

AFRICA BUREAU  
LIVESTOCK DEVELOPMENT ASSISTANCE STRATEGY PAPER

Contents

I.	Introduction	1
	A. Purpose of the Strategy Paper	
	B. Scope of the Strategy Paper	
	C. Main Components of the Strategy	
II.	The Africa Livestock Subsector	2
	A. Importance of Livestock	
	B. Livestock Production Systems in Africa	
III.	Constraints to Livestock Development and Lessons Learned	4
	A. Constraints	
	B. Lessons Learned from Previous Donor Assisted Livestock Projects in Africa	
IV.	Elaboration of the Strategy	7
	A. Integrating Livestock into the Overall Agricultural Sector	
	B. Developing Research and Other Institutions and Delivery Systems	
	C. Support for Market Specific Initiatives and Opportunities	
	D. Support for Private Sector Development	
V.	Implementation Considerations	10
	A. Tactical Orientations	
	B. Institutional Considerations	
	C. Long Term Program Assistance	

Bibliography

Africa Bureau  
Office of Technical Resources  
Agriculture & Rural Development Division  
December 22, 1982

## Preface

This paper has been in preparation since mid-1981 when AID decided to sponsor a second workshop on African pastoral livestock production. It includes ideas from (1) an issues paper prepared for that conference by Peter D. Little, in October 1981; (2) the conference report prepared by the Institute for Development Anthropology in March 1982; (3) "Guidelines for a Livestock Sub-Sector Strategy in Africa" prepared by the Institute for Development Anthropology; (4) a paper on "Livestock Program Strategies and Priorities" prepared by Winrock International in October, 1981; (5) an original draft of this paper and subsequent comments by James Dickey, Sahel Regional Livestock Advisor; (6) the Africa Bureau Senior Agricultural and Rural Development Officers workshop held at Ibadan, Nigeria in May, 1982; (7) revised drafts of this report by Tjaart W. Shillhorn and Tom Zalla, Michigan State University; and (8) comments and editing by AFR/TR/ARD staff, AFR/TR and PPC. The paper incorporates comments from AFR/DP, PPC/PDPR, S&I/AGR and the Deputy Assistant Administrators for Africa provided in response to requests for clearance of an earlier draft.

AFRICA BUREAU  
LIVESTOCK DEVELOPMENT ASSISTANCE STRATEGY PAPER

I. Introduction

A. Purpose of the Strategy Paper

The purpose of this Strategy Paper is to provide a framework within which AID Missions in Africa should prepare their country-specific strategies for assisting the livestock production and marketing components of their agricultural development programs. It also will serve as a guide in the selection and design of specific livestock projects and programs intended to implement these strategies.

B. Scope of the Strategy Paper

The Strategy Paper has been developed within the framework of the approved Africa Bureau Food Sector Assistance Strategy Paper, dated October 1981, and takes into consideration the complementarity of livestock and crop production systems in Africa. The strategy aims at increasing the efficiency of livestock production and the level of farm employment and income arising from livestock. It emphasizes approaches with a history of success and points to the need to continue to monitor and develop production systems in environments where success to date has been more difficult to achieve.

C. Main Components of the Strategy

This livestock sub-sector strategy has four principal components:

1. Assist in formulating and implementing regional, national and institutional policies and programs which integrate livestock and agricultural systems at all levels.
2. Support the building and improvement of research and other institutions and delivery systems which promote livestock development.
3. Support localized, market specific initiatives which will enhance livestock production.
4. Promote increased involvement of the local private sector in the supply of inputs and in the production, preservation or utilization of livestock and livestock products.

## II. The African Livestock Sub-Sector

### A. Importance of Livestock

In many African countries livestock account for as much as one-third of the agricultural GDP, providing income, employment and food for a substantial part of the population. Moreover, national accounts often understate livestock's contribution to the gross domestic product because they ignore the role of livestock and livestock products in crop production, and frequently, illegal livestock exports. Africa has by no means reached its potential in livestock production. The area possesses approximately 200 million livestock units, generally characterized by low productivity from the viewpoint of livestock production in developed countries. However, slight improvements in management systems can sometimes produce considerable pay-off.

Ecologically, Sub-Saharan Africa can be divided into desert, savanna, highlands and humid forest zones. Numerically, livestock production is concentrated in the savannas while a substantial part of the human population lives in or close to the highland and forest zones. Animal diseases have limited the full development of ruminant production in the humid areas of Africa and an important part of ruminant populations elsewhere migrate seasonally in order to avoid either disease or malnutrition.

The majority of African households own some livestock. They are owned by individual family members and contribute in a substantial way to the quality of the human diet and the household economy. Most milk and a considerable amount of the meat production in Africa, especially poultry and small ruminants, are consumed directly by producing households. However, meat and milk imports have increased 242 and 102 percent, respectively, between 1975 and 1980, attesting to a very high commercial demand and a relatively inelastic supply response for livestock products in Africa. In addition, small ruminants and poultry often provide independent income for women, while livestock in general continue to play an important role in the culture of many African people. Farm animals are used for savings, capital accumulation and as a hedge against a wide range of future uncertainties. By better utilizing available manure and animal power, African farmers could considerably improve their crop production. Thus, appropriate improvements in the livestock sector will not only improve nutrition and well being of the rural poor, but may also relieve farmers and governments from increased energy costs related to agricultural growth.

### B. Livestock Production Systems in Africa

The traditional livestock production systems in Africa are diverse and complex and have evolved over centuries. Although they may appear primitive in certain ways, they are, in many cases, the optimal systems under prevailing conditions. Their diversity arises from difference in local climates, pasture and range conditions, diseases, markets and political and social circumstances.

For purposes of this strategy, the production systems in Africa will be categorized as (1) commercial systems, (2) pastoral and semi-pastoral systems, and (3) mixed farming systems.

### 1. Commercial Systems

These are mainly concentrated in poultry and commercial ranching. The large poultry enterprises, generally located near urban centers, use production systems similar to large poultry establishments in Europe and the United States. Commercial ranches use modern ranching technology, including disease control, pasture and water-management, and produce for relatively certain markets. These privately or commercially owned ranches generally operate with low labor input under relatively good management.

### 2. Pastoral and Semi-Pastoral Systems

The majority of African cattle and camels, and many small ruminants, are held in pastoral and semi-pastoral herds. Many of the animals are owned by sedentary farmers and non-farm households who entrust them to herders in return for various forms of payment. These herders move their herds along regular patterns, often around one or more permanent or semi-permanent homesteads or temporary encampments. The migration patterns may vary from year to year according to seasonal constraints and opportunities, such as the availability of pasture and water, and the avoidance of disease. It is generally agreed that this system is an excellent adaptation to uncertain environmental conditions and probably promotes the most efficient use of forage and water in the vast marginal rainfall areas.

The animals of pastoralists are usually an integral part of their culture. They provide milk, meat, fibre, transport, fuel and other products, such as manure, and, as such, are important for the maintenance of social relationships. Livestock products are consumed and sold or exchanged with settled farmers for grain or for grazing rights.

Migratory movement of livestock has become increasingly difficult in recent years due to cropping pressure on land, restrictions on movement across borders, and other governmental regulations. In addition, the long drought decimated many herds, forcing some herders to shift toward arable agriculture. These factors appear to be inducing a shift toward mixed farming and a more sedentary lifestyle by some pastoral groups. Though still relatively limited in some ways, this trend promises to accelerate in the future. In the mean time, there will be a need for continuing selective support for pastoralists via measures which encourage the economic use of rangeland.

### 3. Mixed Farming Systems

Settled crop/livestock farming systems are generally found in the semi-humid savanna and in highland areas, and, to a lesser extent, in the forest zone where cattle do not thrive. In all those areas, small ruminants and poultry are more numerous than cattle, with swine assuming generally

greater importance as rainfall increases. In these ecological zones, local grazing, fodder harvest, and crop residues are sufficient to sustain a limited number of livestock under more sedentary conditions throughout the year. The greater labor input required to keep livestock in mixed farming, as opposed to pastoralist and semi-pastoralist systems, favors the accumulation of the smaller animals by smaller sized, lower resource households. For this reason, support of small stock production in mixed farming systems deserves special attention in AID development assistance programs.

Mixed farmers are usually permanently settled, and livestock production is only one part of an integrated agricultural system that is often highly dependent on crop production. Like their semi-nomadic counterparts, mixed farmers keep livestock for a variety of purposes, but with more emphasis given to commercial sales, religious festivities, manure production and animal traction. A system of pooled herds or entrusted care may still exist for local grazing of ruminants or where extended family members need to move animals to distant pastures at critical times of the year. More attention is given to cutting and preserving forage than in the semi-nomadic systems. Small scale feeding schemes and intensive production of animals and animal products for sale are common and provide at least a part of the family cash income. Mixed farming systems offer potential for a multitude of interventions, though more applied research is needed in non-health areas before AID can support livestock production in the mixed farming context on a broad scale.

### III. Constraints on Livestock Development and Lessons Learned

#### A. Constraints

##### 1. Policy Constraints

In many African countries policy constraints are proving to be particularly intractable impediments to livestock development. Trade policy and pricing policy for meat and foreign exchange, for example, often favor domestic urban consumers and reduce returns to livestock owners both through lower prices and through higher marketing costs for those who run the risk of moving animals through illegal markets. Similar policies for food grains reduce the profitability of animal traction and manure, and thereby discourage the intensification of production necessary to feed a growing, increasingly urbanized population. Commercial policies that favor the export of high-protein agricultural by-products raise feed supplement costs and discourage fattening schemes, animal traction and intensive milk production.

Another important national policy area for the animal-based systems of Africa's semi-arid areas is land tenure. Most African governments do not have clear land tenure policies for the pastoral areas in general, and there are often gross discrepancies between formal (i.e., governmental) and locally recognized and accepted land tenure systems. For the livestock producer, this creates uncertainties regarding access to water and dry season grazing. Often tenure relationships encourage overstocking which, in the long run, negates much of the gain from otherwise sound interventions. Other government policies restrict the availability of vaccines, medicines, feedstuffs and equipment and impede the efficient functioning of markets.

## 2. Institutional Constraints

Livestock development in African countries is severely constrained by the lack of an adequate institutional capacity to conduct the kind of research needed to provide improved livestock production technologies and to guide livestock development programs. This includes the capacity for undertaking pre-design research, monitoring project implementation and evaluating project impact. As a result, learning from experience and past mistakes is very slow. Periodic turnover of both national and expatriate personnel aggravates this problem by inhibiting the development of an institutional memory. Livestock sub-sector activities need an "institutional home" in order to maintain continuity in addressing livestock issues and to develop the necessary political base for forcing policy reforms.

The lack of indigenous technical and managerial resources and the poor use of available public sector manpower further constrains the livestock sub-sector. The common practice of placing scarce, highly trained scientists in administrative positions befitting their level of education rather than in technical positions which require their skills is due, in part, to an institutional incentive structure that favors administration and discourages application, teaching and research. Excessive formal training in relation to the needs of the job often inhibits the supply of lower level technical personnel such as artificial inseminators and vaccinators. For such manpower, a shorter period of practical training would often be a more effective and less costly way of meeting required skill levels.

## 3. Technical Constraints

African livestock production is fundamentally constrained by poor animal nutrition related to the scarcity and quality of dry season feed supplies and, at least partly related to this, poor animal health. In some areas, lack of stock watering facilities and poor animal housing also limit production. These factors contribute to high calf mortality, prolonged physical and sexual maturation cycles and long calving intervals. It is not likely that the productivity of the livestock sector can be increased without addressing these fundamental problems.

## 4. Social Constraints

Inadequate understanding of the multiple economic and social objectives of present livestock producers, and their interrelationships, has especially plagued projects aimed at pastoralists. Risk management, dry season milk and grain supplies, the demands of family members for available cash, the need for animals to slaughter for important social and religious occasions, rights to certain portions of animals which are slaughtered as opposed to those which die, reciprocal social obligations, the need for cash for school fees and unexpected events such as funerals, all can influence producers' attitudes toward livestock management, production and marketing as much as price and more direct economic variables.

B. Lessons Learned from Previous Donor-Assisted Livestock Projects In Africa

USAID, the IBRD and other donors have financed a large number of livestock projects in Africa over the past two decades. This experience yields several lessons that will prove helpful for designing and implementing new projects over the next decade.

1. Overcoming technical constraints relating to dry season feed and water supplies, animal health and marketing infrastructure is proving more difficult than anticipated. Range management systems as practiced in the western United States have yet to be proven economically, socially and politically feasible in Africa, or necessarily ecologically relevant.
2. Project design has paid insufficient attention to the ecological, socio-economic and technical milieu in which projects are implemented.
  - a. There is need for more pre-design research; more experimentation in project design and implementation; and more flexible implementation agendas that can easily incorporate lessons learned as projects unfold.
  - b. Careful monitoring of interventions should be an integral component of project design and implementation.
  - c. Project design should relate holistically to the diverse elements of livestock/cropping/household systems on the one hand and deal with discrete activities which AID has shown it can successfully assist on the other.
3. Not enough attention has been given to building up coalitions of interests to support projects or to obtaining qualified host-country staff and establishing effective project implementation management systems.
4. The active participation of pastoralists, livestock farmers and lower level livestock agents can provide information needed for good project design and monitoring, and the means to reduce recurrent costs and improve project implementation.
5. Traditional livestock trade, including movement over long distances from producing areas to market centers, appears to be fairly efficient and adaptable, under normal circumstances. For this and other reasons that are not always clear, donor projects aimed at increasing off-take rates have had limited success. Off-take rates continue low in spite of heavy investments in marketing infrastructure. Indeed, marketing investments which centralize control over marketing activities many actually reduce off-take.

6. Successful proven technical interventions in pastoral Africa in the near future will probably remain in the veterinary field. In some cases, closely monitored pilot projects which integrate water development with pasture management merit consideration. The range of promising interventions in mixed farming situations is wider, but confirmatory applied research is necessary before they are implemented on a large scale. The technology for successful artificial insemination and disease control aimed at small farmers is known, but effective delivery systems are still the exception rather than the rule.

7. Improvements in the livestock sub-sector will be very difficult to realize in the absence of coherent supportive host country policies concerning access to water, land tenure, external trade, pricing, marketing, taxation and institution development, or without the active participation of livestock producers in project design and implementation.

8. Due to AID's own lack of knowledge as well as the nature of the biological cycle of livestock under African conditions, successful livestock projects and programs require a long-term commitment. American institutions which are involved need to work in close collaboration with host country institutions on a long-term basis.

#### IV. Flaboration of the Strategy

##### A. Integrating Livestock into the Overall Agricultural Sector

##### 1. Improving the National Policy and Planning Environment

Although AID's ability to influence host government policy is limited, in some cases policy changes to the livestock sub-sector may be the only means of improving herder income and livestock production or bringing about more effective integration of livestock and cropping activities. This is especially true where livestock and arable agriculture are served by different ministries.

AID assistance to policy and planning could take the form of assisting with frequent short-term assessments of the livestock/agriculture sector to formulate policy alternatives for discussions with host governments. If governments prove unwilling to undertake needed policy reforms, such actions can be made conditions precedent to continued project development or disbursement of program funds. In some cases, the formation of an ad hoc Livestock Secretariat, including technical, policy analysis and planning entities of those ministries concerned with livestock/cropping interactions, might be appropriate. AID could provide a senior level advisor to the unit while training host country analysts. This unit should have the capability to obtain and analyze data. The ultimate goal would be to institutionalize a host country capability to plan, formulate and evaluate its livestock development policies and programs.

## 2. Formulating and Implementing Projects and Programs

Social scientists and agricultural technicians are only beginning to understand and appreciate linkages between livestock and cropping activities both within the rural household and between specialized crop and livestock producers. Before those linkages can be fully exploited we need a better understanding of them. This can be obtained both by focusing on such interactions during project preparation, design, implementation and evaluation as well as through well defined farm level diagnostic surveys conducted by animal and crop scientists, agricultural economists, and anthropologists working together in a farming systems context. Special attention will have to be given to the role of women in exploring these interactions since women often have substantial economic interests in household/livestock/crop interactions.

### B. Developing Research and Other Institutions and Delivery Systems

#### 1. Institution Building

Decades of donor-supported livestock projects have generated little data that can be used in planning future livestock programs. AID should increase the capacity of both public and private African institutions to conduct their own livestock-related research, strengthen researcher-producer links, and develop data storage and exchange systems with neighboring nations. AID should also ensure that research in animal health and husbandry be integrated in specific farming systems research and development projects across the continent.

The similarity of livestock health and production problems across wide areas of Africa, and the overall scarcity of resources and manpower available to address them points to the need to approach such problems through regional networks of scientists working on common problems. This should be done in the context of the Africa Bureau's Agricultural Research Strategy Paper and Cooperative Development in Africa (CDA), efforts to strengthen African research capabilities through broad based support to selected countries within each of five agro-climatic zones. The international research centers, U.S. Title XII universities, USDA and other U.S. institutions can assist the development of this capacity. Such institutions can play an important role in training the human resources needed for staffing national institutions. AID could also support host country institutions by contracting directly with them for studies which provide location specific information needed to make livestock production successful.

#### 2. Improving Delivery Systems

There is an urgent need to analyze and improve animal health delivery systems, especially for small stock in mixed farming systems. Originally, the colonial governments imposed a livestock tax which in part paid for public sector extension efforts to control epidemic diseases. The taxes, however,

were unpopular and occasionally jeopardized other efforts at improvement. Some countries (Nigeria for example) have since abolished the cattle tax but are still providing officially free veterinary and range management services to livestock owners.

Ultimately, livestock owners themselves should be paying for these services. There is considerable evidence that producers would agree to making at least partial payment for veterinary services, especially if reliable supplies are established. Producers, through their purchasing power, would then have an opportunity to participate in the decision making process concerning the quality and the direction of the services provided them while the role of the private sector in this area could expand. Village veterinary volunteers and private herder associations are examples of promising innovations in this area. The former offer special promise for addressing the health problems of livestock on small mixed farms.

Animal husbandry, artificial insemination, and crop/forage extension are other areas where delivery innovations are badly needed. Closer links between research, training, extension and the farmers need to be forged. Supporting projects which give cooperatives or other local institutions the responsibility for paying part of an extension agent's salary or salary supplement should provide accountability for performance, enhance local institutions and provide participation in managing development. Appropriately designed water management activities can provide similar benefits in addition to controlling grazing.

#### C. Support for Market Specific Initiatives and Opportunities

Many types of livestock development activities make sense only in localized areas where special conditions or special markets, either local or export, prevail. These include such things as cattle and small ruminant fattening targeted at specific markets; intensive milk production in highland areas or near urban markets; or other local opportunities. In addition, support could be given to new "high" technologies, such as genetic engineering in vaccine production or other interventions which potentially have far reaching effects but which may require some applied research, or need testing and monitoring on a pilot scale, before they can be extended with confidence. This component of the strategy endorses AID support of applied research and pilot projects which, through careful monitoring, will provide information which can be used to design better, perhaps larger projects, which will strengthen the overall livestock sub-sector.

#### D. Support for Private Sector Development

The fourth component encourages the participation of the local private sector in livestock development. The encouragement of these activities may be in the form of policy reforms or financial, socio-economic or technical assistance. It should stimulate or improve production, processing or marketing of livestock and livestock products, either locally or for export, by the private sector. It could also include assistance to groups of private entrepreneurs or groups of farmers for such things as producing vaccines and distributing inputs.

African livestock sub-sector programs should support producers' participation and eventual control wherever possible. Local producer organizations can often manage project infrastructure such as water points or veterinary posts, and may also be able to manage cost recovery schemes. Such interventions will require training of local producers in management, marketing and para-veterinary care.

## V. Implementation Considerations

### A. Tactical Orientations

Several types of interventions in the livestock sub-sector are consistent with this strategy. In addition to traditional interventions in the animal health area, these might include, but not be limited to, some of the following activities and projects where environmental and social factors are favorable. In the arid and semi-arid zones, AID can begin very carefully to experiment with pilot projects involving seasonal livestock water supplies designed to optimize the stocking rate and reduce overgrazing near permanent water points, increase grazing in overgrown fire risk areas, improve animal nutrition and reduce animal stress. Water points might be established on trekking routes to facilitate normal marketing in the dry season, with maximum possible beneficiary participation and control. Credit, livestock inputs, commodities to enhance food security, animal health and monitoring services and training may also be selectively supplied through traditionally organized herder associations where these are demonstrated to be effective.

In the higher rainfall agricultural zones, AID can promote increased animal production in mixed farming projects via intensified use of natural forage, crop residue and agricultural and other by-products. Small farmer animal health delivery systems also merit attention. However, the agency's limited experience with such activities to date suggests a cautious approach to them initially, emphasizing action research and development rather than full scale implementation until benefits are confirmed. Intercropping and rotational production of legumes for their residual feed value as well as for cash income, and livestock feeding programs aimed at special markets and/or occasions should be a particular focus of this kind of activity. AID could sponsor on-farm monitored experiments in forage/silage production, storage and use to identify the most cost-effective practices at the farm level. In addition, research to identify other cost effective ways of intensifying forage production should be supported.

AID should also support trypanosomiasis and tick-borne disease research in the higher rainfall areas with emphasis on determining the relative efficiency of trypanotolerant breeds, chemotherapy maintenance and vector eradication-control programs. Technical interventions aimed at vector-borne disease control should be linked to planning for the use of land areas opened up by such programs.

In other areas, AID should support pre-design studies of the ecological, socio-economic and technical context of potential projects. More general market and herd composition and/or management studies should also be supported where these promise to resolve perplexing marketing questions or generate data that will help derive full benefits from livestock sub-sector assistance. With respect to infrastructure, cold storage for medicines and vaccines, dips and on-farm feed storage may be appropriate in selected circumstances.

#### B. Institutional Resources

The financial and human resources to implement this livestock development assistance strategy must come from private and public U.S. institutions working in close collaboration with host country and African regional organizations such as the Inter African Bureau of Animal Resources (IBAR) under the OAU. U.S. resources will come from Title XII and other agricultural universities; USDA; other federal agencies; International Agricultural Research Centers; private voluntary organizations; direct hire AID staff; agribusiness firms; foundations and other "not-for-profit" entities; national associations; and consulting firms. As much as possible, host country resources should come from existing organizations. Where these are weak, first consideration should be given to strengthening them or forming ad hoc working relationships with other existing services rather than creating new institutions. Existing African regional institutions should be strengthened appropriately.

#### C. Long-Term Program Assistance

AID is aware that livestock development is a relatively slow process and encourages long-term program commitment without a rapid turnover of personnel and resources. Cooperative linkages between established U.S. institutions and existing or emerging host country institutions should be encouraged as a means of supporting the formulation and implementation of long term livestock development strategies which are integrated with crop production and other rural household activities.

#### BIBLIOGRAPHY

- Ficher, Carl K. and Doyle C. Baker, 1982. "Research on Agricultural Development in Sub-Saharan Africa: A Critical Survey." MSU International Development Paper No. 1. Department of Agricultural Economics, Michigan State University, East Lansing, Contract No. AID/afr-G-1261.
- Ferguson, D.S., Circa 1977. "A Conceptual Framework for the Evaluation of Livestock Production Development Projects and Programs in Sub-Saharan West Africa," Center for Research on Economic Development, University of Michigan, Ann Arbor.
- Hoben, Allen, 1979. "Lessons from a Critical Examination of Livestock Projects in Africa." AID Program Evaluation Working Paper No. 26. USAID, Washington, D.C.
- Horowitz, Michael M., 1979. "The Sociology of Pastoralism and African Livestock Projects." AID Program Evaluation Discussion Paper No. 6. USAID, Washington, D.C.
- Institute for Development Anthropology, 1980. "The Workshop on Pastoralism and African Livestock Development." USAID Program Evaluation Report No. 4. USAID, Washington, D.C. Contract No. AID/OTR-G-1741.
- International Livestock Center for Africa, 1980. "Pastoral Development Project: Report on a Workshop on the Design and Implementation of Pastoral Development Projects for Tropical Africa." ILCA Bulletin No. 8, Nairobi.
- Little, Peter D., 1981. "Issues Paper: For the Workshop on African Pastoral Production Systems." Institute for Development Anthropology, Binghamton, New York. Contract No. AID/AFR-0085-C-00-1033.
- \_\_\_\_\_, 1982. "The Workshop on Development and African Pastoral Livestock Production." Institute for Development Anthropology, Binghamton, New York. Contract No. AFR-0085-C-00-1033.
- Little, Peter D. and Michael M. Horowitz, 1982. "Guidelines for a Livestock Sub-Sector Strategy in Africa." Institute for Development Anthropology, Binghamton, New York. Contract No. AFR-0085-C-00-1033.
- McDowell, R. F. and P. F. Hildebrand, 1980. "Integrated Crop and Animal Production: Making the Most of Resources Available to Small Farms in Developing Countries." Rockefeller Foundation Conference Paper, Bellagio.
- Norman, D. W., 1982. "Institutionalizing the Farming System Approach to Research. "Paper Prepared to the Africa Bureau Agriculture and Rural Development Officers Workshop", Ibadan, Nigeria, May 10-13, 1982.

Sandford, Stephen, 1981. "Organizing Governments' Role in Pastoral Sector." John Galaty, P. Salzman and D. Aronson, eds: The Future of Pastoral Peoples: Research Priorities for the 1980s. International Development Research Center, Toronto.

\_\_\_\_\_, 1981. "Review of World Bank Livestock Activities in Dry Tropical Africa." IBRD, Washington, D.C.

Sperling, Louise, 1980. "African Livestock Projects: A Documentary Review." Agency for International Development, Washington, D.C.

Winrock International Livestock Research and Training Center. "Livestock Program Strategy and Priorities." Winrock International. Morrilton, Arkansas.