti reported that this worked well as long as the black market exchange rate for Naira was good, however with changes in the black market currency exchange exporting to Nigeria is no longer an attractive proposition. He also said that if one had the right banking connections, it might still be profitable. It is also reported that Nigerian Houssa traders are no longer active in major Sahelian cattle markets.

Reportedly, there is a significant demand for Malian livestock in North Africa, particularly for sheep, and especially at Tabaski. Several people expressed the opinion that this is the most promising and least exploited market for Malian livestock.

The reports regarding the potential demand for sheep appear much more optimistic than those which pertain to cattle. We are told that merchants regularly send sheep to Senegal on the train and sell them for attractive prices. Merchants also regularly sell sheep in Algeria and return with dates to sell in Mali (although at least one merchant expressed a sense that this trade was not legal). Several people indicated that if the two governments could work out some means of currency conversion or officially sanctioned trade goods, that livestock exports to Algeria could be expanded substantially. In the past, Mali has also exported a considerable number of sheep to Libya.

Allegedly, large amounts of livestock, particularly sheep, can be sold in the Near East. According to reports, a private Saudi trader contacted Malian government agencies to inquire about shipping "large numbers" of animals to Saudi Arabia. He proposed that the Malians transport the animals by ship from Abidjan or Dakar, and that he would pay \$45 a head for 30 to 50 kilo animals upon arrival in port in Saudi Arabia. The Malian counter offer was for \$105 a head in Bamako with the Saudi trader responsible for shipping. The same entrepreneur offered \$330 for cattle delivered to Saudi Arabia, while the Malian counter offer was \$490 in Bamako. Given the transportation problems and the potential for loss on a long trip by surface, it is unlikely this was a serious offer; no matter the

difference in price. Another report says the Saudi government has offered to exchange petroleum products for Malian livestock. This would be a more likely arrangement for development of inter-regional trade.

Promoting Private Export Marketing

Considering that livestock trading is in the hands of private entrepreneurs, the Chambers of Commerce may be the most appropriate organization to effectively promote livestock marketing between Mali and neighboring import countries.

Special buying groups from importing countries should be encouraged to make contacts with potential exporters through the Chamber of Commerce in Mali. The Chamber of Commerce could compile a mailing list of active livestock exporters with the help of AMIRA, OMBEVI, and whoever issues the export licenses.

Market conditions concerning supply and demand of meat should be communicated regularly to an exporting country's marketing information agency (in this case the OMBEVI) either by FAX or TELEX. Again, possibly the Malian Chamber of Commerce can more effectively establish the necessary contacts with commercial private buyers in neighboring countries than can the government.

Regional West Africa

Mali belongs to an inter-regional system of supply and demand for livestock and meat that links Sahelian and Coastal countries in West Africa. Therefore, many of the problems of livestock commercialization are linked to policy matters across several countries. These issues include taxes, unnecessary police and customs stops, trekking routes, trucking routes and regulations, availability of rail cars, and currency exchange. Although Mali must address domestic policy matters, many issues require regional attention, by CEBV or a regional economic forum. The entire region would benefit from greater expertise and knowledge of the EEC meat production/supply situation and EEC subsidies and marketing in West Africa. Likewise, similar information on Argentine, South African and perhaps Australian/New Zealand meat production would be informative. The region also needs data on the supply and demand situation in the Near East. USAID/Mali should explore and make use of information available at CEBV and determine how it could be improved to meet the information needs of Mali's livestock sector. Other sources, such as the *Caisse Centrale* may also be able to provide information on global livestock production/markets.

Mali needs to work with other countries in the region, particularly Cote d'Ivoire, to improve trekking routes and transportation and to diminish *tax sauvage* and other export barriers. According to Mopti cattle merchants, Burkina Faso has largely eliminated their *tax sauvage* problems, and therefore is possibly a model from which Mali and Côte d'Ivoire

can learn. Mali and the Côte d'Ivoire should consider participation in a regional activity or a bilateral arrangement to improve transportation and reduce impediments to moving livestock to coastal markets.

Domestic Issues

Mali needs a private sector locus for livestock transactions which can contract and deliver a large number of animals of a specified type and quality at a specific price. The development of an organization or persons who can meet the Saudis in Cairo or Paris, arrange a contract, arrange transportation and deliver the meat or animals in a specified time frame at the specified price would enhance livestock marketing efforts. Smaller-scale deals could contribute to developing such necessary knowledge and experience. Financial resources are also required. The *Association Malien d'Exportation des Ressources Animales (AMERA)* has been established with guidance from the Chamber of Commerce to potentially fill this role. It is too early to tell if, in fact, it has the capacity to fulfill its mission.

USAID should encourage the broadcast and publication of animal and meat prices in a number of markets around Mali, and for important coastal markets like Ferke, Abidjan, and Accra. OMBEVI has just re-initiated the broadcast of prices in 17 markets. Small ruminant and poultry prices should also be included. OMBEVI typically deals primarily with cattle and has given little consideration to small ruminants or poultry.

Information regarding new and existing export licensing procedures and taxes should be disseminated so that herders, farmers and livestock merchants are able to discern deviations, such as the *tax sauvage*. Affaires Economique reportedly would like to publish a *guide d'exportation* which might serve to publish this information in French and Bambara.

As human and livestock populations increase in many parts Mali, particularly in the south, access to traditional trekking routes to markets and to the coast may be compromised. Protected trekking routes should be established. Consideration should be given to providing access to water and grazing along these routes.

Emphasis should be placed on marketing small ruminants both sheep and goats. Small ruminants, particularly goats, are the source of the most common meat used in villages, and provide 32 percent of rural household income. The small carcass is easily butchered and consumed before spoiling, and the hide is tanned to make prayer rugs or other useful personal items. Furthermore, women care for small ruminants and conceivably, could benefit from improved marketing activities. Heavy demand for small ruminants for special holidays such as Tabaski, Christmas, and Easter offer incentives for marketing small ruminants and may even invite special finishing-off of the animal to meet the individual consumer requirements.

Poultry and egg marketing, another village-based enterprise, should also be developed. These activities require little space and consume few natural resources. Small

village-based poultry projects would not compete with larger commercial operations for major city markets such as Bamako, but would provide eggs for the local markets in smaller cities. Recent interviews with commercial poultry farmers in the Segou area revealed that quantities of their eggs sent to Bamako remain unsold. They claim that the Bamako egg market is saturated. According to Segou producers, fresh eggs continue to come from Senegal by train.

Slaughterhouses and Frozen Meat Exportation

The GRM operates slaughter houses in Bamako and the regional capitals at a loss. Reportedly, the government would like to turn these operations over to the private sector. The GRM is interested in a proposal by a U.S. entrepreneur/company to operate Malian slaughter houses. In fact, *Affaires Economiques* would like this activity to be taken a step further: i.e., include exporting frozen meat by refrigerated truck to coastal countries. Apparently, American entrepreneurship is expected to make Malian frozen meat competitive in coastal markets. Additionally, shipping frozen beef would allow for retaining the hides, offal and other by-products in Mali for export or use. Whether or not this optimism for participation in coastal markets is realistic remains unclear. Previously, several unsuccessful attempts were made to ship meat from the Sahel to the coast. Constraints identified in this activity include high transportation and transaction (particularly *tax sauvage*) costs, and problems with refrigeration units which proved difficult and expensive to maintain. Even if the environment and technology have improved since these earlier attempts, there is no evidence that prices would be competitive.

Reportedly, butchers in Abidjan (as in Bamako) recover their costs from selling the four quarters of meat and take their profit from the sale of the fifth quarter (organs, hide, offal). To be economically viable, a chilled/frozen carcass must be delivered to Abidjan at a cost substantially less than that of a live animal. Otherwise, the chilled/frozen meat will not be competitive with live animals from Mali, much less with the less expensive South African and Argentine meat.

OMBEVI Proposal To Enhance Commercialization

OMBEVI is proposing a five-point program to improve livestock (mainly cattle) commercialization in Mali. A brief description follows:

1. *Information system*

Expand the data collection in livestock markets to include an intensive study in 30 markets, a lighter study in an additional 60 markets, and a minimum of information in the remaining 240 markets. They would also like to provide information on important coastal markets and those in Europe and the Near East and provide information on the milk market. OMBEVI proposes that the project hire contractual workers to perform surveys to get around the constraints of the *cadre organique*.

2. *Organization of professionals (butchers, cattle merchants, etc.)*

OMBEVI would like to organize livestock marketing professionals by establishing regional cooperatives for these respective groups to include producers, merchants and intermediaries, brokers and butchers. OMBEVI wants to provide training to prepare these groups for the changes resulting from the privatization of slaughter houses, as well as to improve accounting and provide an organizational base for credit.

These ideas seem to conform closely to those expressed by *Affaires Economiques* and the *Chambre de Commerce*.

3. *Infrastructure for livestock markets*

OMBEVI (and *Affaires Economique*) would like to improve the infrastructure for a number of livestock markets; i.e. to construct or make functional standard items such as corrals, wells, vaccination chutes, loading ramps, scales, etc. and a radio to communicate prices to Bamako. The proposal calls for spending 60 million FCFA each to improve the existing markets at Kati and Niono and 81 million FCFA each to replace the unused market infrastructure of Nara and Nioro and to build a new market at Koutiala.

4. *Financing the cattle marketing system*

An OMBEVI report discusses the credit problems and needs of professionals at different levels and functions in the marketing chain, and the very high financial charges paid at many different levels. According to the report, individual loans have not worked because banks have inflexible regulations and timing, and often require the borrower to maintain as much as 75 percent of the total loan on deposit at the bank. OMBEVI proposes establishing local credit unions and a guarantee fund for exports. For butchers, an insurance fund against seizure of (diseased) animals is proposed. However, the program largely entails revolving credit funds for each category of professional, and paying off butchers debts up to 50,000 FCFA each for a total of 25 million FCFA. The proposal estimates that 175 million FCFA will be needed to establish the revolving funds. It calculates an economic loss of 47 percent of the revolving fund over 5 years at 8 percent per year compounded, i.e. 82 million FCFA. The budget then contains only the 82 million FCFA economic loss, but not the 175 million FCFA financial amount considered necessary to constitute the funds.

To run this program, OMBEVI proposes that the project pay the salaries of:

- 5 Technical Assistants
- 5 Malian Technicians
- 15 Volunteers (*du Progrès*)
- 15 Malian Field Staff
- 20 Chauffeurs

Eight four-wheel drive and two additional vehicles are specifically budgeted in different components of the project. More vehicles are probably included in budgets not detailed. The budgets also appear to include the salaries of another 10 to 20 Malian staff.

5. *Studies*

Studies suggested by OMBEVI include:

1. Cost of production by age of animal (three teams)
2. Fiscal study of the livestock sector to identify ways to finance recurrent costs and development activities for the sector
3. Inventory of trekking routes - (old studies need updating)
4. Introduction of selling animals by live weight

The estimated costs of this five point program are:

| | | |
|-------|-----------------------------------|--------------------------|
| 1. | Information System | 14,788,000 FCFA |
| 2. | Organizing Professionals | 71,886,000 |
| 3. | Improving Market Infrastructure | 63,000,000 |
| 4. | Credit for the Marketing System | 555,300,000 ¹ |
| 5. | 3 studies | 27,492,000 |
| 6. | Introduction of Live Weight Sales | 60,000,000 |
| | | <hr/> |
| Total | | 1,292,466,000 FCFA |

The total is about \$5.2 million which will increase to nearly \$5.6 million when the amount necessary to constitute the revolving fund is added.

Analysis of OMBEVI's Proposal

There are a number of points made in this proposal by OMBEVI that should be considered and included in a commercialization component of the project. However, the proposal is characterized by extremely high costs and resembles a recycling of old proposals without regard to this new era of government austerity, as well as the trend to community participation.

We comment on OMBEVI's specific recommendations as follows:

1. *Information System*

Providing data regarding supply/demand and prices in livestock markets around the country is worthwhile. With this information, the GKM and donors would be better able to analyze markets, and gain a greater understanding of how and why the market operates. However, market users should be considered the most important end users of such information, and an effort should be made to provide data in a timely manner and usable format. An emphasis should be placed on assisting market professionals to exploit economic opportunities. Therefore, the information system must develop the capacity to gather relevant market information quickly and effectively distribute it. An annual report published a year or two after the fact is of no use to market users and would have no impact on market efficiency. Furthermore, topics on which data are provided should be

¹ The proposal here seems to confuse financial and economic analysis. If true, the budget line for reimbursable funds should be increased from 82 million FCFA to 175 million FCFA, ie. by 93 million FCFA to constitute the revolving funds. You have to have the 175 million FCFA before you can lose 47 percent of it.

expanded to include small ruminants and perhaps poultry. Information on a selected few key markets should be broadcast regularly and information on a larger sample should be available in a monthly bulletin, published in a timely manner.

Briefings and/or mini-workshops should also be held for market professionals. *Affaires Economiques* would like to publish a handbook on exporting, including the changes in regulations, and should be encouraged to do so. Briefings or mini-workshops might be held through the Chamber of Commerce.

Economical means of procuring information on foreign markets must be found. Normally this is included in CEBV functions. Other information is probably available from economic forums such as the CEAO. Information on the European livestock markets and situation could probably be obtained through an arrangement with an organization such as the *Caisse Centrale*. Available information should be explored and analyzed as to utility. Information exchange could be arranged with similar agencies in Côte d'Ivoire, Liberia, Senegal, Ghana, Algeria, etc. Rather than posting an agent in, or traveling to out-of-country markets, a more cost-effective system would be to establish a weekly exchange of phone calls, faxes or telexes to collect the data. A private information service might also be sourced and contracted in each potential importing country to compile and report existing data on a weekly or monthly basis.

In terms of the proposed statistical study, DNE appears to be in a much better position to execute this study at a reasonable cost than does OMBEVI. OMBEVI has very limited institutional presence in the countryside. The DNE already has posts and staff near most of the important markets. This staff may not be fully employed outside of the vaccination season. With their agents properly trained, the DNE can probably implement such a study without hiring additional personnel to do the work. OMBEVI also proposes using DNE staff for part of the study.

Over time, as the markets and market professionals become organized it is reasonable to expect representatives to keep and report market statistics, similarly as the representatives of village associations keep and report statistics on cotton marketing. Although some agency will need to compile and analyze this data, having a government agency collect this data should be a temporary phase.

2. *Organization of Market Professionals*

In the opinion of the authors, OMBEVI has seriously underestimated the importance of this component. In fact we believe the following Infrastructure and Credit components (points 3. and 4. among OMBEVI's five points) should be sub-components under organizing market professionals.

To provide infrastructure and credit through local associations and groups greatly increases the likelihood that infrastructure will be maintained and credit repaid. Furthermore, the future possibility of also using these associations to collect market

information requires that, with the exception of the studies, the OMBEVI commercialization program is collapsed into a program dependent on organizing market professionals.

It is not evident that OMBEVI is the appropriate organization to undertake this necessary organizational work. Organizational work requires intensive extension/community development type activities, and OMBEVI does not have the staff or presence in the field to implement this type of work. In markets like Kati, where OMBEVI has been working for ten years, they have not succeeded in organizing the market or the market professionals. Market professionals strongly resent paying OMBEVI fees, as well as OMBEVI's failure to maintain the market infrastructure. OMBEVI does, however, report some success organizing butchers. This team was unable to confirm or deny this activity. Nonetheless, if OMBEVI is regarded with distrust or suspicion it is unlikely to achieve success organizing market professionals.

Evidence suggests that the DNE might be in a better position to implement an organizational strategy rather than OMBEVI. The DNE already has an under-utilized staff in most areas where organizational activities would take place. Currently, DNE is perceived less negatively by professionals and producers.

An association of market professionals provides a forum for training. For example, reportedly butchers are looking for ways to differentiate their product and to compete in offering higher quality. Therefore, they could be trained to use saws to cut bones rather than an ax, so the meat is not full of bone splinters. A trainee program could equip young graduates to enter the butcher's profession, which infusion could influence the profession to become more quality oriented and responsive to consumer demands.

3. *Market Infrastructure*

OMBEVI wants 60 million FCFA each to improve the markets of Kati and Niono, where OMBEVI has failed to maintain and make operational the infrastructure provided 14 years ago. The cost is enormous and out of proportion to the potential benefits. Use of the funds OMBEVI receives from these markets to maintain the existing infrastructure would probably have allowed them to operate effectively.

The 81 million FCFA OMBEVI proposes to spend on infrastructure for Nara and Nioro is to replace previous investments in market infrastructure which were never made functional. The team recommends that investment should be made in market infrastructure only when it assists local associations or cooperatives in activities which they are also willing to finance. The local association should be responsible for building and organizing the market and determining infrastructure in which they are willing to invest.

The example of the Moptic Livestock Development Agency (ODEM) assistance to the Sofara market seems to provide the best model which we have seen for the auto-financing of market infrastructure. ODEM invested about 3 million FCFA and helped arrange for some Food For Work aid to help the cooperative of Sofara build its market.

The cooperative collects the 100 FCFA per head fee on cattle and 50 FCFA per head on small ruminants. Thirty percent of the fee revenue is deposited in the bank, and another 30 percent is used to reimburse ODEM for the loan. The other 40 percent is used for operating expenses.

Obviously, before associations will auto-finance market infrastructure, organizing work must be accomplished.

Finally, sophisticated infrastructure is unlikely to enhance marketing efforts for technical reasons. The exception would be the walled market, which permits a greater freedom for market participants to socialize throughout the day. In fact, socializing may help to increase the number of market attendees.

3.a Additional Infrastructural Needs: Trekking Routes.

By contrast, improvement and establishment of trekking routes is an important and urgent infrastructural need. Although OMBEVI proposes a study of trekking routes, it is not assigned high priority. However, conflicts in the Mopti/Delta region give us an indication of problems which may be encountered in the future if this situation is not addressed. These problems will increase as population increases and even less land is available for cultivation. Trekking remains the most economical means of moving livestock and trekking routes continue to be important between markets, among rural producing areas and urban consuming areas, to get animals to export markets, for important transhumance routes, and to cross heavily populated regions, particularly from northern to southern pasture zones. Unless these permanent trekking routes are established soon, it may become very difficult, if not impossible to initiate them.

Previous studies of trekking routes must be updated and in fact, existing studies identify and approximate the course of many of the important trekking routes. New studies must determine which routes are in danger of being blocked by expanding population and/or cultivation. These problematic routes must be given priority. Before starting work on any one trekking route, a study should determine exactly where it does/can/should run and where possibilities exist for watering and grazing animals along the way. Routes should make maximum use of existing water points and areas with grazing potential. In some heavily populated areas it may be necessary to provide water points and even corrals, although this should be considered as a last resort. Local populations should be involved in establishing the trekking routes and consulted as to how water and pasture can be made available. In the future herders may have to pay villagers along the way for the privilege of grazing their animals, although this will raise the cost of trekking.

The USAID project component should consult and collaborate with efforts by other projects and RDOs to establish a network of trekking routes.

Once routes are officially established, they must be protected by the administration. We observed a situation in the Mopti region where the officially marked permanent trekking route had been cultivated for many miles. Herders who rely on this route currently

cannot use it because it is planted in sorghum and millet. Without enforced protection, the transhumance system continues to decline.

4. Credit for the Marketing System

Many of the professionals in the livestock marketing system do not have the finances to operate efficiently; however, the marketing system would operate more effectively and efficiently if financing were less of a constraint. Short term credit transactions often require a fee which translates to an annual interest rate of several hundred percent.

Butchers in particular appear to have difficulty arranging financing. Many butchers, and particularly the apprentices, operate on a small scale with scant financial resources. Theirs is a risky venture in which they must sell a perishable product in a short amount of time; with the certainty that a percentage of animals are diseased and will be seized by the meat inspectors.

In the past, USAID has attempted to finance a revolving fund for butchers and producers through ECIBEV. The credit activity did not obtain the desired results, and poor repayment rates placed the credit funds in jeopardy. At present, USAID is having repayment problems on loans to large grain merchants who are among the largest economic operators in Mali. There is no reason to believe that the results on revolving funds proposed by OMBEVI would be different now, unless there is an accompanying fundamental change in the manner in which credit is organized and used.

The most appropriate form of credit would be a group arrangement channelled through associations and cooperatives of market professionals. Whatever credit might be offered should be operated through the banking system and under the conservative criteria which the banking system uses to grant loans. The associations or cooperatives are normally required to deposit money in the bank which serves as a guarantee for the loan. The maximum amount of money an association or cooperative can borrow is dependent on how much it has deposited. Although an individual is permitted to borrow perhaps a third more than he/she has deposited, an association can often borrow several times what it has deposited. One approach to increasing an association's access to credit would be for USAID to use a matching fund concept with regard to a guarantee fund. If an association deposits 3 million FCFA, USAID might deposit 3 or even 6 million FCFA as additional guarantee money in a guarantee fund at the bank reserved for USAID funds. USAID funds would be handled by the bank and remain separate from the association's funds. Criteria would have to be established with the bank and the associations as to when and what matching funds would apply to a given loan request. A fee calculated as a small percentage of the value of each loan under the guaranteed matching fund would be assessed by the bank to help insure the integrity of the guaranteed matching fund. A credit specialist would need to work out these or other arrangements with a bank.

Before implementing a credit activity, the livestock marketing credit situation should be comprehensively studied. Previously, the *Caisse Centrale* undertook such a study and

consequently proposed a credit program which was never implemented. The results of this study and the proposed credit program should be analyzed before any credit activity is undertaken. USAID should collaborate with the *Caisse Centrale* on any major credit component since the *Caisse* is likely to have better access and influence over the banks than is USAID.

A second, but closely related issue, is the establishment of an insurance fund to protect butchers from the seizure of diseased carcasses by meat inspectors. This is an even more complex operation than credit through associations, because it is inevitable that diseased animals will be found and seized, thus diminishing the fund. Again, USAID funds should be used in the banking system only as a guarantee. Butchers must be willing to establish a substantial fund and regularly contribute enough to keep the fund solvent. Contributions might be a flat fee per head (differing respectively for cattle and small ruminants) or a percentage of the value of animals handled.

The Bamako butchers' association has reportedly built a fund of nearly 6 million FCFA in approximately one year (1989). Their ability to raise that kind of money gives an indication that some of the credit and insurance issues can be handled through the association.

Whatever is done, the initial step should be an effort by the market professionals through their associations, rather than a gift from USAID via OMBEVI. However, working through local initiatives and organizing associations is a slow process, and results are established slowly. Activities dependent on effective associations can only be initiated after the years required for organizational activities. Nevertheless, the "quick start" approaches attempted in the past were expensive and usually failed.

Meanwhile, this period of organization permits time to carry out a series of much needed studies.

5. *Studies*

The descriptions of the three studies and the introduction of selling animals by live weight appear to be isolated proposals which have been tacked together to make a study activity. In truth, they remain isolated activities with no attempt to establish a study program which would cover the life of the project. For example, it makes no sense to provide 2 four-wheel drive vehicles for an isolated study involving only 30 days of field activity, as is proposed in the case of the cost of production study.

Cost of Production Study.

The study proposes employing 21 enumerators, which may or may not be necessary. Whether market data is collected by increased OMBEVI staff or DNE agents, it would seem that these same people might be mobilized to participate in a cost of production study in their area. Although a rapid identification of production costs is desirable, the survey should be designed to continue to obtain information throughout different seasons to complete the picture of what these costs are in different situations.

A second feature to consider in the cost of production study is an evaluation of how and why producers value their livestock. In fact, animal prices are inexplicably high compared to the estimated low production costs of the traditional production system. Therefore, perhaps producers' attitudes towards the value of their animals may be an important consideration in setting prices. However, until further study is undertaken this is only inference.

Auto-Financing of Livestock Development Activities.

The Ministry of Environment and Livestock Production (MEE) needs a strategy for auto-financing livestock development activities, and a study might contribute to establishing such a strategy. Perhaps equally as important should be the development of a policy for applying user fees and cost recovery in programs in which revenues are collected. This cost recovery is applicable in several instances including returning the cost of vaccines to CVL for its vaccine production and related activities, charging the full cost of animal health delivery (in addition to the cost of vaccines) and using this revenue to finance the operating costs of DNE's health delivery system, and to using Kati market fees first and foremost to operate the Kati market and to maintain and improve the Kati market infrastructure. With the elimination of export taxes, the proper management of user-fee revenues appears much more important than does an analysis on the use of the head tax collected on livestock.

Rather than a comprehensive effort, a series of studies specific to different sources of user-fees and their management is necessary. An obvious example is the cost of production study urgently needed at CVL to determine an appropriate cost/price for the vaccines which it produces. A study will also be needed to determine the cost of DNE health delivery services in order for DNE to move towards full cost recovery. Charges for using the slaughter houses and their facilities should also be considered. The Ministry needs a policy and strategy with regard to these many different potential user fees, and should identify what this change to a user fee system will mean for the Ministry and its different services. This will likely be a continuing concern that requires analysis over time, rather than a quick six-month study.

Inventory of Commercial Trekking Routes.

The authors agree that the updated studies of trekking routes are necessary (see discussion under the infrastructure component), however, it is an issue which is much too urgent to consign to study alone. A livestock sector project should update available information on trekking routes, and with that knowledge pro-actively work to establish permanent protected routes in key locations.

Introduction of Selling Animals by Live Weight.

There is little merit in the recommendation to sell animals by live weight given existing circumstances. In fact, producers and market intermediaries would most likely find this practice problematic. The purpose of this recommendations is to prevent unscrupulous merchants from taking advantage of naive herders and farmers who do not know the value of their animals. However, producers are also unlikely to be unfamiliar with scales and kilos, and are probably more secure negotiating in FCFA value which they do understand. A more simple measure would be to provide publications and radio diffusion of prices to inform producers and market professionals as to what kind of prices they might expect.

A scale has existed for years at the Kati market which is the source of many of the animals butchered in Bamako. Yet these same butchers and brokers who reportedly requested the introduction of selling animals by live weight also apparently refuse to use the scale. If there is a need to establish a relationship between the price of animals and the price of meat, animals could be weighed after purchase at Kati or at the Bamako slaughterhouse. Weighing the animals after sale would assist government services collecting statistics on the livestock sector.

Bureaucrats may have a need to develop appropriate statistics for the livestock sector, and would therefore benefit from this practice. However, there are alternative methods to develop this information, e.g. to work directly with market professionals, who may also have a professional interest in similar information. Perhaps this activity could be included under the Organization of Market Professionals component.

Furthermore, the rationale cited for this study, i.e. the need to study the relationship between meat prices and the high cost of animals, seems to predate the liberalization of meat prices. If butchers and brokers have the freedom to increase meat prices they have latitude to maneuver between high animal prices and low meat prices.

Other Studies Proposed by the Concept Paper Team

1. Why animals presented in markets are not sold

Herders are often characterized as having a "traditional mentality," which supposedly constrains them from selling their animals in a rational manner. In fact, statistics indicate that only 65 percent of the animals presented in the market are purchased. The most recent available DNE statistics (1988 annual report) provide the following statistics of animals sold: 64 percent for cattle, 53 percent for sheep, and 61 percent for goats. The 1987 OMBEVI report indicates 65 to 75 percent of cattle are sold in rural markets, with Segou and particularly Bamako pulling down the average. (The Bamako average is probably low because animals are trekked in for slaughter and presented daily until sold.) Evidence derived from observation of the Fatoma and Sofara markets indicates that livestock buyers present simply did not have enough money among them to purchase the number of animals presented. Herders/producers continue to bring more animals to market despite the inability of the marketing system to absorb them, which indicates an attitude contrary to that traditionally supposed. An untested hypothesis is, then: "The herders are willing to sell many more animals than the market can absorb." If this proves to be true, then a corollary hypothesis would follow: "Rather than the traditional attitudes of herders as the primary constraint in the market (resulting in diminished offtake), there are inherent problems within the market." These could include the availability of export markets and inefficiencies in the marketing process, but further study is required to identify and determine the scope of these constraints.

It is recommended that this study be carried out over time; perhaps over a year or longer, and in conjunction with the study on costs of production and producer valuation of animals. The price at which herders sell, and the reasons why they did not sell particular animals, would contribute to understanding how producers value their animals.

2. Small Ruminant Marketing

Evidence indicates there is a potential to increase small ruminant marketing and exports. Potential for this activity appears more promising currently than for increasing cattle exports and therefore it is recommended that a livestock project include a significant component which actively promotes private sector small ruminant marketing with a particular focus on exports. However, at present there is a lack of relevant information from which to derive a structure for this project component. We propose that a study be undertaken prior to or concurrent with the project to elicit more information, with the provision that it move from study to an operational small ruminant marketing activity.

3. *Cattle Export Potential*

Cattle exports appear to be constrained by competition in the Côte d'Ivoire market, currency problems and war in Liberia, and currency and economic problems in Nigeria. Nonetheless, cattle exports have traditionally been a significant component of the Malian livestock sector and therefore require attention. Long term efforts should concentrate particularly on the means to penetrate the Nigerian market.

4. *Availability of Agro-Industrial Livestock Feed Products*

Reports are conflicting regarding the availability of agro-industrial by-products with potential use as livestock feed. Producers uniformly complain that such products are not available to them. Other sources cite that milling by-products are exported at 15 FCFA/kg and the sugar mill finds it difficult to dispose of molasses. Apparently, a major problem is the seasonality of demand: there is little demand for these products during the rainy season and overwhelming demand during the dry season. However a system to preserve and store these products to respond to seasonal demand does not seem to exist. Meanwhile, there is a consensus that feeding animals is the primary constraint to livestock production, yet the available resources and highly sought industrial by-products do not appear to be efficiently used. This problem requires further study with a view to finding solutions to stocking, preserving and marketing these by-products.

5. *Transformation Studies*

A series of studies should be undertaken on the transformation of animal products, one of which is milk. The International Livestock Center for Africa (ILCA/CRZ) will probably provide the studies needed for the area around Bamako, yet we are told that ULB does not know the cost of pasteurizing and processing fresh milk. Small processing units like the one functioning in Mopti appear interesting, but little relevant economic and financial analysis is available. Additional small units are being set up in Sikasso, Kayes and Koutiala.

Hides and skins are also worthy of study. Reports indicate that there are presently more exporters of hides and skins than any previous time, but that the export value of these products has dropped precipitously. The dynamics of this situation should be investigated further, as there appear to be constraints to profitably marketing these items. For example, a private firm which indicated interest in buying a tannery reports that it cannot both meet the GRM's pollution control requirements and still make a profit. Furthermore, the quality of hides is compromised by sloppy butchering and by the tradition of marking animals (similar to branding). Questions to direct research include: can hide quality be improved; can more leather products be produced in-country and sold; are there solutions to meeting GRM pollution control requirements which would yet permit

cost-effective operations; is there a use/market for horns; can blood and bones be processed for more efficient use in livestock feeding; can the slaughterhouses be operated privately at a profit; etc.

6. Poultry and Egg Marketing

A poultry and egg marketing study could help increase producer incomes as well as have an impact on nutrition/consumption. Poultry, and particularly egg producers, complain that the Bamako market for these products is poorly organized, causing problems in selling their products. A study could focus on improving marketing efficiency and increasing demand.

A Studies Office

Many of these issues are related to areas where at present we do not have enough information to recommend concrete actions. There are also a number of studies needed in the commercialization area as listed below. Therefore, we recommend that the project establish a studies office at the level of the Director of DNE or the level of the MEE cabinet.

The OMBEVI proposes to undertake and finance isolated studies with no attempt to establish a studies office and program which would meet various needs over time. There is also little indication as to what existing personnel OMBEVI might already have to staff such an office. Given the obvious linkage to policy concerns, a studies office should be established by the project, but at the level of the Director of DNE or the level of the MEE cabinet. It should supervise these various studies and provide analysis and input on policy and commercialization issues. Malian staff should include expertise in the areas of animal science, agricultural economics, veterinary medicine and sociology. Technical assistance should be provided at least in areas of animal science/animal production and agricultural economics.

The Role of OMBEVI

The ability of OMBEVI to implement an appropriate commercialization program is not evident. Much of OMBEVI's proposed strategy revolves around organizing market professionals and producers. OMBEVI has been operating the important Kati livestock market just outside of Bamako for about ten years, and to date has not proven an ability to organize the market or the professionals who use it. In fact, market professionals at Kati and elsewhere seem to identify OMBEVI primarily with its role of taxing market users rather than as an agency with a vocation of extension, group organization or as a provider of services. Market professionals distrust OMBEVI and resent its role as taxing

users without providing services in return. For these reasons OMBEV⁷ is not an appropriate organization for organizing market professionals; i.e. it is not an appropriate organization for implementing its own proposed strategy to improve commercialization.

OMBEVI would like an increased role in collecting livestock market statistics, but does not have the staff to do the job. Therefore, this would require the project to hire staff on contract to implement its proposal. Meanwhile, DNE has staff in most of the necessary locations, which with proper training could implement the proposed information system at much lower cost than could OMBEVI. In fact, it appears that it may be beneficial to integrate OMBEVI into DNE to avoid duplication of personnel and expense.

Animal Health

At the national level a livestock project should have three foci with regard to animal health:

1. Support CVL in achieving its mission with regard to vaccine production and the improved diagnosis of animal diseases.
2. Support the privatization of animal health services and delivery of services.
3. Assist DNE's transformation from an animal health service to an agency which regulates animal health activities, meat quality, slaughterhouses etc.; (and which takes a lead role in animal production extension activities and commercialization).

Central Veterinary Laboratory (CVL)

The CVL is producing vaccines and serums and has initiated an effective quality control monitoring on all vaccines. Vaccines are exported, sold to development projects in Mali and sold directly to DNE. About 75 percent of the domestic sales go to development projects which cover substantially less area than DNE Field Services. Recently, vaccines have been exported to Burkina Faso and Guinea Conakry.

The CVL began to produce small ruminant vaccines recently. Use of the vaccines has increased rapidly from nearly no output to 500,000 doses. They are also developing new cattle, fowl pox, and salmonellosis vaccines for poultry. Poultry vaccines are currently imported and are not reliably available.

Studies on the prevalence of brucellosis in the herds supplying milk to the major population centers are continuing; in the near future CVL will make appropriate recommendations.

Also under study is the identification of viruses which cause respiratory diseases in small ruminants before the age of five months. Tsetse fly areas have been identified and control measures are implemented.

A country-wide sero-surveillance program is underway to identify cattle immune to rinderpest after vaccination. The average vaccination rate is 61-71 percent in Regions I and II.

The Diagnostic Network procedure consists of receiving a properly prepared field sample taken from the suspect animal, expeditiously analyzing the sample and then communicating via two-way radio with field DNE agents concerning the diagnostic findings. Also, included in this element has been the training of DNE field agents to do their own simple diagnostic work and to properly prepare samples for sending to the CVL.

CVL should increase the range of vaccines produced, particularly targeting small ruminants and poultry. Production of small ruminant vaccine is both recent and relatively small-scale. Development and production processes for poultry vaccines should be encouraged, which is an orientation that corresponds with CVL's need to increase the quantity of vaccines produced.

The CVL was built with as large a capacity as deemed necessary for a regional West African vaccine production facility. However, only in the last few months has it begun to export vaccines to neighboring countries and in the meantime there has been a serious lack of economic efficiency. Since the majority of production costs for vaccines are indirect, an increase in the quantity produced will result in a decreased cost per dose. Therefore, increasing the range and quantity of vaccines produced domestically, and increasing vaccine exports will contribute to making the CVL a more economically efficient enterprise up to the limits of existing capacity. The CVL must continue to carefully monitor the quality of vaccines as it increases production. Quality control is necessary to achieve its acceptance in the export market and to safeguard the health and safety of domestic livestock.

The development of a cost accounting system is essential to improve CVL operations. Costs to be determined include those for vaccine production and quality control and the cost of other services which are performed and might be assessed a users' fee such as testing water or dried meat. The CVL presently charges 20 FCFA per dose for vaccines packaged in 10 dose bottles, but it is not clear whether this fee covers the cost of both production and packaging. The CVL must determine what the full cost recovery price would be at different levels of output, and subsequently charge prices which will cover at least the costs of vaccine production and quality control. In 1991 the CVL will be required by the government to pay its own water and electricity bills which may encourage CVL to become more cost conscious.

The CVL should be encouraged to improve the functioning of its diagnostic capabilities to identify outbreaks of contagious diseases and other health problems which have an economic impact. Emphasis should continue on the CVL established diagnostic network which functions in cooperation with DNE health posts. DNE field staff training

in diagnostic procedures should continue as so should the CVL's animal disease research program.

USAID should consider supporting the CVL with non-project funding; particularly in animal health efforts. This is for two reasons: it would provide USAID with leverage in policy formulation, and would allow a livestock project to focus on commercialization and the natural research management pilot project. This emphasis could alleviate some of the management problems encountered in the previous project.

Health Delivery

Vaccination against rinderpest and contagious bovine plural pneumonia (CBPP) is mandatory. The Pan African Rinderpest Campaign provides financing for total coverage of frontier zones, including the delivery system and cold chains. The remainder of Mali depends on DNE funds. For all vaccinations, including those for blackleg, anthrax, and pasteurelloses bovine, stockmen pay around 15 FCFA per injection (20 FCFA when packaged in small 10 dose bottles). In 1988, a total of 4.6 million doses of cattle vaccines were administered by DNE agents, which should have resulted in the recovery of 69 million FCFA. The charge per dose does not meet the expense of its manufacture, not to mention delivery or conservation. Stockmen pay the cost of any pharmaceutical products used, but there is no official DNE service charge for delivery.

DNE has a countrywide distribution of technical personnel capable of delivering health care services, but they lack operating funds for items such as transportation as well as fuel to operate freezers. In fact, DNE continually depends upon projects to subsidize its operating budget. Consequently, the staff does not have the means to handle the vaccination task completely and effectively. DNE personnel receive few incentives through the government system and, according to reports, are underemployed nine months of the year. Consequently, morale is probably low. Since staff lack transportation, equipment and incentives, it is believed that herders/farmers pay individual agents most of the costs of health delivery to assure the delivery of services.

With the exception of vaccination delivery, the DNE has a reputation for lacking equipment and expertise to intervene in the livestock sector. Much of DNE field staff consists of veterinary nurses who are poorly trained in improved animal production, much less integrated livestock and crop production systems. RDOs have developed their own health delivery systems because DNE was not considered adequate to help protect oxen and farm/village livestock not concentrated in large herds. These activities are often staffed by DNE personnel seconded to the RDO. DNE will probably not have staff to second under the new *cadre organique*. Although DNE would like RDOs to contract DNE to continue to provide these services, these contracts should go to the private sector and not DNE.

Animal health delivery services should be handled by the private sector, but this is as yet untested in Mali. Until very recently, government policy did not allow veterinarians

to practice privately or to procure and sell veterinary pharmaceutical. Furthermore, the private sector cannot compete with DNE services provided at subsidized rates. Except for providing vaccinations for contagious diseases, the health delivery field is not well-developed. There is little economic incentive for the private sector to become involved in animal health delivery unless it is allowed to participate in providing vaccinations.

Government policy should require DNE to determine the cost of animal health delivery and to rapidly increase user fees to obtain cost recovery. This would also increase DNE operational funds, assuming DNE is allowed to keep the revenue. Careful consideration should be given to whether or not fees should be increased suddenly or gradually.

USAID is funding operational expenses of vaccination campaigns in Region I and II under the Mali Livestock II Project. This should be phased out and replaced by a cost recovery plan which makes vaccinations available to farmers at full cost recovery by either DNE agents or private veterinary services. Emergency outbreaks could, if necessary, be handled by small vaccination teams mobilized for that specific function, or by contracting a team of private sector veterinary agents with, perhaps, transport furnished by DNE.

Privatization Of Animal Health Delivery and Veterinary Pharmacies

On July 26 and October 2, 1986 Presidential decrees authorized and established regulations for creating private veterinary practices. However, until 1990 there was little incentive to start a private practice because no provision existed to establish the rights of veterinarians to purchase and import pharmaceutical products.

In 1991 the parastatal Veterinary Pharmacy of Mali (PVM), which is the DNE controlled pharmaceutical supply system, is scheduled to become privatized. Despite the high prices charged, PVM had losses of 33.4 million FCFA (\$134,000) for 1985 and 12 million FCFA (\$48,000) in 1986 on a turnover of 600 million FCFA (\$2.4 million). Subsidized prices on products will increase by 40 percent before 1991.

Sahelienne de Production et Sante Animale (SAPROSA) a private firm, also imports veterinary products, and reportedly has shown no losses. SAPROSA, with private bank financing, is beginning a project to manufacture drugs in Mali. The value of veterinary drugs imported into Mali in 1987 was 710 million FCFA (\$2.84 million).

There is a need to establish private veterinary practices and pharmacies if for no other reason than to reduce reliance on the highly inefficient, subsidized government veterinary services. Initially, private veterinarian operations would probably flourish within or near densely populated areas having greater numbers of potential clientele. Establishing privately owned and operated pharmacies in rural areas will require resources. Test cases could be undertaken a number of ways including underwriting loans, and/or by making animal health care service contracts with individual veterinarians who wish to establish private practice.

Until DNE subsidies are eliminated for vaccination and veterinary services, private veterinary practices will have little chance of succeeding. The privatization process would be facilitated if foreign donor projects would cease subsidizing DNE operations and other veterinary services. The private livestock production sector will be able to pay for vaccines and veterinary services through commercializing their livestock operations, which is similar to that of any businessman who gathers development capital by using and managing his bank account. Stockmen may have to sell an animal or two to pay annual veterinary costs.

Private sector animal health delivery needs to be studied, explored and tested. The EEC is assisting this effort by helping set up 30 young men who are graduates of Katibougou. These young men are setting up veterinary medicine depots, not clinics. Only veterinarian doctors are allowed to set up their own clinics, so these men must find a veterinarian doctor under which to serve legally. EEC credit is only available for those who set up in the "interior", i.e. away from Bamako. Several persons in the DNE have expressed the opinion that, even though the GRM policy is to disengage from veterinary health delivery, 60 percent of the posts will still be served by the DNE in five years. According to these same DNE personnel, most of the posts would not be profitable for private sector health delivery. Neither is DNE expected to leave vaccination to the private sector, since the DNE will have to maintain the capacity to respond to outbreaks of infectious diseases.

Because of the policy constraints that existed until recently, there are no known examples of private full-time veterinary practices. The establishment of successful examples would provide an incentive for private sector investment in this activity.

USAID should enter into a dialogue with MEE/BNDA/Veterinary Association to encourage the establishment of full-time private veterinary practices, particularly in geographic areas of concentrated livestock production outside of the immediate vicinity of Bamako. A USAID-funded livestock project should develop a program which includes loan guarantees, small enterprise, management, and financial management training through the Chamber of Commerce, Peace Corps and/or CLUSA. A project should also facilitate contact with, and establishment of, livestock production associations.

Village associations, perhaps regrouped in multi-village livestock production associations, should be encouraged to contract for their own animal health care (cattle, small ruminants, poultry), as well as for animal production expertise.

As mentioned above, RDOs should also contract for private sector animal health care. In many cases RDOs may be able to contract directly with the people who are now seconded from DNE.

Related Institutions

The institutional situation for a new livestock project is both difficult and changing, although many of the changes appear to be moving in a positive direction.

National Livestock Service (DNE)

The DNE (*Direction Nationale de l'Élevage*), under the Ministry of Environment and Livestock, is currently responsible for policy formulation and implementation of livestock policies and programs throughout the country. DNE has eight regional offices plus the National Headquarters Office and, according to the Annual Report (1988), is furnishing personnel to five research and development projects: EIV, PRODESO, TONKA, ZONDY, and the National Youth Service.

DNE regional offices coordinate and supervise all field activities undertaken by the Division. There are 46 DNE *Secteurs (Circles)* with a veterinarian assigned as *Secteur* Chief, and 280 veterinary posts (*Arrondissements*) with a veterinary assistant assigned as Chief of Post. Personnel guidelines call for one animal health agent, one animal production agent, and one pastoral and water management agent at each post. Personnel as of 1988 totaled 1,153 including 260 Veterinarians and Livestock Engineers, 392 Livestock Technicians, and 501 Technical Agents

DNE is comprised of five divisions: Animal Production, Animal Health, Program and Projects, Management and Improvement of Natural Pastures and Water Resources, and Personnel and Materials.

A. Animal Production Division.

The Animal Production Division is responsible for studies and programs (mainly for project concepts), and collecting and publishing statistics³. Published statistics include:

- livestock numbers,
- market statistics (OMBEVI gathers information in 17 livestock markets)
 - ▶ slaughter statistics
 - ▶ export numbers
 - ▶ livestock presented and sold
 - ▶ selling prices

³There is an overlap and duplication of effort by DNE and OMBEVI in collecting livestock statistics which seems to be an inefficient use of limited resources. DNE with its extended network of agents nationwide is better placed than OMBEVI to gather market information.

- transhumance numbers,
- watering points,
- pasture conditions,
- annual mortality,
- exportation of leather and pelts,
- and number of agent visits to the field.

B. Animal Health Division.

The Animal Health Division is responsible for animal disease control and prophylactic treatments, inspection of livestock and livestock products entering the domestic and export markets and enforcement of legislation regulating the livestock industry. Until 1991 it will be responsible for the PVM (*Pharmacie Veterinaire du Mali*), a parastatal which imports and distributes veterinary drugs and vaccines. The importation and sales of veterinary pharmaceutical becomes a private sector activity in 1991.

C. Program and Projects Division.

The Program and Projects Division is responsible for:

- Monitoring and evaluation of all projects
 - ▶ compare what has been done with what is supposed to have been done,
 - ▶ assure it adheres to the national plan
 - ▶ assure it follows the administrative and financial plan in project design,
- Rural extension - responsibility for dissemination of animal production, forage cultivation, and poultry production techniques,
- Training and career improvement
 - ▶ *recyclage* (short term job related training)
 - ▶ long term training
 - ▶ planning of training
- DNE program coordination, for example: USAID-Livestock Sectoral Project has activities within the Animal Health and Animal Production Divisions).

D. Management and Improvement of Natural Pastures and Water Resources Division.

The Management and Improvement of Natural Pastures and Water Resources Division has the following Sections:

- Development and Management of Pastures,
- Water Development,
- Socio-Economic and Mapping Section.

E. Personnel and Materials Division .

The Personnel and Materials Division is self explanatory.

F. Operations.

The DNE is an agency which has never been funded to be fully operational and it presently appears to need an infusion of both energy and purpose. Its primary purpose has been to vaccinate cattle herds, particularly as part of the international vaccination campaigns held approximately once a decade. DNE is dependent on these campaigns and projects for the purchase of equipment such as vehicles and freezers, for materials such as syringes and needles and for its operating fund. Historically, it has had an adequate budget one or two years out of ten. Many reports indicate that in the past many of the agents at the Veterinary Post level were busy vaccinating perhaps three months out of the year, but for the remaining nine months had neither job activities nor operating funds.

DNE has not evolved adequately to keep up with the times. It has never been funded for, nor adapted to the emerging need for animal health care in thousands of sedentary agricultural villages across Mali and on hundreds of thousands of individual farms. The successful RDOs have developed their own animal health care programs and promote animal traction and mixed farming. However, many of the RDOs' livestock agents are seconded from DNE to work in the livestock programs. In spite of this collaboration, it is clear that in these instances both the program concepts and the funding come from the RDOs.

The DNE is cognizant of a needed transition from animal health alone to an orientation towards animal production and marketing. However, it appears that DNE has had neither the funding nor the vision to make this transition. For example, the primary function of the DNE Animal Production Division is to collect livestock statistics and prepare them for the annual report. Although the DNE has traditionally been dominated by veterinarians, there has been a significant influx of animal scientists and other non-veterinarians into the upper echelons of DNE and the MEE in recent years. There appears to be conflict between the veterinarians and non-veterinarians regarding the future of DNE.

GRM policy under the Restructuring Program indicates that providing animal health care is one of the services from which the government would like to withdraw. There is much talk of privatization of veterinary services and a pilot project to set up veterinary medicine depots is underway. In reality, many officials within DNE do not agree with this policy orientation and do not think it can, should, or will succeed on any large scale. They believe that DNE will continue to provide vaccinations and health care delivery to a majority of the country. The DNE maintains that it requires a large staff to respond to potential outbreaks of contagious diseases. However, a mobile force one tenth of DNE's present size could respond to the five to ten outbreaks identified each year. Furthermore, this mobile force could consist of veterinary agents working on contract.

Following the logic of GRM policy, it would appear that the DNE should move toward becoming a regulatory agency. In this role it would, among other things, supervise animal health and pharmaceutical and inspect meat and slaughter facilities rather than provide direct local veterinary services. It is not yet clear that movement has begun in this direction.

USAID can facilitate this change in direction by focusing the project on commercialization and animal production within the context of improved natural resource management. USAID should seriously consider relegating any aid to animal health to non-project status. This will also help simplify project management.

DNE needs reorientation, some restructuring, and staff training so that it becomes an animal production extension agency in addition to its role in regulating animal health. At present, the Animal Production Division is responsible for statistics rather than extension activities in animal production. Furthermore, animal production extension is technically demanding, and the majority of local level staff has been trained only as veterinary nurses. Although the DNE has a number of two-year technicians and four-year engineers from Katibougou, a majority of its field staff has two years of training in veterinary nursing. A training program which would recycle these agents through short-term animal production training would help make the DNE a viable animal production extension agency.

Currently, a World Bank Extension Program signifies potential changes in the national extension environment, as it calls for an integrated extension program in agriculture, livestock and forestry. However, implementation is unclear; some people within the Bank appear to advocate using agents from their respective services and want to organize them at the regional and local levels to work together. Still others are calling for a single service with agricultural, livestock and forestry agents. No matter which approach is implemented, both call for using a single agent as the main interface with a given village. This would be an agricultural agent in primarily agricultural zones and a livestock agent in primarily livestock producing zones. This local agent would be supported by content specialists from the other two services. Throughout Mali, this means that most local agents would be agricultural agents, and most livestock agents would be in the role of supporting content specialists. It is difficult to imagine DNE's local level staff of predominantly veterinary nurses filling a role as content specialists in animal production. But we do not know if or when the Bank's extension program will take effect, or how it will finally be structured. In the meantime, DNE staff, particularly those with limited veterinary nursing training, need to be recycled and receive regular training in animal production and extension techniques as well as techniques regarding organizing farmer/village/herder groups into associations and cooperatives.

Another change which should be considered is the integration of OMBEVI into DNE. OMBEVI activities in the area of collecting market statistics overlap with those of DNE. DNE has the field staff to expand the collection of market statistics and to organize local producers and market professionals while OMBEVI does not. Furthermore, as discussed previously, OMBEVI has proposed a commercialization program in which a principle element is organizing market professionals and producers. Although the basic idea has merit, OMBEVI is an inappropriate implementing organization because of the

antagonism generated by its policy of charging market user fees without providing any market maintenance or services to those users in return. It is unlikely that OMBEVI would overcome this negative perception in the near future. In concept, the integration of OMBEVI is sound technically and economically. However, this would require a new Commercialization Division within DNE, which would require a political decision and appropriate support on the part of the GRM.

The OMBEVI and DNE statistical activities should be merged and placed in a Statistical Section within DNE. Logically, this would fall into the Project and Program Division so it could work in conjunction with the Monitoring and Evaluation Section. DNE should either develop a new Livestock Extension Division, or reorganize the Animal Production Division (after removing statistics) to deal with extension activities. This should include animal and pasture production and management techniques, forage cultivation and use of crop residues, and poultry production. It should also include socio-economic constraints and considerations, extension methods and organization of farmer/herder/village groups into associations and cooperatives. This Livestock Extension Division should be responsible for directing DNE training activities, which should focus on these animal production and extension concerns. This Livestock Extension Division and DNE training should be organized with consideration of how animal production and DNE agents will fit into the proposed Integrated Rural Extension Program.

Malian Office of Livestock and Meat (OMBEVI)

The OMBEVI began operations in 1969, with USAID assistance. Responsibilities include efforts towards the commercialization of animals and animal by-products activities, to produce technical and scientific bulletins, to make available market prices for livestock, to provide a documentation center. Recently, OMBEVI has acquired responsibility for evaluating projects. There are 324 livestock markets in Mali for which information could be supplied. Currently, OMBEVI has no contacts in Côte d'Ivoire for livestock marketing forecasts or actual market conditions.

OMBEVI needs an infusion of energy and purpose. Currently there is pressure to reduce the size of the civil service, which supports the idea to integrate OMBEVI into DNE. USAID put substantial funds into OMBEVI a decade ago with the expectation that it could significantly improve commercialization of livestock. These expectations were never realized and OMBEVI received little or no funding under the most recent phase of the USAID livestock project. As mentioned above, there seems to be considerable duplication between the work of OMBEVI and DNE's Division of Animal Production. This overlap relates to collecting statistics on numbers of animals and prices in cattle markets. If DNE agents are underemployed, it is not clear why OMBEVI should hire additional staff to do work which DNE could do with staff which already exists in those locations.

As discussed in detail in the commercialization section, OMBEVI does not appear to be an appropriate organization to implement the commercialization program that it has

proposed. Organizing market professionals and producers is crucial to this proposal. Market infrastructure and credit should also only be considered when it can be provided within the context of facilitating activities of an association or cooperative. The antagonism of market professionals towards OMBEVI makes it an unlikely candidate to carry out this activity successfully.

Given these problems, it appears that it would be appropriate to integrate OMBEVI into DNE and transfer these and other OMBEVI functions to DNE.

The Central Veterinary Laboratory (CVL)

The CVL, which is also discussed earlier, appears to be a sound, high-energy institution. It has an important role and the capacity to achieve it. However, CVL must recognize the limitations of USAID financing, i.e. that it should move toward self-financing. Vaccine revenues are probably inadequate to finance the entire diagnostic program for the country but CVL should be able to finance a substantial percentage of its budget.

Other Issues

Management Information System (MIS)

The DNE and Ministry need an effective management information system (MIS). The project will also need an operative management office and structure. This team has not spent time on management issues but agrees in principle that MIS may help coordinate and improve decision making throughout the Ministry.

Training

The *Ecole des Infermières Vétérinaires (EIV)* at Sotuba currently is inadequately funded to achieve the level of training necessary. Emphasis presently is on animal health, with little training in animal production. However, the facility could be used to train DNE staff in animal production, extension and organizational techniques and animal health. It could also provide training to the private sector or villagers in the context of specific extension activities. Curriculum development is essential.

EIV should be renamed and given a new direction to become the School of Livestock Extension and Animal Health. It should be responsible for redirecting existing livestock technicians and agents into integrated rural extension specialists, better prepared to interact with other subject specialists (primarily foresters and agriculturalists), and with village groups (clientele). An appropriate integrated curriculum would have to be

developed with an orientation towards teaching livestock production, land and territory management, and socio-economic concepts. This should be accomplished through a series of short courses and a program of regular training for DNE staff. This does not have to be patterned strictly after the World Bank's Training and Visit System (T&V), i.e., with visits rigidly scheduled every two weeks but it should be programmed and regular. The school could be an effective vehicle for developing the curriculum and content of these regular training sessions in collaboration with the Livestock Extension Division.

The school can also be a vehicle to provide short courses for Veterinarian Nurses and to give practical training to selected village leaders and management committees in aspects of bookkeeping, banking, conducting meetings and livestock, pasture, forestry and forage development as well as management, and simple animal health care.

Similar short courses should be planned to provide forestry and agricultural technicians and agents with an overview of livestock production, particularly within the framework of mixed farming. This recommendation is pending the determination of need for such integrated extension agents and should be coordinated closely with other major donor activities. The World Bank-assisted integrated agriculture and livestock programs, *Amenagement Pastorale (Caisse Centrale, Region III, at Sikasso)*, ODEM (Mopti), UNDP Programs, and USAID, are currently discussing integration of extension services. OHV and CMDT are already involved in similar integrated community activities and could possibly serve as models for developing training needs.

Other training needs are described below:

Extension Agent Training.

There are several points germane to improving extension agent performance:

- A number of livestock agents need training which emphasizes maximum animal unit output. Practical training should include small ruminants, poultry, care of traction oxen; production, storage, the storing and use of farm crop residues as livestock feed, and the planting, harvesting, and storage of forage crops. Agents must understand how Village Territory Management (VTM) systems work and how to support them.
- Supervisory, short courses for Veterinary Engineers (IPR graduates) similar to those described above, but on a higher administrative level course could be offered for both private and public engineers.
- There will also be an intermittent need to develop practical subject and specific technical short courses including:
 - ▶ Development and management of forage/pasture seed multiplication plots;
 - ▶ Training of village management committees in simple bookkeeping, finances and banking procedures, and buying and selling of goods.

- Animal health agents should also have periodic retraining and be brought up to date with new techniques and diagnostic procedures.
- Field days should be held at agricultural/livestock research facilities/plots to get an overview of rural activities. These should be attended by technical specialists and agents with village management committees and selected members of Management Groups.
- Field trips to livestock markets in various parts of the country should be organized for village management committee members, marketing committee members and other selected members.

Private Sector Entrepreneur Training.

- Local butcher training in preparing cuts, cutting through bone with saw (preventing splintering of bone) and the protection and conservation of fresh meat. Learning simple, small business recordkeeping techniques would be useful. Care in skinning animals would probably make the hides more marketable.
- Animal products transformation, such as cheese-making, pasteurization of fresh milk using small pasteurization units, making bilton (strips of dried meat), and hide tanning for local use by artisans.

This is an area in which female extension agents with proper training could excel, ie. training women to develop small farm based enterprises in the preservation and marketing of farm livestock products. Many similar activities are traditionally in the domain of rural women.

- Entrepreneurial/marketing strategies include buying and selling animals for domestic and export markets, treating hides and furs and animal fattening.
- Management training for veterinarians for veterinarians pursuing private practices may need training assistance in areas of buying and selling veterinary products, bookkeeping/accounting, loan procurement, and contract procedures (Small Business Management Course).

Some of the proposed training might be provided through the new Livestock Extension Training School, however some may be more appropriately handled through programs established or envisioned at the Chamber of Commerce. Project and DNE personnel might work with the Chamber of Commerce to facilitate such training in the private sector.

Information Seminars and Bulletins.

Local one day regional seminars should be organized to inform export and domestic livestock buyers of the rules and regulations governing marketing of animal and animal products. These seminars should be organized through the Chamber of Commerce with the cooperation of DNE.

Women

The role of women in livestock production has been largely ignored. Almost all activities and interventions have assumed men to be the appropriate clientele, which is erroneous. Village poultry production and care is almost exclusively a female task. Therefore, extension activities which train men to feed and care for poultry are inefficient and will probably be ineffective because they are targeting the wrong clientele. Women and women's associations should be the primary participants and beneficiaries of village poultry activities. If properly designed a livestock project's emphasis on village poultry activities has a strong probability of having an impact on women.

Women and women's associations should also be given equal opportunity to participate in commercial poultry activities. However, at present the egg market appears to be saturated by private sector commercial activity, and village poultry projects appear to have better potential for meat production.

Women also own and care for a large percentage of the small ruminants in Mali. It must be stressed that a small ruminant project component must also be carefully designed to target women as priority participants. Historically, almost all extension activities in Mali targeted men.

The number of female extension agents should be increased. DNE has 35 women agents out of 387 field staff. A greater number of agents should be trained to support women's role in husbandry, product transformation and commercialization. Although the present situation calls for trimming the civil service, and an IMF-imposed hiring freeze is in place, the extension service ability to target women would have a better chance of succeeding if a reasonable portion of extension agents were women. If contract hiring becomes possible and necessary in a livestock project, every effort should be made to hire women. More women's voices and lobbying power would enhance the ability of the extension service to respond to women's needs and respective roles.

USAID should use whatever leverage it has with the BNDA to insure that loans for animal fattening activities are available to women and women's associations from the *Embouche* Fund. It would be very helpful to have female agents promoting these activities.

Credit

Direct lines of credit have presented serious management problems in the past and have consistently lost money. Credit through the banks and village associations has a much better repayment rate. Banks will not lend to some of the more risky ventures. Reports indicate one must be willing to accept 30 to 40 percent default rates if one lends to ventures which the banks consider too risky. Guaranteed loans help encourage banks to provide loans in somewhat riskier situations without taking on the management headaches of providing direct loans. USAID should consult the Caisse Centrale study on credit for the livestock sector and its proposal for providing credit. If possible, USAID should try to collaborate with the Caisse Centrale, which is likely to have more influence over the banks than USAID.

USAID should assist groups e.g., cooperatives and associations, in activities for which they will be responsible and in which they are willing to make a substantial investment. Modern sector entrepreneurs can also form cooperatives if they want access to such funding.

One approach that has merit is to match guarantee funds deposited at banks by cooperatives or associations in order to allow larger loans to these groups. The loans would be handled by the banks and USAID funds could be kept in separate accounts so they never mix with association funds. A small fee on all loans receiving this matching guarantee could help maintain the USAID fund.

Credit may be a necessary tool to promote livestock activities, but it is a tool which is extremely tricky and dangerous. As with poultry projects, most credit projects or credit components of projects in the past have failed. Given this history, the CLUSA activities in the OHV project are particularly interesting and are worthy of study.

The project should facilitate the organization of associations which can be responsible for and administer credit provided through the banking system. This is not to say that the project should never provide credit directly, but the project should go to extreme lengths to avoid providing credit directly. The BNDA system is slow and bureaucratic. It is difficult to work through the banking system and get the instant results which projects would like to achieve. At present only a few cooperatives and associations are organized and have a fund which can be deposited in a bank as a guarantee fund. Little credit will be used until several years of intense organizing activity has been successfully implemented. But credit should help facilitate activities of those groups who demonstrate enough promise to develop the guarantee fund, however it should not be a gift, and should be carefully evaluated. USAID/Mali's experience with revolving credit in the livestock sector bears witness to the need for a conservative approach.

Research

Applied research is an important contributing factor in any rural agriculture, forestry, or livestock extension program. The success of extension systems depends directly on research activities fitting closely with farmer requirements for information.

The project needs to encourage closer collaboration between farmer issues and problems, and research efforts. Extension services need a direct linkage to research on crops and forage, livestock, land-use and forestry. The ability of farmers and the appropriate extension service to communicate a farmer problem to the appropriate research unit and receive an answer back, is important to all three parties involved. Responses should include an assortment of printed bulletins, seminars, and field visits.

Research Constraint.

The lack of existing applied research at the village/farm level could prove a serious constraint in extension activities in a livestock sector project and particularly within a pilot livestock project. It is likely that the DNE and a pilot project would need a unit to liaise with the research structure and particularly with the livestock research program. The same liaison unit should be active in pre-extension trials and activities.

Pilot Project

The team recommends small-scale testing of concepts and issues discussed within the scope of this study. These could be operationalized in one or two villages with emphases and direction as discussed below.

Natural Resource Management

An estimate of the cattle population, taken over the last ten years, indicates that animal numbers have decreased in the north Sahel Ecological Zones of Mali and increased in the south Sudanian and Guinean Zones.

Sahelian herds are moving out of the Sahel in search of grazing lands and many are migrating south. Breman (1986) says that the North Sahel is overstocked by 25 percent and that the South Sahel is overstocked by 13 percent. In 1980, about 50 percent of Mali's cattle and 71 percent of small ruminants were located in the Sahel; which is 75 percent of the country's land area. Yet in 1989, less than 30 percent of cattle and 53 percent small ruminants were found in the Sahel. The southern zones represent only 25 percent of Mali's land area, and are more productive in bio-mass. In spite of the region being somewhat infested with tsetse flies, local ownership of animals is increasing, largely due to the cash crop of cotton. Cotton farmers are reinvesting their cotton earnings into livestock. Expanding local herds are competing with the ever-present seasonal transhumant herds for pasture.

Degradation of natural resources is out of control in the northern regions of Mali, known ecologically as the Sahel North and Sahel South. The only hope for environmental survival is by recovering the balance between man, animals, and vegetation.

Increased animal populations in the south, combined with increased human populations and expanded sedentary agriculture, results in overstressed land resources.

There are five important factors which can be addressed in a new livestock project which will contribute to sustainable agricultural systems and improved natural resource management:

1. A focus on increasing the productivity of the existing national herd with a corollary acceptance that the number of cattle and small ruminants should not be increased.
2. A focus on commercialization activities which help increase offtake and stabilize or reduce livestock numbers by providing attractive marketing opportunities.

3. An orientation towards encouraging livestock activities within the context of integrated mixed farming systems. Within such systems, cash income from livestock can provide an incentive for improving the productivity of both the livestock and the natural resource base. These activities would include: growing forage, improving pastures, making more efficient use of crop residues, and producing manure and compost to improve soil fertility and water holding capacity of the fields in production.
4. Support improved rural/pastoral land use activities and the development of new rural/pastoral codes which institutionalize improved land use. Support for a Territory Management (VTM) pilot project in Regions I and/or II would be one way to support such activities. A model is needed which: 1) reduces the heavy community development orientation to a level which can be replicated; and 2) which specifically considers transhumants in determining village land use. Territory Management or *Amenagement de Terroirs* is a general concept of land use planning and management of local natural resources which might be implemented at a village and/or multi-village level. Returning control and responsibility for natural resource management to the local population, and particularly the village as a unit of social organization, is an important aspect of the decentralization movement. There are a number of territory management initiatives (ODEM, FAO -Banamba, CMDT, etc.) but the concept is not well defined. The approach holds the promise of developing local management of space/territory in a given locality, but is slow and tedious, given the community development necessary to facilitate communal decisions. One form of territory management which has recently received some political support is called *Gestion de Terroir Villageois* (GTV). This approach focuses almost exclusively on the village level, and in several test cases has almost automatically excluded transhumants from using the village territory. If implemented on a large scale this would have important macro-economic consequences for the livestock sector and for Mali. A pilot project in an area where there is positive interaction between sedentary farmers and transhumant herders would provide a useful experience and model for other areas.
5. Support improved animal health care, again with a view to improved productivity. In light of natural resource management, animal health care appears, initially, to be a two-edged sword because the immediate effect is to increase the number of animals using available resources. But in the long term producers need an assurance that a high percentage of their animals will survive. The implication here is that offtake and productivity are enhanced.

With few exceptions, rangelands in Mali are overstocked. The Sahel regions are overstocked by as much as 25 percent and the southern Savannah and Guinea ecological regions in most cases have exceeded their carrying capacities (Bremen et al, 1987; DRSPR).

The lack of biomass in home pastures and along their traditional transhumant routes have caused early entry into the Mopti Region, where crops of sorghum and millet stand unharvested. Nomadic and transhumant herds and flocks have already moved near to their crossing points into the delta area (there are three crossing points), anticipating a late November entry into the delta. Early arrivals have already caused insurmountable conflicts between herders and cultivators.

The number of cattle and small ruminants now using the delta's flood plains have reached enormous proportions. Pasture resources are not sufficient, and animals are forced to leave the flood plains early in search of forage. The delta has shrunk in size because of large rice cultivation schemes and the fact that the rivers do not always reach flooding levels; this year, for example, the Bani River did not flood the delta.

Until recent years, tsetse flies in the southern region of Mali kept large ruminants confined to certain pasture areas. Today, expanding sedentary human populations have cleared more land for cultivation, thus reducing tsetse fly habitat. Though trypanosomiasis exists to some extent, the prophylactic treatment is available at relatively low cost. CVL is working on tsetse fly control in the region and local N'Dama cattle are resistant to the disease.

Recent discussions with an ILCA scientist revealed that dairy herds around the Bamako area are having difficulty finding rangeland with any amount of biomass, and soon may soon find themselves with no pasture availability. Urban area human populations have expanded over the last 20 years to the point that animals, once commonly kept in households and grazed within neighborhoods and on the outskirts of towns, have nothing on which to graze in town or out. Urban animals have become undernourished, consume plastic bags, and are garbage scroungers. Urban perimeters have become what the inner cities were years ago, housing areas for city workers who commute daily to their places of employ within the city. Pasture land has been replaced by housing compounds and small cultivated fields.

Farmers are increasing the practice of supplemental feeding with cut green and dry grass, crop residues, industrial residues such as brans from rice, millet, maize, and sorghum; molasses from the sugar mill; peanut and cottonseed cake. AliVet is reportedly adding 15 percent maize to commercial feed mix. Prepared feeds are available from CMDT (*Alimentaire du Betail*) and AliVet, but are very expensive to feed at the level necessary to maintain herd productivity. Prepared feeds sell for 2,000 to 3,000 FCFA per 100 kilograms. Although high in protein, they offer little in the way of total volume or caloric intake required for energy, reproduction, and milk production.

The lack of adequate quantities of roughage is a major constraint in livestock productivity in Mali. This lends credence to maintaining and improving, rather than increasing the national herd.

Strategy

A livestock project should first focus on commercialization activities, which help increase offtake and stabilize or reduce livestock numbers by offering attractive marketing opportunities. Second, focus should be towards improving animal productivity in terms of meat, milk, eggs, and by-products, and the transformation and preservation of these same products. And third, a project should focus on encouraging livestock activities within the context of integrated mixed farming/communally managed systems. Within such systems, cash income from livestock can provide an incentive for improving the productivity of both the livestock and the natural resource base.

Village Territory Management (VTM)

Terminology and Approaches.

Village Territory Management (VTM) is a descriptive term for a new concept, although it may have similarities to other systems. The objective is to insure that the villages and their inhabitants become the management entities responsible for the rangelands, forests, water resources and croplands within their territory boundaries. It is not meant to take away private initiatives, nor is it an integrated rural development mechanism. An attempt to resolve all community-related issues at once is ill-advised; there is no functioning rural development support infrastructure and the probability for failure is therefore, high. It is more advisable to start out with smaller management units, slowly and methodically identifying common needs in agriculture, livestock and grazing, and forestry. Local management committees and extension consultants would establish objectives, identify resources, and develop management plans and marketing strategies.

Boundaries of VTM units should to be determined by the participating villages themselves. The grazing, livestock watering, human watering, forest care and cutting may enter into the village territory. The verification of adjacent boundaries would be wise, and would avoid possible future conflicts. Boundaries could be recorded on a map for baseline information storage. Village territory will not necessarily follow the administrative boundary such as *Arrondissement* or *Cercle*.

Constraints.

There are many constraints to implementing a VTM-type approach, including:

- A lack of literate farmers to serve on management committees.
- A lack of rural extension agents within one technical agency.
- A lack of integration and communication between Forestry, Livestock and Range, and Agriculture.
- The inability of a technical agency (such as DNE), to properly integrate the

necessary disciplines and train existing agents in rural extension ideology and techniques.

- The inability of the present agriculture, forestry, and livestock and range research institutions to participate in an adapted (direct on-farm testing) and applied (intermediate on-farm testing) research approach.
- The tentative legal or official status; whether or not a VTM unit be accepted legally as an organized body without having to join the National Cooperative Movement
- The management committee must be able to work freely within existing land code system.
- A lack of an established national training body for training in small business administration and cooperative organizations on the village level. (Will CLUSA train non-National Cooperative organizations?)

Selection of Test Case Areas for VTM.

The methodology used in selecting test case areas is very important in the overall development scheme. The populations within potential test case areas must have the sense that they have proactively subscribed to and participated in a program rather than solely having been chosen recipients of a government-imposed program.

Test areas should be established by competitive selection of interested groups of neighboring villages or an *Arrondissement* in Regions I and/or II. *Regional, Cercle, and Arrondissement* Administrations would assist in locating interested village groups or *Arrondissements* as possible candidate areas.

Selection of the *Arrondissement* or village group would not be random. Villages, ideally, should share common territorial borders with each other.

The actual selection of participating test areas would be determined by using competitive criteria based on common social, economical, and physical factors. Visits by the same multi-discipline selection team would first determine the necessary criteria in writing, and establish village(s) desire to work and communicate together to improve their economic and environmental well-being.

Final selection of participating villages would be based on competitive scores, as determined by information gathered during multi-site visits. The selection process should take three to four months.

Management Committee.

The selected village(s) would form a territory management unit. Elected representatives from each village would form their own management committee. The management committee usually consists of ten persons that have been elected to various offices for a period of three to four years, and would collectively write by-laws and a constitution concerning objectives of their unit, and determine types of collective and individual improvement they might want to undertake.

Day-to-day operations could be handled as agreed upon by the group, although often this role is filled by the committee chairperson(s).

By-Laws and Constitution.

Each Village Territory Management unit would draft their own by-laws and constitution which states their objectives, what constitutes a full member and a non-resident member (e.g. transhumant herds), what membership fees and annual dues are paid, what is to be done with the money, what are the officers and special committees functions and the duration of office.

The draft of by-laws and constitution is approved by each participating village group, and appropriate changes are made before registering the document.

Once the draft is approved and recorded a bank account is set up in a convenient bank with the membership fee and dues collected. Membership campaigns are undertaken in each village by the village representative and members of the management committee.

Bank Loans and Credit.

Communal groups have better access to bank loans, have the advantage of group buying and selling, and facilitate community work projects by drawing on more labor. Bank loans for the individual farmer are impossible to find.

Possibly, a project inputs might include a supported credit line at a local bank for financing small Village Territory Management projects in livestock, agriculture, and forestry. The loan would have to be solicited on behalf of a particular VTM by its management committee.

Transhumance.

Transhumance should be purposefully included in the scope of Village Territory Management, but new transhumant herds should not be encouraged. Protocols should be formalized between VTM management committee and tenured transhumant herders. There should not be any surprises to either party concerning rights to resources. Transhumants should be obligated to adhere to the by-laws and constitution of the resident

VTM, which would eventually include management plans for forests, pasture lands, water, and croplands.

Forestry and Land-Use Laws.

An objective under this component would be to define local land-use issues and determine problems and alternate possible solutions. Study would include existing rights held by individuals and communities regarding trees, pasture lands, water, and forests; and would subsequently determine management alternatives offering the most viable sustainability.

Special legislation will be necessary to give VTMs authority to be responsible for their own natural resources such as forests, water, and grazing lands. Special land use agreements should be arranged between a transhumant herd and the Association.

Land-use seems to be an issue that can be better addressed on a local level, within the *Cercles* and *Arrondissements*.

Rural Code/Land Tenure.

Land codes and tenure is a national issue in which there appears to be a great deal of geographic differences. A national body has been formed to study the issues of rural land codes and tenure, and to make proposals for legislation. However, complexities have made the task difficult to solve on a comprehensive national level.

The VTM should eventually have more control of the use of lands and natural resources within their identified boundary area. The initial pilot project villages would serve as a test cases in communal grazing and forest management.

Private Veterinary Services.

One possible mid-term objective might be to contract for veterinary service. In the case of multi-test area units one privately contracted veterinary delivery system could be shared.

Livestock producers would consider using private veterinary services if DNE were operating at cost recovery; i.e. paying the true value of the vaccine and delivery system.

Commercialization.

Because of emphasis placed on marketing within the VTM units, management committees may desire to have a marketing committee formed to pursue marketing of their goods, which could, conceivably, include livestock.

Local markets should be studied, and if appropriate, an effort be made to improve. Studies and infrastructure improvement should be management committee-initiated and supported by communal resources with some project support where needed.

Distribution.

It would be preferable to have two to three VTM test cases simultaneously working for the purpose of evaluating the system. Preferably the Village Territory Management units would not be grouped side by side, but neither would be so distanced as to make logistical support difficult. Over time and if initial efforts prove successful, neighboring village groups might want to form their own Association, and a mushrooming effect occur. In the long term, this could positively affect the natural resources.

VTM, or a similar communal approach, allows the farmers themselves to make decisions pertaining to their own environment. This is in contrast to the classic approach in which the government functionary services tell the farmer what he needs. The administrative services would participate in management committee meetings, acting as consultants. The subject specific extension agent would assist VTM members in organizing and implementing programs.

The VTM would promote linkages to, and mutual feedback with, agriculture and livestock research to provide supporting technical packages. Close collaboration with OHV and DRSPR to provide an integrated extension approach should be considered.

Conclusion

The livestock sector in Mali contributes to the nation's economic health both in GDP and export earnings. In order to contribute to continued economic growth, livestock sector programs must be oriented towards animal productivity and enhanced commercialization. This can be accomplished through a variety of measures undertaken including orienting policy to clarify land tenure/land use issues, to expedite export licensing procedures and eliminate export tax, to deal with women's issues i.e. identifying women's role(s) in the livestock sector etc. Enhanced commercialization of the livestock sector would include activities oriented to regional and domestic issues. Inter-regionally, information systems regarding market intelligence in key West African markets should be established and made readily available. Interregional trekking routes should be acknowledged and protected to facilitate movement of livestock to markets.

Domestically, the commercialization of livestock sector can be improved through the following:

Organizing market producers, which can facilitate access to credit, and provide a structure for further activities.

Training of producers in areas of business management, including accounting and/or recordkeeping procedures, in technical expertise relative to respective functions (such as training butchers in cutting/sawing techniques etc.);

Dissemination of information on customs/export licensing procedures for potential exporters within the sector;

Development of the capacity of existing local organizations (e.g., the Malian Chamber of Commerce) to provide information on promising export markets; and

Institutional capacity developed within agencies such as DNE to monitor the sector and collect relevant data on production and markets etc.

Studies undertaken in a livestock sector improvement project could include the following:

- investigation of offtake of local markets;
- costs of production and livestock valuation;
- financing of sales and purchase, including the role of credit;
- study of inter-regional marketing of livestock including sheep as well as cattle, and small ruminants and poultry;

Animal health should be emphasized, which would include the expansion of vaccines to include small ruminants and poultry. Increased marketing of vaccines, particularly for export would also require stricter quality control procedures. A livestock project should stress the privatization of health delivery, which would necessitate determining the cost of health delivery (to facilitate a move towards cost recovery) as well as the re-orientation of institutions (such as DNE) to regulatory, rather than delivery functions. Funding for CVL and DNE health delivery should be through sources other than a livestock sector project as envisioned within the scope of this paper.

Institutions should be integrated to eliminate overlapping functions and to better utilize available personnel. A project should attempt to move towards an integration of agricultural, livestock and forestry extension service systems.

These concepts should be tested through a pilot project under which the Village Territory Management (VTM) concept is implemented. This would focus on land use issues, and would establish multi-village management councils to consider border questions and transhumance issues. A pilot project would also be supported by technical packages incorporating many of the above-described recommendations.

In regards to animal production, productivity of the national herd is stressed, rather than an increase in numbers. Even small increases in livestock productivity can have a positive impact on the Malian economy.

ANNEXES

| | |
|---------|--|
| ANNEX A | Physio-Demographic Information For the Republic of Mali |
| ANNEX B | People Contacted |
| ANNEX C | Bibliography |

ANNEX A

PHYSIO-DEMOGRAPHIC INFORMATION FOR THE REPUBLIC OF MALI:

Physical size: 1,240,000 square kilometer

TABLE 1

Agro-Ecology Zones of Mali

| Zone | Rainfall mm | % Land- Surface | Tons DM/ha. | ha. /TLU | Livestock Population |
|------------------|----------------|--------------------|----------------|-------------|-------------------------|
| Sahel North | _300 | 56 | ¢.1 | 35-50 | 27% |
| Sahel South | 300-600 | 19 | .6-1.2 | 2.5-7 | 24% |
| Sudanian Savanna | 600-1000 | 14 | av.1.5 | 2-2.5 | 33% |
| Guinean Savanna | ¢1000 | 11 | 1.3 | 1.9 | 10% *** |

* Crop residues provide a maximum of 10% of total feed requirements of village livestock.

** Tsetse fly infested, low nitrogen due to poor soils, dry season grass spp. average _1% protein.

Climatic Zones

Humid Zone (South Sudanian and Guinean Zone), the region of Sikasso, this zone is completely situated south of 900mm rainfall,

Sudanian Zone (500 - 1200mm), the regions of Kayes, Segou, and Koulikoro, a small part of these administrative regions are in the sahel,

Sahelian Zone (Regions of Gao and Tombouctou),

Delta Region (Administrative Region of Mopti).

TABLE 2

Average Annual Rainfall mm

| <u>STATION</u> | <u>50 YEARS</u> | <u>1966-1984</u> |
|----------------|-----------------|------------------|
| Kayes | 821 | 577 |
| Nioro | 709 | 412 |
| Mopti | 552 | 458 |
| Hombori | 454 | 353 |
| Gao | 271 | 200 |
| Menaka | 263 | 202 |
| Tombouctou | 225 | 147 |
| San | 749 | 683 |
| Segou | 724 | 590 |
| Bamako | 1099 | 869 |
| Kita | 1151 | 882 |
| Kenieba | 1408 | 1083 |
| Bougouni | 1337 | 1082 |
| Koutiala | 1022 | 859 |
| Sikasso | 1373 | 1144 |

Human Population.

- 8,322,000 persons (census 1986),
- 85% is Rural,
- 2.6% yearly increase,
- Great variation in population density per Region
- 6.7 persons/square kilometer,
- Population doubled from 1965 to 1988.

LIVESTOCK INFORMATION:

TABLE 3

ESTIMATED LIVESTOCK NUMBERS BY REGION - 1988
add 000 except where *

| <u>Region</u> | <u>Cattle</u> | <u>Sheep/Goats</u> | <u>Pork</u> | <u>Camels</u> | <u>Horses</u> | <u>Donkeys</u> |
|---------------|---------------|--------------------|-------------|---------------|---------------|----------------|
| KAYES | 740 | 1,157 | *500 | - | 8 | 19 |
| KOULIKORO | 763 | 1,945 | 2 | 3 | 18 | 66 |
| SIKASSO | 1,291 | 682 | - | - | 1 | 36 |
| SEGOU | 652 | 1,302 | 50 | *184 | 15 | 45 |
| MOPTI | 901 | 2,902 | - | 3 | 12 | 166 |
| TOMBOUCTOU | 250 | 1,302 | - | 99 | 1 | 97 |
| GAO | 75 | 1,702 | - | 125 | *576 | 80 |
| BAMAKO- | 31 | 63 | 5 | - | *800 | 1 |
| DISTRICT | | | | | | |

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TABLE 4

SHEEP AND GOAT POPULATION BY REGION FROM 1977 TO 1987
(add 000 to given numbers)

| Year | Kayes | *Koul- ikoro | Sik- asso | Segou | Mopti | Tomb- ouctou | Gao | Bama- ko | Total |
|-------------|------------|-----------------|--------------|--------------|--------------|-----------------|--------------|-------------|---------------|
| 1977 | 800 | 971 | 289 | 766 | 2,429 | 0 | 3,244 | - | 8,532 |
| 1978 | 980 | 1,131 | 447 | 857 | 1,958 | 1,588 | 1,791 | - | 8,752 |
| 1979 | 827 | 1,235 | 442 | 989 | 2,587 | 1,829 | 2,024 | - | 9,933 |
| 1980 | 898 | 1,057 | 475 | 928 | 2,888 | 2,846 | 2,415 | - | 11,507 |
| 1981 | 981 | 1,125 | 756 | 999 | 2,727 | 3,055 | 2,732 | - | 12,375 |
| 1982 | 1,137 | 1,188 | 618 | 1,063 | 2,905 | 3,003 | 2,483 | - | 12,397 |
| 1983 | 920 | 1,173 | 614 | 1,391 | 3,531 | 1,491 | 2,379 | - | 11,499 |
| 1984 | 940 | 1,300 | 375 | 1,300 | 3,100 | 1,307 | 2,030 | - | 10,352 |
| 1985 | 921 | 1,440 | 441 | 1,308 | 2,922 | 1,045 | 1,702 | - | 9,797 |
| 1986 | 1,049 | 1,600 | 506 | 1,273 | 3,029 | 1,195 | 1,650 | - | 10,302 |
| 1987 | 1,062 | 1,856 | 581 | 1,154 | 2,788 | 1,231 | 1,857 | - | 10,529 |
| 1988 | 1,157 | 1,945 | 682 | 1,302 | 2,902 | 1,302 | 1,702 | 63 | 11,055 |
| 1989 | 1,237 | *2,063 | 724 | 1,344 | 3,051 | 1,305 | 1,807 | *11 | 11,542 |

SMALL RUMINANT DISTRIBUTION IN % BY REGION

| | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ | ⊙ |
|------|----|----|---|----|----|----|----|---|
| 1977 | 10 | 11 | 3 | 9 | 29 | 0 | 38 | |
| 1987 | 11 | 18 | 6 | 12 | 25 | 11 | 16 | |

* Region of Koulikoro - District of Bamako Source: Analyse des Effets de la Secheresse sur L'Elevage (1989), Direction National de l'Elevage, MEE.

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TABLE 5

CATTLE POPULATION BY REGION 1977 TO 1988

add 000 to given number

| Year | Kayes | *Kouli-koro | Sik-asso | Segou | Mopti | Tomb-ouctou | Gao | *Bamako | Total |
|-------------|------------|-------------|-------------|------------|-------------|-------------|------------|------------|-------------|
| 1960 | 379 | - | 261 | 430 | 746 | - | 1445 | 560 | 3821 |
| 1961 | 390 | - | 261 | 438 | 766 | - | 1445 | 562 | 3862 |
| 1962 | 395 | - | 287 | 496 | 766 | - | 1450 | 561 | 3955 |
| 1963 | 467 | - | 314 | 530 | 844 | - | 1560 | 545 | 4260 |
| 1964 | 480 | - | 329 | 484 | 911 | - | 1722 | 576 | 4502 |
| 1965 | 549 | - | 366 | 422 | 979 | - | 1800 | 656 | 4772 |
| 1966 | 549 | - | 366 | 422 | 979 | - | 1800 | 656 | 4772 |
| 1967 | 533 | - | 430 | 515 | 1260 | - | 1800 | 645 | 5213 |
| 1968 | 520 | - | 480 | 620 | 1400 | - | 1800 | 530 | 5350 |
| 1969 | 520 | - | 480 | 620 | 1400 | - | 1800 | 530 | 5350 |
| 1970 | 520 | - | 480 | 620 | 1400 | - | 1800 | 530 | 5350 |
| 1971 | 525 | - | 492 | 632 | 1418 | - | 1756 | 578 | 5401 |
| 1972 | 498 | - | 512 | 569 | 1375 | - | 878 | 627 | 4459 |
| 1973 | 482 | - | 541 | 430 | 1324 | - | 348 | 664 | 3789 |
| 1974 | 476 | - | 529 | 398 | 1279 | - | 348 | 663 | 3693 |
| 1975 | 487 | - | 564 | 398 | 1345 | - | 365 | 651 | 3810 |
| 1976 | 510 | - | 603 | 356 | 1457 | - | 387 | 524 | 3837 |
| 1977 | 525 | 477 | 634 | 309 | 1618 | - | 431 | 6 | 4000 |
| 1978 | 668 | 689 | 835 | 512 | 1080 | 302 | 248 | 6 | 4340 |
| 1979 | 687 | 697 | 971 | 627 | 1159 | 361 | 257 | 6 | 4765 |
| 1980 | 743 | 758 | 933 | 663 | 1699 | 776 | 270 | 8 | 5850 |
| 1981 | 745 | 780 | 1092 | 686 | 1812 | 863 | 411 | 8 | 6397 |
| 1982 | 801 | 838 | 1066 | 739 | 1974 | 775 | 460 | 10 | 6663 |
| 1983 | 732 | 724 | 1053 | 720 | 1560 | 558 | 314 | 15 | 5676 |
| 1984 | 565 | 606 | 1040 | 595 | 1447 | 432 | 194 | 20 | 4899 |
| 1985 | 525 | 628 | 1101 | 555 | 1062 | 295 | 148 | 30 | 4344 |
| 1986 | 662 | 649 | 1170 | 581 | 1031 | 239 | 117 | 26 | 4475 |
| 1987 | 735 | 705 | 1228 | 554 | 1014 | 244 | 79 | 30 | 4589 |
| 1988 | 740 | 710 | 1245 | 564 | 1020 | 257 | 75 | 30 | 4641 |

* In 1976, the Region of Bamako was divided in two: The Region of Koulikoro, which covers almost all that of the old Region of Bamako and the District of Bamako, which includes the city and suburbs. At the same time, the Region of Gao was also divided in half: The Region of Tombouctou and the Region of Gao.

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TABLE 6

CATTLE HERD STRUCTURE

| <u>AGE</u> | <u>MALES</u> | <u>FEMALES</u> | <u>CASTRATED</u> | <u>TOTAL</u> |
|--------------|--------------|----------------|------------------|--------------|
| 0-1 | 10.2% | 10.4% | 0.0% | 20.6% |
| 1-2 | 7.7% | 7.9% | 0.0% | 15.6% |
| 2-3 | 3.8% | 6.9% | 0.2% | 10.8% |
| 3-4 | 1.9% | 6.1% | 0.7% | 8.8% |
| 4-5 | 1.0% | 5.5% | 1.6% | 8.1% |
| 5-6 | 0.7% | 4.7% | 1.7% | 7.1% |
| 6-7 | 0.6% | 4.2% | 1.5% | 6.3% |
| 7-8 | 0.45 | 3.8% | 1.3% | 5.5% |
| 8-9 | 0.3% | 3.5% | 1.0% | 4.8% |
| 9-10 | 0.2% | 3.1% | 0.8% | 4.2% |
| 10-11 | 0.2% | 2.7% | 0.6% | 3.5% |
| 11-12 | 0.1% | 2.0% | 0.3% | 2.5% |
| 12-13 | 0.1% | 1.2% | 0.1% | 1.4% |
| 13+ | 0.0% | 0.8% | 0.0% | 0.8% |
| TOTAL | 27.4% | 62.8% | 9.7% | 100% |

TABLE 7

IMMUNIZATION SUMMARY 1988 add 000
rounded to nearest 1000

| <u>Region</u> | <u>Pest Bovine</u> | <u>CBPP</u> | <u>Anth- rax</u> | <u>Black- leg</u> | <u>Pasteurel- lose Bovine/O-C</u> | <u>Rabies</u> | <u>New Castle</u> | <u>Pox</u> |
|------------------|------------------------|--------------|----------------------|-----------------------|---|---------------|-----------------------|------------|
| Kayes | 243 | 213 | 2 | 67 | 71 13 | *4 | *700 | *172 |
| Kouli- koro | 352 | 334 | 10 | 178 | 195 61 | *36 | 27 | 18 |
| Sikasso | 262 | 272 | 2 | 197 | 198 28 | *143 | 27 | *35 |
| Segou | 275 | 230 | 3 | 182 | 160 70 | - | 18 | - |
| Mopti | 483 | 294 | 25 | 114 | 76 132 | *23 | - | - |
| Toumbou- ctou | 14 | 9 | 2 | 3 | 3 1 | - | - | *78 |
| Gao | 1 | 1 | 8 | 1 | 4 21 | - | - | - |
| Bamako | 6 | 6 | *275 | 9 | 9 *456 | - | - | - |
| Total | 1,636 | 1,459 | 52 | 752 | 718 326 | *206 | 73 | 18 |

* Actual count, no 000 following number

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TABLE 8
SLAUGHTER RECORDS 1988

| Region | Cattle | | Sheep | | Goats | |
|--------------|----------------|--------------------------|----------------|--------------------------|----------------|-------------------------|
| | Number | Average Carcass Wt. kgm. | Number | Average Carcass wt. kgm. | Number | Average Carcass wt. kgm |
| Kayes | 13,265 | 122 | 6,528 | 16 | 13,542 | 14 |
| Koulikoro | 16,450 | 93 | 7,033 | 11 | 28,372 | 10 |
| Sikasso | 16,889 | 108 | 30,519 | 11 | 36,801 | 11 |
| Segou | 14,865 | 120 | 20,301 | 11 | 74,910 | 11 |
| Mopti | 9,413 | 103 | 15,060 | 12 | 44,600 | 11 |
| Toumbouctou | 658 | 132 | 8,464 | 13 | 13,683 | 14 |
| Gao | 2,569 | 103 | 5,342 | 10 | 15,549 | 10 |
| Bamako | 71,332 | 125 | 21,140 | 12 | 36,120 | 12 |
| Total | 145,441 | 113 | 114,446 | 12 | 263,577 | 12 |

TABLE 9
LIVESTOCK PRICE LISTS 1988
Average Prices
nearest 1000 FCFA

| | Bull | Calf | Bull | Heifer | Cow | Steer | Sheep | Goats |
|----------------------------|------|------|------|--------|-----|-------|-------|-------|
| <u>KAYES REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| Bafoulabe | 40 | | 77 | 45 | 63 | 83 | 9 | 25 |
| Kayes | 56 | | 128 | 70 | 67 | 108 | 17 | 11 |
| Kenieba | 40 | | 75 | 40 | 45 | - | 12 | 8 |
| Kita | 40 | | 60 | 45 | 55 | 70 | 15 | 13 |
| Yelimane | 42 | | 90 | 50 | 70 | 110 | 15 | 10 |

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TABLE 9 con't

LIVESTOCK PRICE LISTS 1988
Average Prices nearest 1000 FCFA

| | Bull | Calf | Bull | Heifer | Cow | Steer | Sheep | Goats |
|-------------------------|------|------|------|--------|-----|-------|-------|-------|
| <u>KOULIKORO REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| Banamba | 38 | | 60 | 41 | 48 | 80 | 10 | 6 |
| Dioila | 33 | | 60 | 38 | 30 | 90 | 8 | 6 |
| Kangaba | - | | - | - | - | - | - | - |
| Kati | 38 | | 70 | 50 | 60 | 95 | 10 | 7 |
| Kolokani | 30 | | 75 | 40 | 35 | 85 | 10 | 8 |
| Koulikoro | - | | - | - | - | - | - | - |
| Nara | - | | 58 | - | 58 | 64 | 13 | 11 |
| <u>SIKASSO REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| N'Togonssa | 38 | | 68 | 45 | 50 | 65 | 6 | 4 |
| Sikasso | 46 | | 80 | 46 | 58 | 95 | 14 | 7 |
| Bougouni | 41 | | 64 | 31 | 34 | 75 | 10 | 6 |
| Koutiala | 48 | | 76 | 49 | 65 | 83 | 7 | 5 |
| Kadiolo | 49 | | 95 | 67 | 59 | 88 | 8 | 5 |
| Kolondieba | 43 | | 55 | 35 | 38 | 68 | 10 | 6 |
| Siekorole | 33 | | 60 | 31 | 43 | 65 | 9 | 5 |
| Yorosso | 28 | | 55 | 29 | 28 | 65 | 9 | 6 |
| Molobala | 38 | | 64 | 35 | 48 | 65 | 8 | 16 |
| <u>SEGOU REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| Baroueli | 30 | | 65 | 50 | 45 | 90 | 9 | 6 |
| Bla | 30 | | 55 | 35 | 37 | 68 | 8 | 6 |
| Macina | 30 | | 66 | 34 | 43 | 62 | 7 | 4 |
| Niono | 30 | | 87 | 44 | 59 | 83 | 11 | 8 |
| Segou | 34 | | 88 | 44 | 54 | 87 | 11 | 7 |
| Tominian | 26 | | 63 | 43 | 30 | 65 | 7 | 6 |
| <u>MOPTI REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| Bandagara | 25 | | 52 | 47 | 30 | 70 | 8 | 7 |
| Bankass | 35 | | 73 | 39 | 40 | 100 | 10 | 7 |
| Djenne' | - | | - | - | 65 | 75 | 8 | 7 |
| Douentza | 29 | | 69 | 45 | 41 | 75 | 11 | 5 |
| Koro | 25 | | 57 | 27 | 34 | 60 | 8 | 4 |
| Tenenkou | | 10 | | to | | 30 | 10 | 4 |
| Niafunke' | 23 | | 43 | 42 | 31 | 64 | 10 | 6 |
| Youwarou | 56 | | 32 | 48 | 39 | 45 | 6 | 4 |
| Mopti | 40 | | 88 | 54 | 30 | 104 | 10 | 9 |

TABLE 9 Con't

LIVESTOCK PRICE LISTS 1988

Average Prices nearest 1000 FCFA

| | Bull | Calf | Bull | Heifer | Cow | Steer | Sheep | Goats |
|--------------------------|-------|-------|-------|--------|--------|-------|-------|-------|
| <u>TOMBOUCTOU REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| Dire' | 36-50 | 50-80 | 49-60 | 16-60 | 75-110 | 5-13 | 4-9 | |
| Goundam | ? | ? | 10-68 | 12-80 | 56-86 | 3-13 | 3-8 | |
| G. Rharous | 18-38 | 5-80 | 30-90 | 4-60 | 50-100 | 6-13 | 3-9 | |
| Tombouctou | - | - | - | - | - | - | - | - |
| <u>GAO REGION</u> | | | | | | | | |
| <u>Sector</u> | | | | | | | | |
| Gao | 35 | 68 | 60 | 70 | 76 | 11 | 9 | |
| Menaka | 55 | - | - | - | - | 9 | 7 | |
| Ansongo | 38 | - | 60 | 67 | - | 8 | 7 | |
| Bouem | - | - | - | - | - | - | - | - |
| Kidal | - | - | - | - | - | 10 | 7 | |
| <u>BAMAKO</u> | 49 | 92 | 58 | 79 | 103 | 17 | 8 | |
| <u>DISTRICT</u> | | | | | | | | |

SUMMARY
LIVESTOCK MARKET TRANSACTIONS
1988

| REGION | CATTLE | | SHEEP | | GOATS | |
|-------------------|----------------|----------------|------------------|----------------|----------------|----------------|
| | Present | Sold | Present | Sold | Present | Sold |
| Kayes | 16,565 | 11,033 | 8,884 | 6,162 | 8,715 | 4,996 |
| Koulikoro | 88,871 | 62,547 | 102,354 | 75,375 | 116,276 | 88,082 |
| Sikasso | 19,459 | 14,253 | 45,199 | 34,415 | 37,388 | 28,650 |
| Segou | 80,214 | 53,532 | 136,302 | 91,264 | 138,505 | 95,102 |
| Mopti | 262,664 | 175,878 | 361,786 | 259,516 | 338,923 | 221,361 |
| Tombouctou | 13,347 | 7,363 | 76,433 | 28,172 | 72,629 | 41,077 |
| Gao | 240 | 1,103 | 11,780 | 4,689 | 25,860 | 10,060 |
| Bamako - District | 139,078 | 69,790 | 308,150 | 57,712 | 187,527 | 70,831 |
| TOTAL | 620,438 | 395,499 | 1,050,888 | 557,305 | 925,823 | 560,159 |
| % SOLD | 64% | | 53% | | 61% | |

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ANNEX B

PEOPLE CONTACTED Livestock, Concept Team

MINISTRY OF LIVESTOCK AND ENVIRONMENT (MEE)

| | |
|------------------------|---|
| Mr. Ibrahima W. Diallo | Chief of Cabinet |
| Mr. Guindo Ousman | Technical Counselor, Animal Production |
| Mr. Bafoutigi Sacko | Technical Counselor, Economics |
| Dr. Ibrahim Diallo | Assist. Technical Counselor, An. Hus. |
| Mr. Seydou Bouare | Technical Counselor, Anti-Drought |
| Mr. Kone | Technical Counselor, Waters and Forests |

NATIONAL LIVESTOCK SERVICE (DNE)

| | |
|------------------|-----------------|
| Dr. Gagny Timbo | Director |
| Dr. Hamadoun Sow | Deputy Director |

Division of Animal Production

| | |
|----------------------|----------------------------|
| Mr. Dramane Bakayogo | Division Chief |
| Mr. Yaya Konate | Provisional Division Chief |
| Mr. Abdallah Kounta | Head of Poultry Program |

Division of Animal Health

| | |
|-----------------------|-----------------------|
| Dr. Coulibaly Mantala | Division Chief |
| Dr. Kane Mamadou | Deputy Division Chief |

Division of Range and Water Management

| | |
|--------------------|--------------------------------------|
| Mr. Brahima Diallo | Division Chief |
| Mr. Kelepha Dumbia | Agronomist/Animal Scientist |
| Mr. Yaya Sidibe | Sociologist |
| Mr. Gerard Godet | Pastoralist/Technical Assistance/FAC |

Division of Projects and Programs

| | |
|-------------------|------------------------------------|
| Mr. Seydou Sidibe | Division Chief |
| Dr. Amadou Diallo | Chief of Monitoring and Evaluation |

Others

| | |
|--------------------|------------------------------------|
| Mr. Cisse | Deputy Director, Project Northwest |
| Dr. Muslim Maiga | Regional DNE Director, Sikasso |
| Mr. Stany Gerard | Agro-Pastoral Project, Sikasso |
| Dr. Ousmane Traore | Regional DNE Director, Dioila |
| Dr. Maiga Ibrahim | Regional DNE Director, Segou |
| Mr. Phillip Dambul | Poultry Agent, Segou |
| Mr. B. Camara | Chief of Post, DNE, Marka Coungo |
| Mr. Cisse | Chief of Post, DNE. Mopti |

CENTRAL VETERINARY LABORATORY (CVL)

| | |
|-------------------|-------------------------|
| Dr. Boubacar Seck | Director General |
| Dr. Kouyate | Chief Pathology Section |
| Dr. Bouare | Entomolgy |

LIVESTOCK SECTOR PROJECT

| | |
|--------------------|--------------------|
| Mr. Michell Jacobs | Operating Director |
|--------------------|--------------------|

MALIAN OFFICE FOR LIVESTOCK AND MEAT (OMBEVI)

| | |
|-----------------------|---------------------------|
| Mr. Modibo Sangare | Director |
| Mr. Sadou Oumar Ba | Deputy Director |
| Mr. Maiga Souleymane | Chief Evaluation Division |
| Mdm Nana Yaya Haidara | Chief Documentation |
| -Lansry | |

VETERINARY NURSING SCHOOL (EIV)

| | |
|---------------------|----------|
| Dr. Yacouba Samanke | Director |
|---------------------|----------|

MALIAN COTTON AND TEXTILE DEVELOPMENT (CMDT)

| | |
|------------------|----------------------------|
| Dr Moktar Traore | Chief, Livestock Program |
| Mr. Guindo | Chief, Training Program |
| Mr. Yaba Kone | Regional Director, Sikasso |

RURAL PRODUCTION SYSTEMS RESEARCH DIVISION (DRSPR)

| | |
|--------------------|-----------------------------------|
| Dr. Goita | Director |
| Mr. Bakary Kone | Animal Scientist, OHV |
| Mr. Koniba Bengali | Animal Scientist, Sikasso |
| Mr. Bert | Technical Assistant/Dutch/Sikasso |

OHV

| | |
|----------------------|------------------------------|
| Mr. Issa Djire | Chief of Extension, Bamako |
| Mr. Cheickne Sidibe' | Sector Chief, Ouelessebouyou |
| Mr. Koifa Kone | Sub-Sector Chief, Fougorela |

USAID

| | |
|--------------------|------------------------------------|
| Mr. Tracy Atwood | ADO |
| Mr. Wayne McDonald | Head, Natural Resources/Livestock |
| Mr. Doral Watts | Livestock |
| Mr. Drame Cheik | Livestock |
| Mr. David Atwood | Agricultural Economist/ADO |
| Mr. Vic Duarte | Economist |
| Mr. John Bressler | Programs Officer |
| Mr. Don Clark | Deputy Mission Director |
| Mr. Tadesse Kabrie | Agronomist |
| Mr. Reid Whitlock | Cereals |
| Mr. Mike McGahuey | NRMS Office, Afr. Bur., Washington |

EVALUATION TEAM/LIVESTOCK SECTOR PROJECT

| | |
|-------------------|------------------|
| Mr. Warren Putman | Animal Scientist |
| Dr. Dan Miller | Veterinarian |
| Mr. Norm Ulsake | Ag. Economist |

OTHER CONSULTANTS

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| Dr. James Thompson | Decentralization |
| Mr. Bob Hall | Decentralization |

FARMERS

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| Mr. Francois Coulibaly | Farmer, Ouelessebougou |
| Mr. Balle | Poultry Farmer, Marka Counga |
| Mr. Fafa Dambele | Farmer, Segou |
| Mr. Camara | Poultry Farmer, Segou |
| Mr. Samanke | Poultry Farmer, Segou |
| Mr. Brahmin Traore | Farmer |

LIVESTOCK COOPERATIVE OF SANAKOROBA

Mr. Tangara
Mr. Boubacar Haidara

KATI LIVESTOCK MARKET

| | |
|-----------------|-----------------|
| Mr. Gone Bole | Head of Market |
| Mr. Tjon Bakari | Cattle Merchant |
| Mr. Taki Fall | Cattle Merchant |

CHAMBER OF COMMERCE

| | |
|---------------------|---------------------------------|
| Mr. Darhamane Toure | President |
| Mr. Daba Traore | Secretary General |
| Mr. Sidebe | Personal Aid/Secretary |
| Mr. Diakite | Businessman, Representing AMERA |

ECONOMIC AFFAIRS

Mr. Saidou Sangare
Mme. Coulibaly

ODEM, MOPTI

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| Dr. Noumon Diakité | Director |
| Dr. Alfonse Temé | Deputy Director |
| Dr. Diallo Zoumana | Chief, Animal Production |
| Dr. Karim Diarra | Chief, Laboratory |
| Dr. Kader Diarra | Chief, Evaluation |
| Mr. Tidiany Bocoum | Chief, Population/Organization |
| Mr. Magadougou Camara | Pasture and Water Management |

INTERNATIONAL LIVESTOCK CENTER FOR AFRICA (ILCA)

| | |
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| Dr. Diallo | Director |
| Mme. Alice Reese | Animal Production Specialist |

CAISSE CENTRALE

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| Mr. Papazian Vatche | Caisse Centrale, Mali |
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WORLD BANK, MALI

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|---------------|----------------------------------|
| Mr. Doan Quan | World Bank Ag. Extension Program |
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WATERS AND FORESTS, MOPTI

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| Mr. Adama Dicke | Regional Director |
| Mr. Bather Kone | USAID Funded Forestry Project |
| Mme. Rebecca McClean | Land Tenure Study, U. of Wisc. |

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ANNEX C

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