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## 9. ABSTRACT

Assesses current range management activities in four northern States of Nigeria to find if a methodology has emerged that is generally applicable to other areas in Nigeria and to neighboring countries in West Africa -- particularly those countries in the Sahel region. This region is characterized by frequent drought, and unless appropriate range management practices can be demonstrated and livestock producers persuaded to adopt those practices, both the delicate ecology of the region and its livestock industry will be done irreparable harm. Three general tasks were assigned to the assessment team. It studied the economic and social feasibility of alternative range management interventions appropriate for Nigeria and other regions of Africa. It examined the tsetse fly clearance operations and development of the cleared areas in terms of the implications for range management practices, land utilization, and animal production. It reviewed the construction, management and utilization of surface and borehole sources of water in relation to the impact of these wells upon land use, livestock grazing, and ecological balance. The major factors considered were the status of livestock herds and production, the human population, and the environment. The assessment team found that clear and definable benefits were attributable to appropriate range management techniques. Findings and recommendations for specific sites are included.

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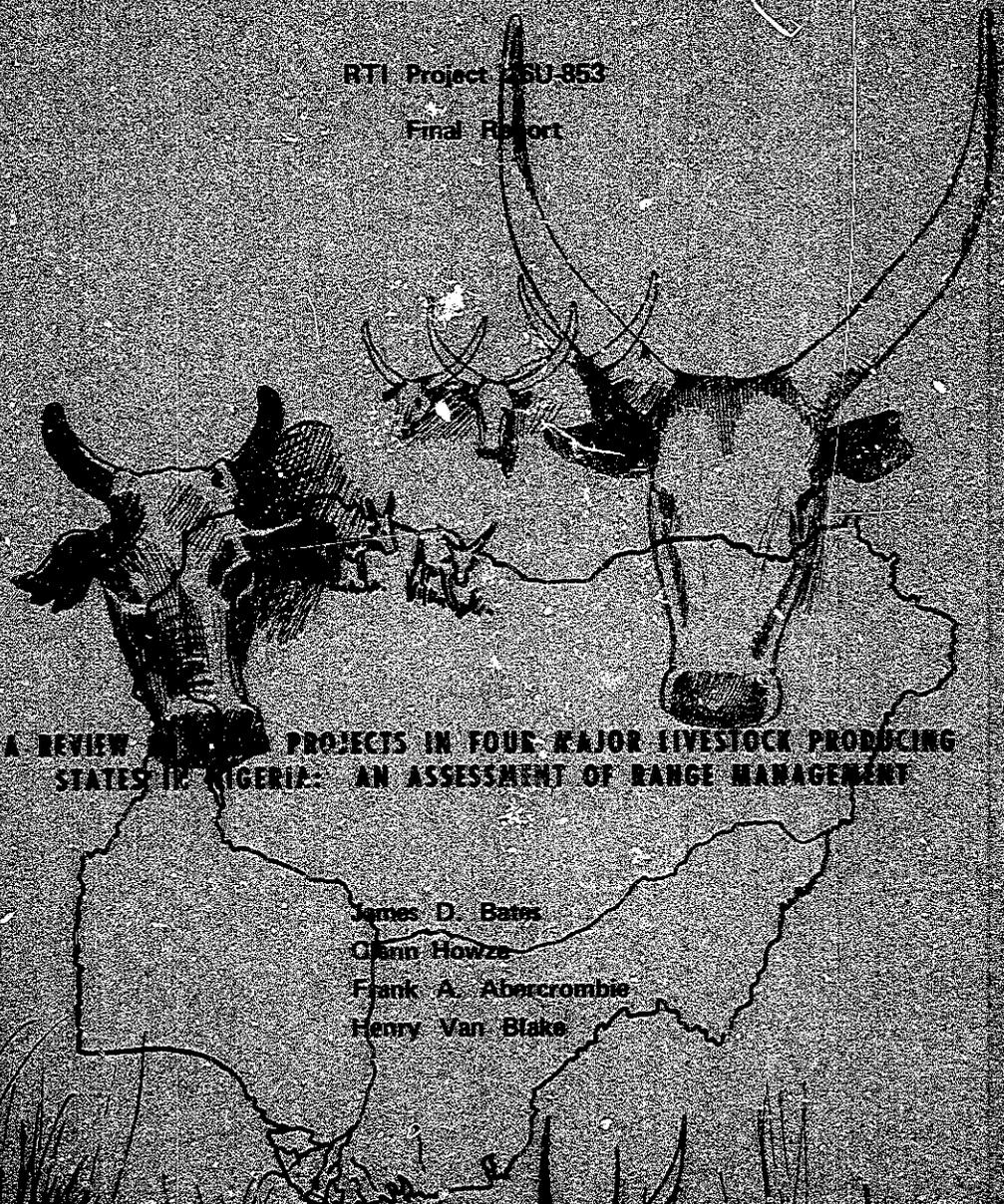
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A REVIEW OF RANGE PROJECTS IN FOUR MAJOR LIVESTOCK PRODUCING STATES IN NIGERIA: AN ASSESSMENT OF RANGE MANAGEMENT

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STATES IN NIGERIA: AN ASSESSMENT OF RANGE MANAGEMENT

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## ACKNOWLEDGMENTS

This report has been prepared with the objective of providing an assessment of selected range management projects in the northern States of Nigeria. The assessment team concentrated on the functional aspects of projects that were included in the assessment and elected to devote a major portion of the effort in Nigeria to talking with people at the range level. Considerable time was spent on the project sites discussing the problems and strengths of the projects as originally planned and seeking to uncover reasons for major deviations from these plans. Nigeria has experienced significant political and economic changes in the 12-15 years since these range management projects were initiated. The assessment team attempted to take into account these factors in assessing the impact of the USAID assistance in this area of livestock production.

For the reception and assistance provided to us, we would like to express our appreciation to the Federal Ministry of Agriculture and Natural Resources in Kaduna, to Dr. Inuwa Mohammad, Director, Federal Livestock Department, to Dr. David-West, Division Chief, Range Management, and to members of their staff who were extremely helpful in making arrangements for the assessment team to conduct the tour of the projects. Within the States, officials were very cordial and genuinely interested in the assessment of range management. On numerous occasions, men who had formerly held positions of responsibility at the range or project level but have since moved on to positions of wider responsibility took time to review with us the events that had transpired.

  
James D. Bates  
Team Leader

A REVIEW OF USAID PROJECTS IN FOUR MAJOR LIVESTOCK-PRODUCING  
STATES IN NIGERIA: AN ASSESSMENT OF RANGE MANAGEMENT

I. INTRODUCTION

A. Purpose of Review of Range Management Projects

The purpose of the United States Agency for International Development's (USAID) assessment of current range management activities in four northern States of Nigeria was to ascertain whether or not a methodology for range management has emerged that can be generally applicable to other areas in Nigeria and to neighboring countries in West Africa; most particularly those countries in the Sahel region.<sup>1/</sup> The first range management projects in Nigeria were USAID-sponsored projects and were started in the early 1960's. After USAID terminated its involvement in the projects in 1968, the Nigerian government assumed responsibility for their operation. Thus, these projects have been active for 15 years. The experience received during these 15 years should provide invaluable information concerning those range management techniques that have been most successful. Likewise, the Nigerian experience can point to the pitfalls to be avoided. The lessons gleaned from this experience in Nigeria should be extremely useful in the design and implementation of range management projects in countries with similar climates, range conditions, land tenure characteristics, social organizations, and livestock-rearing practices.

The impetus for the current review is USAID's commitment to respond to the request of Sahelian states for aid in rebuilding the livestock industry which has been seriously damaged as a result of the recent drought and accompanying famine that has occurred in West Africa. During

<sup>1/</sup> States that are normally included in the Sahel Region of West Africa are Senegal, Mauritania, Mali, Niger, Upper Volta, Chad, and small portions of Nigeria and Cameroon.

this period a significant proportion of the savannah of the Sahel was denuded due to heavy overgrazing and decreased grass production. Desertification continues to occur, and the livestock industry clearly is in jeopardy. A decrease in livestock production has contributed to the widespread malnutrition in these areas.

To a large extent the current range situation in the Sahel is probably due to the failure of livestock producers in the region to carry out sound range management practices. The region is characterized by frequent drought, and unless appropriate range management practices can be demonstrated and livestock producers persuaded to adopt those practices, both the delicate ecology of the region and its livestock industry will be done irreparable harm. Much of the land is not conducive to cropping, and thus, livestock grazing is the only economical agricultural activity. Range management designed to preserve the ecology of the Sahel and to maximize livestock production is essential.

The Sahelian States hold many characteristics in common with the northern area of Nigeria: climate and range conditions are similar; the same ethnic and language groups that inhabit this portion of Nigeria are found in much of the Sahel; and patterns of nomadic herding and animal husbandry are common to both regions. Historically, the herds-men have ignored national boundaries and have moved their herds throughout the region. When the drought came, Nigeria's livestock-producing areas faced the same set of problems faced by the States in the Sahel. Thus, both the range management techniques developed in Nigeria and the Nigerian drought experience should provide useful information for the design of range management programs in the Sahel.

In the absence of adopting appropriate range management practices, the Sahelian States will continue to face three major and recurring problems:

1. Famines associated with cyclical droughts will become more severe and the recovery periods lengthened.
2. A continued loss of essential natural resources--grass land and forest areas--due to desertification.
3. The potential economic value of the livestock industry will not be realized, and thus both the nutritional level of the population and economic growth will be hampered.

In summary, the review of range management programs in Nigeria was conducted in order to aid in the design and implementation of range management projects for the Sahel. The Nigerian experience should have produced important lessons which are applicable to many other West African nations.

B. Objectives and Methodology of Assessment

The extensive work conducted in several States in northern Nigeria over the past 15 years--both USAID-assisted projects and projects carried out by the States--offers an excellent opportunity to assess the impact of various range management intervention plans. Specifically, three general tasks were assigned to the assessment team. They were:

1. To determine the economic and social feasibility of alternative range management interventions appropriate for Nigeria and other regions

of Africa. The interventions considered were to include:

(a) Modification of the range management practices of traditional herdsmen; and

(b) Modification of the management and control of range-land use by State governments, native or local authorities, cooperatives, communal ranches, livestock committees, or other organizational groups.

2. To review the construction, management, and utilization of surface and borehole sources of water in relation to the impact of these wells upon land use, livestock grazing, and if possible the ecological balance of pasture, water, animals, and wildlife.

3. To examine the tsetse fly clearance operations and development of the cleared areas in terms of the implications for range management practices, land utilization, and animal production.

The major factors considered in this assessment include the status of livestock herds and livestock production, the human population, and the environment. The basic methodology employed was to reconstruct from existing records where available and from personal recollection, the status of these three factors prior to program intervention, to determine the present status and then to attempt to highlight those interventions which had either positive or negative impacts on the project areas.

C. Composition of Assessment Team

The assessment team consisted of four members, each selected for a specific area of interest and experience. A key member of the assessment team was Mr. Frank Abercrombie, USAID Range Management

Specialist currently working with AID/Washington in livestock programs. Mr. Abercrombie spent 6 years in the North Central and North West States of Nigeria (1961-1966) during which time he initiated and carried out USAID-supported range management projects. In addition, Mr. Abercrombie has worked in Kenya, Ethiopia, and Somalia with range management programs.

The second team member was Mr. Henry Van Blake, USAID Livestock Specialist presently assigned to the Department of Veterinary Medicine at Tuskegee Institute in Alabama. Mr. Van Blake has extensive experience in livestock production. He was assigned to the Western State in Nigeria from 1962 to 1973 as a Livestock Specialist.

Dr. Glenn Howze, Rural Sociologist and Chairperson of the Department of Sociology at Tuskegee Institute in Alabama, was the third member of the assessment team. In addition to his teaching assignments, Dr. Howze has under way a current socioeconomic survey of livestock producers in Guyana. His primary interest is the adjustments of traditional herdsmen to programmed interventions in range management practices.

The final assessment team member and project leader was Mr. James D. Bates, Agricultural Economist and Manager of the Survey Methodology and Operations Department with the Research Triangle Institute in North Carolina. Mr. Bates worked on a USAID contract for the Federal Government of Nigeria from 1963-1965 with the Federal Office of Statistics under their Rural Economic Surveys Program. His primary interest is the long-term impact of livestock production and the potential benefits of various intervention projects.

These four team members worked closely in conducting this assessment. Site visits and discussions with relevant livestock officials and local herdsmen were jointly held. Review sessions and discussions of the reports reviewed and sites visited were held daily throughout the tour.

D. Itinerary of Assessment Team

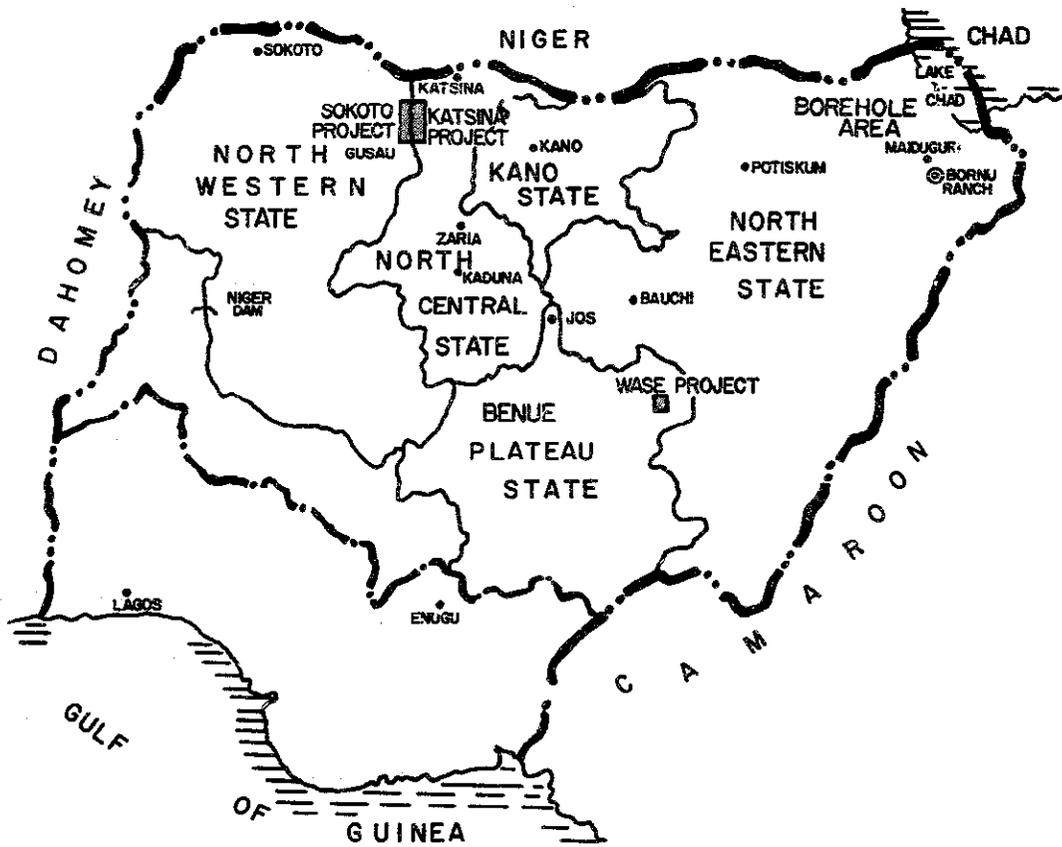
After preliminary briefings in Washington, the assessment team arrived in Kaduna, Nigeria, on February 26, 1975, and began discussions with the Director of the Planning Division of the Federal Livestock Department. An itinerary<sup>3/</sup> was established that took the assessment team on a 21 day tour (February 28 - March 20) of range management projects across the northern portions of Nigeria. Site visits were made to most of the former USAID projects and discussions held with livestock and range management officials in each state and province visited. A considerable portion of the tour was devoted to inspection of ranges and contacts with the local herdsmen.

The assessment team returned to Kaduna on March 20 and prepared a preliminary report for the Federal Livestock Department. A debriefing session was held with appropriate Federal and State livestock and range management officers on Friday, March 21. The team returned to the United States on Saturday, March 22.<sup>4/</sup> On Wednesday, March 26, the team re-assembled in Washington to prepare the assessment report. Trip debriefings were presented on Thursday, March 27, to a program evaluation group from AFR/DP, AFR/DS, and AFR/CNR and on Monday, March 31, to the Livestock Staff Seminar.

<sup>3/</sup> See appendix A for a detailed itinerary.

<sup>4/</sup> Three members returned to the United States on March 21. The fourth member took copies of the preliminary report to Lagos and held informal discussions with USAID/Lagos and the Permanent Secretary of the Federal Ministry of Agriculture and Natural Resources.

Figure 1. Outline map of Nigeria showing location of range management projects and sites visited. March 1973.



## II. SUMMARY OF MAJOR FINDINGS AND RECOMMENDATIONS

Subsequent sections of this report will provide a complete description of the range management aspects of livestock production in northern Nigeria, the traditional production system, the USAID range management projects in Nigeria, and the current status of range management in the country. In this section the major recommendations are presented.

The assessment team found, some 15 years following the initial USAID range management work, that there are clear and definable benefits that accrue to livestock production which can be attributable to appropriate range management techniques. The length of time that pilot projects have been in operation has been sufficient to draw well-defined and clearly supported conclusions concerning the impact of given range management practices adapted to the West African livestock production industry.

\*\*\*\*\*

FINDING:

Range management practices designed for and implemented on the Katsina and Sokoto pilot projects have been demonstrated to be appropriate and effective techniques to successfully modify the traditional herding patterns of nomadic West African livestock producers. Observed problems on the projects were due to breakdowns in administrative functions, drought, and minor faults in project design.

RECOMMENDATION:

*That USAID incorporate the basic approach developed in Nigeria into range management projects designed for West African countries with similar conditions. Specific elements of this approach are detailed in subsequent recommendations.*

\*\*\*\*\*

FINDING:

Oriental visits, development of technical skills, and professional training in range management are keys to the implementation of long-term programs and are objectives that must be pursued at several levels for maximum achievement of program goals.

RECOMMENDATION:

*That in countries with few if any professionally trained personnel, training in range management at the B.S. degree level be implemented in the early stages of a development program. The initial project life must overlap the completion of this degree training by a minimum of 2 years to provide in-country practical application of newly obtained academic skills. Training at the technician level should also begin early in new project areas.*

\*\*\*\*\*

FINDING:

Traditional herdsmen, heretofore primarily nomadic, have demonstrated a willingness to settle within a given area where water and grass in sufficient quantities are available year round for their cattle.

This tendency to settle could be substantially encouraged by a gradual development of basic rights to land in some form of land tenure.

RECOMMENDATION:

*That existing and future range management projects be modified to include provisions to insure that basic land tenure rights of grazing areas be given or in some manner transferred to the traditional herdsmen. Strict adherence to modern range management practices such as elimination of annual burning of the ranges, observance of deferred rotational grazing schedules, and voluntary limitations of the number of animals to the estimated carrying capacity of the ranges will occur most effectively when the local herdsmen have attained some semblance of land or range ownership.*

\*\*\*\*\*

FINDING:

Essentially all of the initial construction basic to range development requires the utilization of heavy earth moving equipment. Effective and timely maintenance also depends largely upon heavy equipment. A characteristic common to developing nations is that heavy equipment and spare parts must be imported. Routine servicing, repairs, and scarcity of spare parts often become major obstacles in keeping equipment operative.

RECOMMENDATION:

*That when initiating range management projects in a country, strong consideration be given to the establishment of a large, centrally located heavy equipment pool that has the capability of furnishing the equipment required for the construction of all range facilities (dams, roads, firebreaks) and that has a staff of service engineers to carry out major repairs. This central pool should stock sufficient repair parts to enable making timely repairs. Localized smaller equipment pools should be dispersed throughout the range areas for maintenance of the ranges.*

\*\*\*\*\*

FINDING:

The two pilot projects in range management in Nigeria served as a haven for large numbers of cattle during the recent drought period. While the heavy intrusion of cattle violated basic range management principles designed to maximize the available resources, the ranges enabled many animals that otherwise would have perished to survive the drought.

RECOMMENDATION:

*That existing and future range management projects incorporate into the design drought condition contingency plans that can be implemented in time of drought. These contingency plans should also provide for a gradual resumption of standard range management practices after the drought has ended.*

\*\*\*\*\*

FINDING:

Successful adaptation of new range management practices by traditional and nomadic herdsmen requires in addition to range-related facilities (dams, roads, firebreaks) both a sufficient time period of observation through demonstration and a supportive, authoritative body to enforce the process of assimilation. In the two pilot studies in Nigeria, these factors were present in the informal extension efforts of a highly motivated USAID technician and the establishment of a strong grazing committee that served both as a council and as a policymaking body.

RECOMMENDATION:

*That range management interventions be implemented through the mechanisms of a legal body containing representation of local herdsmen, technicians, and governmental officials from various livestock agencies. A strong, initially informal, extension component executed by the technician and directed toward the herdsmen must be an integral part of this implementation if practices such as controlled burning, rotational grazing schedules, and limitations on carrying capacity are to be adhered to over a period of time sufficient to overcome existing patterns and practices of livestock production.*

\*\*\*\*\*

FINDING:

The experiences of the Bornu Borehole areas and the recently tsetse-freed areas of the sub-Sudan indicate that it is extremely difficult to initiate range management programs once an area is inhabited by humans and cattle population.

RECOMMENDATION:

*That activities designed to open new areas for use (tsetse clearance) or to change the existing pattern of use (boreholes, surface storage of water) be accompanied by land capability studies to insure that the best use of the land is made. For areas that are designated for livestock, these plans should include provision for imposing standard range management practices which are in effect prior to the changes in land utilization.*

\*\*\*\*\*

### III. LIVESTOCK PRODUCTION IN MAJOR CATTLE-PRODUCING STATES OF NORTHERN NIGERIA

Livestock production has been a major activity in portions of Nigeria for centuries. Almost all of the 11 million head of native cattle and a substantial portion of the total sheep and goat population are found in the savannahs of the north. The livestock producers supply essentially all of the domestic beef consumed in the large urban areas in southern Nigeria. The cattle are shipped by rail and truck or trekked to the southern markets. In this chapter, a review and description of the livestock production in Nigeria is presented in order to place the assessment in the proper context.

#### A. Major Livestock Breeds

The native herds are primarily Zebu-type animals. In the North Eastern State the majority of the animals are Shuwa-Arab (Wadara), non-Zebu Kuri, Rahaji (M'Bororo) with some white Fulani, and Yola-Gadali. White Fulani predominate in the North Central State. North Western State has primarily White Fulani, Sokoto Gudali, and Rahaji. A brief description of the major breeds in these states is provided in appendix B, as there are some variations in their characteristics.

#### B. The Fulani Herdsmen

Eighty-five percent of the cattle in the northern States of Nigeria are owned by Fulani tribesmen, and almost all of the remainder are owned by Kanuri and Shuwa herdsmen who are found in the North Eastern State.<sup>1/</sup>

<sup>1/</sup> International Bank for Reconstruction and Development, Appraisal of Livestock Development Project Nigeria 1974, Annex 2, page 1.

The Fulani are a small ethnic group comprising only about 3 percent of the population of the north. The Fulani have their own language and culture and for centuries have resisted assimilation with and acculturation by the numerically and politically dominant Hausa population.

Cattle herding has been their chief economic activity for centuries. They were originally a nomadic people who have historically followed their herds in search of water and grass. Political boundaries traditionally have meant little. They are found in all the countries of the Western Sudan and frequently cross political boundaries with their herds.

The Fulani have very few possessions. The need for continual mobility limits possessions to what can be carried on a pack oxen. Housing is usually temporary and is constructed out of sticks and grasses that are found in the area of the campsite. They tend to live in clusters of family groups headed by an elder. The elder makes all the decisions concerning where and when the camp is to be moved.

Cattle rearing is an extremely important aspect of the Fulani's life. At a very early age boys are trained to herd cattle. From that time forward their lives are spent with the cattle. Days are spent tending the cattle while they graze, and taking them to and from watering. At night the herdsman keeps the cattle in his camp, as most herds are quite small in number.

The Fulani people typically own no land and must secure permission from government officials and/or crop farmers to graze their cattle. As crop production has increased in the north and as the population has grown, less and less land has been available for grazing. In

order to assure adequate grazing land, the government of Nigeria has been establishing grazing reserves where permanent settlement and crop farming are prohibited.

Traditionally, the Fulani have not been commercial livestock producers; i.e., they did not grow and ready the cattle for the market. Cattle are a source of individual prestige and wealth. Cattle also provide the family with its basic diet of milk and milk products. The excess dairy products, together with other products, are sold in local markets to provide the money for purchasing other necessities such as grain, cloth, and staples, or for paying taxes. Cattle are owned by the men of the family, but the dairy products are claimed by the women. The nomads normally grow no crops but purchase all grain from farmers, who permit the herds to graze over cultivated land after the harvest in exchange for the manure left behind. In turn, the farmers buy from the migratory owners work oxen and animals for fattening on crop residues.

The typical herd is small, the model herd size being about 30 animals. Herd composition as it relates to age and gender has not been a major concern. The Fulani's main objective is that there are enough brood cows available to insure herd size and to supply the milk needs of his family.

Except for the influence of the livestock projects reviewed in this study upon a limited number of Fulani, the contemporary Fulani practices essentially the same animal husbandry that was practiced by his ancestors. Modern scientific techniques of animal production are unknown to him. The only type of modern practice widely used is veterinary care; cattle are being vaccinated against most of the major diseases. The lack of



Fulani herdsmen discussing range conditions with assessment team and Range Management Officer on Zamfara Grazing Reserve (Sokoto Project) in March 1975.

modern husbandry practices contribute to low calving rates, high mortality rates, and the extremely slow maturation of animals. In many respects, the husbandry practices are concerned with keeping the animal alive rather than with increasing production.

While the normal life style of the Fulani is nomadic, sizeable minorities are seminomadic and sedentary. A recent estimate reports that 20-25 percent of the herdsmen are settled, 30-35 percent are seminomadic, and the remaining 40-50 percent are fully nomadic.<sup>2/</sup> The sedentary Fulani usually combines herding with farming activities. He uses crop residue as supplementary food during the dry season. The seminomadic Fulani usually maintains a permanent homestead in the wet season grazing area, where he often has some crop production. When the dry season comes, he leaves his permanent home and takes his cattle south in search of grass and water. The truly nomadic Fulani is constantly on the move trying to maximize the availability of grass and water for his animals while avoiding tsetse-infested areas.

Historically, the migratory pattern of the nomadic and seminomadic Fulani is determined by the weather. During the wet season, they move their cattle northward into the Sudan Zone which is free of tsetse flies. When the dry season comes, the cattle are moved southward into the sub-Sudan and Guinea Zones where water is more plentiful. The migratory routes are well established and are used year after year by the same herdsmen. While there is a great deal of variation in the distance travelled, it is not unusual for a herdsman to move his herd several hundred miles from the most northerly part of his wet season grazing area to the furthest point south for his dry season grazing.

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<sup>2/</sup> Ibid, page 1.

The Nigerian government has started to institute programs to encourage nomadic Fulani to become sedentary. The reason for this policy is the need for increased beef production. Nigeria is currently producing less than 70 percent of the beef it consumes.<sup>3/</sup> The sedentary herds have better weight gains, lower mortality, and higher calving rates than the migratory ones. Furthermore, better veterinary care can be provided to stationary herds. The policy of establishing grazing reserves is directed toward settling the Fulani livestock producer.

C. Land Tenure

Legally, the nomadic herdsmen do not have rights to most of the land that they use for grazing. With the increase in farming, grazing land is becoming more and more scarce. In the adjudication of land disputes, authorities have tended to make decisions in favor of the permanent farmers, rather than the nomadic herders. In order to counteract this and to assure adequate grazing land for the national herd, federal and state governments are setting aside grazing reserves. The legal mechanism for this is the Grazing Reserves Act of 1965<sup>4/</sup> which was drafted with the help of USAID livestock technicians.

Conceptually and in practice direct relationships exist between rights to land and willingness to settle in an area. Prior to the establishment of the Grazing Reserves Act, rights to land by traditional herdsmen were not formally or legally acknowledged; essentially all herdsmen were nomadic. Historically it appears that the herdsmen had not demanded or sought land tenure (other than the privilege to move their cattle through more or less designated routes to the south during the dry season). As

<sup>3/</sup> Ibid, Annex 1, page 2.

<sup>4/</sup> A copy of this Act is given in appendix C. A major recommendation of this study is that the various states establish uniform grazing reserve laws to facilitate and encourage range management practices.

farming began to require a greater proportion of the available land, the need to establish areas for grazing became more apparent. Nigeria, and the same is true in other West African Countries, had set aside large areas that were designated as forest reserves in which villagers were not allowed to settle. In the Sudan areas the forestation is not heavy; consequently these existing forest reserves provided substantial areas in which native grass was abundant. Thus, the concept of setting aside areas for specific use was an acceptable practice in Nigeria. The designation of forest reserves as both forest and grazing reserves marked the beginning of the utilization of relatively large areas for livestock grazing.

Initially, the establishment of grazing reserves did not materially impact upon the nomadic tradition of the herdsmen. The historical imposition of the cattle tax encouraged the herdsmen to be continually on the move.

It became apparent that if the fullest utilization of the grazing reserves was to be achieved, a procedure was required that would involve the Fulani in the management of the reserves. The involvement consisted both of his more intensive use of the land as well as his conservation of the existing resources. Uncontrolled burning, overgrazing, and poor animal health practices were areas through which some level of personal involvement could lead to significant improvements in the livestock industry. An organization structure, termed a "grazing committee" was established in each of Katsina and Sokoto grazing reserves. The composition of the committee was extended to include representatives of the herdsmen, local or native authority officers, province or state livestock officers, and other officials that were related to the livestock industry. The committee met regularly and considered issues such as grazing permits,

provision of supplemental feeding, and salt blocks, requests for assistance in constructing or repairing dams. Appendix F of this report includes the minutes of a meeting of a joint committee meeting of the Katsina and Sokoto grazing committees.

The assessment team reviewed minutes of a number of grazing committee meetings and observed that requests were beginning to develop seeking schools for Fulani children, as well as requests for added social and health facilities. The establishment of viable functioning grazing committees, necessary for the best utilization of the grazing areas, also has a positive impact upon the concept of ownership or rights to land. The settlement of a number of formerly nomadic herdsmen also points to the contribution of these committees to the development of a more stable livestock industry in Nigeria.

D. Livestock Marketing

The marketing system for cattle has been long established in Nigeria. Cattle dealers buy the animals from the Fulani herdsmen. These cattle are either slaughtered in the north or shipped south to the urban centers such as Ibaden and Lagos. While, increasingly, the trade cattle are being sent by truck or rail, most cattle are still driven on foot on well-established cattle trails. However, shipments by truck have substantially increased in the last 7 to 8 years (see table 1). The length of travel is typically many hundreds of miles, and the cattle arrive in poor condition with considerable weight loss.

Table 1

RECORDED MOVEMENT OF CATTLE TO SOUTHERN AREAS FOR SLAUGHTER  
BY METHOD OF TRANSPORT, 1967-1973  
AND FIRST QUARTER 1974\*

Year	Method of Transportation							
	On Hoof		Rail		Truck		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1967	192,231	64.6	96,800	32.5	8,523	2.9	297,554	100.0
1968	219,459	64.3	74,519	21.8	47,521	13.9	341,499	100.0
1969	167,631	57.5	78,883	27.0	45,048	15.5	291,562	100.0
1970	171,897	54.1	96,308	30.3	49,461	15.6	317,666	100.0
1971	344,883	67.8	84,314	16.6	79,649	15.6	508,846	100.0
1972	268,442	57.0	97,122	20.6	105,433	22.4	470,997	100.0
1973	376,784	59.5	101,949	16.1	154,853	24.4	633,586	100.0
1974	114,224	59.0	29,527	15.3	49,650	25.7	143,401	100.0

\* SOURCE: Nigeria Livestock and Meat Authority from data provided by State Ministry of Agriculture and Natural Resources. Table prepared from data collected by George B. McLeroy and presented in an unpublished report "An Overview of the Commercial Cattle Trade in Nigeria," December 1974; used by permission of Mr. McLeroy.

Currently, there are no grading systems for beef, and the animals are not fattened prior to slaughter. The animals that are slaughtered at the abattoirs are inspected by veterinary personnel to certify that they are healthy. However, locally consumed cattle often are not slaughtered in the abattoirs, and for these there are no veterinary checks.

The number of cattle slaughtered annually has remained rather stable over the past 7 to 8 years with the exception of 1973 (see table 2).<sup>5/</sup> This represents about 8 to 9 percent of the national herd.

E. Cattle Tax

The most unpopular governmental activity for the cattle owners is the taxation of cattle. Taxation of cattle, called "jangali", is a very old practice in Nigeria. The Fulani have long been forced to pay money to the authorities in the areas where they grazed their cattle. Despite the long-term nature of this practice, the Fulani dislike it and reportedly go to great lengths to avoid the taxes. The most frequent method of avoiding taxes is the underreporting of herd size. As a consequence, national data on herd sizes and composition are not very reliable.

F. Organization of Government Livestock Programs

Since the reorganization of the government in 1967 into states, responsibility for most of the governmental livestock programs has shifted from the national government to the state governments. The responsibility

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<sup>5/</sup> Ibid, page 1.

Table 2

RECORDED NUMBER OF CATTLE SLAUGHTERED ANNUALLY  
IN THE NORTHERN STATES AND SOUTHERN STATES 1967-1973\*

Year	Slaughter Point					
	Northern States		Southern States		Total	
	Number	Percent	Number	Percent	Number	Percent
1967	583,296	66.2	297,554	33.8	880,846	100.0
1968	642,137	65.3	341,499	34.7	983,636	100.0
1969	629,025	68.3	291,562	31.7	920,587	100.0
1970	550,995	63.4	317,666	36.6	868,661	100.0
1971	469,910	47.6	508,846	52.4	987,756	100.0
1972	443,236	48.5	470,997	51.5	914,229	100.0
1973	862,008	57.6	633,586	42.4	1,495,594	100.0
1974	247,988	56.2	193,401	43.8	441,389	100.0

\* SOURCE: Nigeria Livestock and Meat Authority from data provided by State Ministry of Agriculture and Natural Resources. Table prepared from data collected by George B. McLeroy and presented in an unpublished report "An Overview of the Commercial Cattle Trade in Nigeria," December 1974; used by permission of Mr. McLeroy.

of the state livestock effort falls within the state Ministries of Agriculture and Natural Resources. In the northern states, the Veterinary Division has responsibility for all livestock programs, i.e., health and production. Thus, range management is a subunit under the Veterinary Division. It is headed by a Senior Range Management Officer.

The Federal Ministry of Agriculture and Natural Resources has as one of its major units a Federal Livestock Department. It has responsibility for overall livestock policy and development. The four major divisions in the Federal Livestock Department are:

1. Tsetse and Trypanosomiasis
2. Veterinary Public and Animal Health
3. Planning
4. Federal Leather Institute

Livestock extension activities have not received an important emphasis from either the federal or the state ministries. There is currently little effort to educate the traditional herdsman concerning sound husbandry practices. Likewise, it appears that very little effort is directed toward educating the traditional herdsman about the reasons for and methods of range management.

#### IV. OVERVIEW OF RANGE MANAGEMENT

The development of range management programs in Nigeria began in 1960.<sup>1/</sup> This development was in response to Nigeria's determination to establish a more fully developed agricultural sector. Livestock production had historically been a major economic activity in Nigeria. National economic development plans called for increasing the level of this activity. Increased livestock production was needed to feed an expanding population, and the surplus production could be used for export. It was in this context that USAID was asked to develop projects designed to increase livestock production.

##### A. Initial Assessment of Range Management Aspects of Livestock Production

An early assessment of the livestock industry in Nigeria pointed to the need for the development of range management programs. A number of preexisting range-related problems were noted:

##### 1. Overgrazing

A survey of the rangeland produced evidence that much of the savannah land had been and was continuing to be overgrazed. This was especially true around primary sources of water. This continued overgrazing could destroy the ecology of the areas resulting in erosion and long-term, perhaps irreversible, damage to the savannahs. If this occurred the areas would become even less productive for livestock.

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<sup>1/</sup> See Project Completion Report - USAID Assistance to Livestock Development, 620-11-130-774, March 27, 1972; and A. Fessenden, Evaluation of Livestock Development Project (an in-house USAID mimeograph report) March 10, 1972.

2. Dry Season Water Supply

During the long dry season the water supply became extremely scarce; there were few year-round sources of water. Therefore, herdsmen were forced to migrate south with their cattle in search of water.

3. Nomadic Herding

The ever present need to be constantly moving to find sufficient grass and water has resulted in a nomadic lifestyle for the herdsmen. Ever mindful of the welfare of their cattle, the nomadic herdsmen paid little attention to political boundaries. Furthermore, the nomadic herding was essentially of the subsistence type. Livestock and livestock products (milk, hides, etc.) were sold only when money was needed for such things as cattle taxes and weddings. The major range management concern was that nomadic herding is not conducive to sound range management practices. Furthermore, nomadic herding hindered the development of commercial livestock production and the development of a strong national economy. Nevertheless, an immediate shift to sedentary herding was neither socially nor technically feasible because of longstanding traditions and migration patterns, and the lack of year-round water and grass.

4. Tsetse Fly and Trypanosomiasis

Large portions of Nigeria had ample grass and water, but were not suitable for livestock production because of the presence of tsetse flies which when infested carry trypanosomiasis. Only the Sudan

Zone was free of tsetse flies during the wet season. The sub-Sudan was only suitable for grazing in the dry season, and the Guinea Zone was suitable only for grazing cattle such as N'Daama which are tolerant to trypanosomiasis. Thus, a large area of productive grazing land was available only for limited use because of this fly-borne disease problem.

B. Pilot Projects Demonstrating Range Management Techniques

USAID's range management efforts in Nigeria began in 1960<sup>2/</sup> in the Katsina Province (currently the Katsina Emirate of the North Central State). The project site was at the Kukuri-Jangari Forest Reserve near the village of Runka. The Katsina project was a pilot project designed to develop a range management methodology which would be applicable to the entire livestock area of the northern areas of Nigeria. The specific methodology employed had the following elements:

1. Water Development

In order to assure an adequate water supply for year-round grazing, it was necessary to construct a system of dams for storage of surface water.

2. Proper Stocking

Given the fact that the rangeland had been historically stocked beyond its carrying capacity, it was necessary to survey the range and determine the proper stocking rates. The livestock population in the project area would be limited to the estimated carrying capacity to insure the maximum production of livestock.

<sup>2/</sup> The most complete description of these projects is found in Land Management Study of Northern Nigeria, E.L. Kemmis, Carl P. McCrillis, Jean M.F. Dubois, and Howard R. DeLau, U.S. Department of the Interior, Bureau of Land Management, June 1967. The portions of that report describing Sokoto, Katsina, and Wase Projects have been reproduced and included in this report as appendix D.

3. Deferred Rotational Grazing

Deferred rotational grazing was chosen as a management technique that would guard against the destruction of the land and increase the establishment of perennial grasses. The model designed for the Nigerian projects is shown in figure 2.

4. Livestock Management Practices

To supplement the range management aspects of the project, standard livestock management practices such as regular veterinary care and supplemental feeding were included.

A more detailed discussion of the range management methodology development at the Katsina project will be discussed in the section of the report dealing specifically with that project. It is sufficient to say that a methodology was developed and tested at the Katsina project, and it was determined that these range management techniques could be generalized to selected other areas of Nigeria. Therefore, other range management projects were initiated by the government of Nigeria and USAID, patterned primarily after the Katsina project.

C. Range Management Training of Nigerian Personnel

At the time USAID started the range management program in Nigeria, there were no Nigerians trained in range management. Recognizing that the future of range management in the area depended upon the development of trained Nigerian personnel, USAID assisted in developing a program for training promising Nigerians in range management. This training effort had four parts:

**TREATMENT**

PERMANENT WATER ALL PASTURES

- A GRAZE DURING THE WET SEASON, JULY – SEPTEMBER.
- B GRAZE DURING THE LATE DRY SEASON, APRIL – JUNE.
- C BURN IN JUNE THEN GRAZE DURING THE EARLY AND MID-DRY SEASONS, OCTOBER – MARCH.
- D TREAT AS DESIRED, DEFER OR GRAZE WHEN FORAGE IS NEEDED.

TREATMENT	PASTURE	GRAZING SEASON			YEAR
		APR-JULY	AUG-NOV	DEC-MARCH	
A	1				1st
B	2				
C	3	BURN			
D	4	DEFER OR GRAZE AS NEEDED			
B	1				2nd
C	2	BURN			
D	3	DEFER OR GRAZE AS NEEDED			
A	4				
C	1	BURN			3rd
D	2	DEFER OR GRAZE AS NEEDED			
A	3				
B	4				
D	1	DEFER OR GRAZE AS NEEDED			4th
A	2				
B	3				
C	4	BURN			

REPEAT SEQUENCE

Figure 2. An example of a single, rainy season, four-pasture deferred rotational grazing plan similar to the plan designed for Nigerian Projects. (From Abercrombie, Frank D., Livestock Advisory, Office of Development Services, Agency for International Development, Range Development and Management in Africa, August 1974, page 50. Used with permission of author.)

1. Short-term Training

In order to acquaint Nigerian personnel involved with the initial range management project, experienced ministry personnel who were to play active roles in the range management programs were selected and sent to the United States for noncredit study. This program provided for training for periods of 3 to 9 months. First-hand observation and exposure to range management in the southwest areas of the United States were provided in this short-term training. Some academic training was provided at U.S. colleges, and practical experience was obtained by working with various agencies of the U.S. Department of Agriculture.

2. Technical Training

Recognizing the need for Nigerian technicians to fill posts such as range management assistants, the government of Nigeria and USAID cooperated in the establishment of a certificate-level range management training program at Mando Road near Kaduna, Nigeria. This training was initially conducted by USAID technicians. The academic program was incorporated into the cattle operation on the farm located at the school. Men were given first-hand practical experience in working with cattle and with problems that they would likely encounter in the field.

3. Professional Training

In order to assure the continuation of range management in Nigeria after the termination of USAID support, it was necessary to provide degree-level professional training in range management. USAID provided scholarships to 12 Nigerians enabling them to do B.S.-level work in range management at U.S. institutions.

4. Other Training

On-the-job training in heavy equipment operations, surveying, and other skills necessary for range development was given to the men on the project sites. Thus, the range management training program involved the entire realm of practical, technical, and professional training.

V. REVIEW OF LIVESTOCK-RELATED PROJECTS IN NIGERIA  
(1961-1970)

An initial step in the current assessment was a review of the project goals and objectives of former projects. The assessment team assumed that these files would be available in the USAID/Lagos, Nigeria office for the Nigerian projects. Two members of the assessment team spent 2 days reviewing project files in Lagos and determined that the majority of the original project files had been destroyed. The only project files available were some 1967-69 progress reports. These were reviewed, but were of no significant importance to this assessment.

Upon the return of the assessment team to Washington, project files were researched to find relevant documents pertaining to the early USAID's livestock projects in Nigeria. The most useful information obtained was from a series of livestock-related project summaries that had been previously completed by a livestock range management specialist in the AID/Washington office.<sup>1/</sup> The information obtained from this source revealed that there existed a general project entitled, "Livestock Development - Northern Nigeria." The stated goals/objectives of this project were:

"To assist the Ministry of Animal and Forest Resources in Northern Nigeria to develop livestock and poultry industries. Activities aided by AID include: a) introducing range management techniques; b) increasing poultry

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<sup>1/</sup> These summaries contain a two-page statement giving the costs, project goals, problems, accomplishments, and lessons learned. The summaries pertaining to range management and/or livestock are included as appendix E.

production; c) demonstrating cattle-fattening techniques; d) establishing livestock breeding stations to upgrade stock; e) constructing and operating a demonstration abattoir and two retail outlets, and f) helping train livestock and veterinary technicians."<sup>2/</sup>

The estimated total cost for this general project was \$8,880,000.

Since this general project statement included in addition to range management poultry production, the construction and operation of an abattoir and retail outlets, and the training of veterinary technicians, it is necessary to review various subprojects to define project goals on a more direct basis.

A. Range Management

A subproject included in the general project was subtitled "Range Management." This subproject had an initial financial commitment in fiscal year 1961 of \$1,826,000 which was programmed over a 9-year period. Three project goals were specified for this subproject:

1. To demonstrate the value of livestock improvement and range management techniques through development and operation of pilot areas;
2. To introduce improved herd management and marketing;
3. To train Nigerians in range management and livestock production practices and develop managerial capabilities.

During the life of this subproject (1961-1968), a number of significant accomplishments were realized. Two pilot project areas were developed and range management designs implemented on each pilot

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<sup>2/</sup> Livestock Development, Northern Nigeria, Project Number 620-11-130-774.

area. The first of these was in Katsina Province (now North Central State) and the second in Sokoto Province (now North West State). These two areas, with a common boundary, consisted of approximately 1,600 square miles of range. Dams were constructed to provide water, and fire-breaks were established for control and to serve as demarcation lines. The range management practices introduced included limitation of herd size to estimated carrying capacity of available grass, deferred rotational grazing, supplemental feeding of high protein feed, and provision of mineralized salt blocks.

Grazing committees were established to serve as a policymaking body for the reserves. The committees were composed of local political leaders, personnel from the livestock division of the Ministry of Agriculture, and representatives of the Fulani herdsmen.

Considerable effort was expended to demonstrate to the traditional herdsmen (Fulani cattlemen) the possibility of increasing both the quality and quantity of livestock by developing the native range areas in association with improved herd management and animal health.

The establishment of these two pilot projects required that a number of intermediate level Nigerians be trained in the development and operation of grazing projects. This training occurred in three ways: several men with considerable experience in livestock production were sent to the United States for 3-to-6 month short courses in range management; young men with some livestock experience were sent to Mando Road School for a 2-year program in range management; other men were trained on the project as heavy equipment operators, surveyors, and grazing control officers.

A total of 12 participants were sent to the United States for B.S.-degree work in range management with the expectation that they would return to positions of responsibility with the live-stock production industry of Nigeria.

A final initial achievement of this subproject was the introduction of grazing fees for the use of the grazing reserve. The intent of this procedure was threefold: first, to control and limit the number of cattle that would be on the range; second, to provide a source of revenue that perhaps could eventually replace the cattle tax; and third, provide funds for the annual maintenance for the physical structure on the project sites.

B. Bornu Ranch

A second subproject under the same general project (Project Number 620-11-130-774) was titled "Bornu Ranch." This project's initial obligation was in FY 1963 with an estimated project completion date of 1970. Total funds allocated were \$689,000. The project goals of the Bornu Ranch included the following:

1. To produce improved bulls that could be distributed to local cattle owners in an effort to upgrade the traditional live-stock herds;
2. To demonstrate the advantages of supplementary feeding of animals during the dry season;
3. To train Nigerians in producing and selecting improved breeding stocks;

4. To demonstrate and train Nigerians in modern ranch and livestock management;

5. To demonstrate the possibility of increasing forage production through range management practices.

The ranch was established under USAID's technical and financial support; during the initial years of its existence, several notable accomplishments were achieved. A ranching unit capable of sustaining a foundation breeding herd of 500-600 breeding cows was established. After earlier setbacks suffered when imported (exotic) bulls could not adjust to the climatic and disease problems common to the areas, cross-bred bulls and cows were selected for upgrading the foundation herd. This foundation stock was maintained, and through careful selection, a substantial herd of improved animals was established.

Surplus grass was produced and stored as hay and was fed to the livestock during the dry season when grass was no longer available in the pastures. The production of supplemental forage required the development of a range management system which would yield increased production of high quality forage from the native grasses. A final accomplishment of the Bornu Ranch was the general demonstration of modern ranch management techniques.

C. Mando Road Training School

A third subproject was entitled "Mando Road Training School." Project funds totalling \$250,000 were devoted to this project which was authorized in 1963. The objective of the project was to assist in developing a nondegree livestock training school that would train students in range management and livestock production. USAID provided technicians to serve as instructors in the school.

Once the school was operational, it produced trained-middle-level livestock and range management personnel at the rate of 25-30 per year.

D. Manchok Ranch and Kaduna Abattoir<sup>3/</sup>

A final subproject had two components entitled "Kaduna Abattoir" and "Manchok Ranch."

The Kaduna Abattoir project had three primary project objectives:

1. To serve as a training and demonstration unit for proper flaying, sanitation, meat inspection, and carcass data collection;
2. To demonstrate modern methods of meat slaughter and marketing;
3. To establish grades and standards in meat marketing.

The Manchok Ranch project had two objectives:

1. To provide 100 improved quality slaughter animals per week for the abattoir at Kaduna;
2. To demonstrate the feasibility of cattle fattening under an intensive pasture and feeding program.

The abattoir provided a place for training in sanitary methods of meat handling, and an outlet for quality beef. In addition, the mechanism was established for recording weights of animals slaughtered and grades of beef. The ranch provided training in the operation and management of a fattening ranch and with the technique of supplementing grass rations with concentrate feeds. For a period of time, higher quality beef grades were provided to the Kaduna market. Perhaps the most significant accomplishment was the demonstration of the need for improved marketing of slaughtered animals.

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Since neither of these two subprojects were concerned with range management, the assessment team did not visit these sites. This brief description is included to present a overall picture of the total livestock development project.

These USAID projects represented the initial range management work in Nigeria. This assessment team was instructed to review the pilot projects at Katsina and Sokoto, to visit the Bornu Ranch, and to review the current work in tsetse fly eradication. In addition, the team was requested to look into the grazing ranges in and around the boreholes in the North East, and to visit the Wase Range Management Project. The last two projects were introduced into the USAID Range Management Program in what can be referred to as "Phase II" since they were not part of the original livestock development program.

E. Range Management - "Phase II"

The range management work in Nigeria entered into a second phase in 1965 with the establishment of a PASA agreement with the Bureau of Land Management, U.S. Department of Interior. This agreement provided for the expansion of the pilot projects in Sokoto and Katsina by developing four additional range management projects.<sup>4/</sup> The objectives of this second phase remained essentially the same and are summarized below:

1. To demonstrate the value of proper range management techniques through operations in the six pilot areas;
2. To provide year-round water and forage in these pilot areas so that some Fulani herdsmen would settle there;
3. To introduce improved herd management and livestock operations;
4. To train Nigerians in range management and animal husbandry.<sup>5/</sup>

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<sup>4/</sup> These projects were to be replications of the Katsina and Sokoto pilot projects.

<sup>5/</sup> "Evaluation of Livestock Development Project," page 4, March 10, 1972.

The only range management site of these additional four that was included in this current assessment, was the project at Wase in Benue Plateau State. The Wase project was the only one that was ever operational. The other three projects never became functional. While the early termination of USAID support of livestock production in Nigeria was a contributing factor to the failure in completing these projects, several comments abstracted from the above-cited report entitled "Evaluation of Livestock Development Project" (March 10, 1972) are of interest to this assessment. The report contained the following statements:

"With the limited exception of the Sokoto-Katsina range management area, this activity cannot be said to come anywhere near meeting its goals. The activity was very deficient in planning. Insufficient attention was paid to analyzing the activity's setting. In 1963 when the activity was emerging from the pilot stage, the resident USAID agricultural economist warned that the project should be limited to a managerial size. The Mission needed socioeconomic studies on the Fulani before the project expanded and much more attention should be paid to the management aspects. His proposals were never implemented.

"It seems that most project technicians tried to transplant an American technology without sufficient adaptation to local conditions. They overemphasized physical facilities of range management and neglected the institutional/managerial aspects. The huge quantities of U.S. heavy equipment provided were not compatible, spare parts were not available, and the Ministry did not have the necessary mechanics and repair facilities.

"The range management activity was complicated by the local government structure, since both the regional ministry and the native authorities were administering the ranges. In order to manage the activities of the participating population and exclude the nonparticipants from seemingly abundant pasturage, political and physical control are needed, along with sufficient willpower, money, and technical skills. In this activity, it seemed that the only one which existed was the financial where-withal.

"Given the overcrowding on grazing land, the high price of beef, and the Fulani's increased susceptibility to change, a pilot range management project combined with other moves to alter the cattle raising system might make somewhat more sense now than it did in 1962. However, this project was an inappropriate way to tackle the problems of the livestock sector and should not have been undertaken on such a scale."<sup>6/</sup>

These comments are particularly relevant in that the findings and recommendations of this present evaluation are quite different from those expressed in the evaluation of 1972. The failure to attain an operational status in three of the four additional range management projects appears to have overshadowed and masked some rather significant accomplishments that can be directly attributable to the Katsina and Sokoto pilot projects. Furthermore, as will be detailed later in this report, it is extremely difficult to determine how much of the failure of these projects was due to the factors listed in the preceding paragraphs and how much is due to USAID's early termination, the civil war, and the change in governmental structure.

F. Other Range Management-Related Projects

There are two other range management-related projects which, while not a part of the original livestock development project "Phase I" nor mentioned in "Phase II," are of considerable importance in any range management assessment in Nigeria.

The first of these is the artesian borehole project in the region southwest of Lake Chad in Nigeria's North East State. In the early 1960's, a U.S. Geological Service team drilled approximately 200 wells

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<sup>6/</sup> "Evaluation of Livestock Development Project," March 10, 1972, pages 4-5.

in this area in an effort to define the extent of the aquifer in the Lake Chad artesian basin. The wells were drilled to a depth of 500 to 600 feet in a grid pattern with 10-mile intervals. A substantial number of these wells (boreholes) produced a continuous and significant flow of water. Almost without exception, these wells provided water in areas that heretofore had absolutely no water during the prolonged dry season.

Due to the lack of water, the traditional herdsmen grazed these ranges only during the rainy season and for a few weeks following the end of the rains. Therefore, there was normally substantial grass remaining when the cattle would move southward in search of water. As news spread that year-round water was now available and plentiful, large numbers of cattle migrated to this area during the dry season, grazing on the native grasses and utilizing the boreholes as a source of water.

The influx of cattle for year-round grazing and the rapid deterioration of grasses in the general area of the wells led to a request from the Nigerian government for assistance in developing a range management program for the boreholes area. Thus, in this indirect manner the borehole wells became associated with the range management work in Nigeria.

The major achievements in the borehole area were the capping of flowing wells, the installation of control valves, and the construction of concrete structures to store the flow of water and to serve as watering troughs for the livestock. Additional areas were set aside as grazing and/or forest reserves, but this action followed, rather than preceded, the drilling of the wells and the large influx of cattle. Very little



Concrete structures constructed to direct the flow of water from boreholes, and to serve as watering troughs for livestock. Northeast of Maiduguri, March 1975.

information is available in project files concerning the boreholes and USAID's range management program for the area. Nevertheless, this area of Nigeria is a major livestock producing area, and a review of range conditions and range management activities would not be complete without consideration of the borehole area of the Chad Basin.

A second activity related to livestock production and to range management is the tsetse fly eradication program in Nigeria. USAID supported some work in this program in assisting to clear the Hadejia Valley, an area northeast of Kano. While this area is quite heavily cropped, livestock do graze in the area following the harvest, feeding on the crop residues. Prior to tsetse clearance, animals did not generally graze the area. Of more direct interest to livestock production and to range management are current tsetse fly clearance operations being carried out by the Tsetse and Trypanosomiasis Division of the Federal Livestock Department. Much of the area now being cleared is new land (that is, not currently being utilized for either cropland or grazing). As these areas are freed of the fly, herdsmen are quick to move their cattle into the area and graze their animals. The interest of range management specialists in the activity is clear: as new lands become available a land use plan should be developed to provide for the optimum utilization of the area, whether it is best suited for cropland or for grazing. These areas best suited to grazing of livestock are being gazetted as grazing reserves.

G. Range Development Costs

Two rather extensive studies have been prepared that present analyses of the range management costs and benefits. The first of these two reports was the Land Management Study of Northern Nigeria,<sup>7/</sup> prepared by the Bureau of Land Management of the U.S. Department of the Interior. This is a detailed report of the overall management projects in Nigeria and includes the projects of this current assessment.<sup>8/</sup>

The second report containing an economic analysis of range management projects is the World Bank Report<sup>9/</sup> referred to earlier. This report was prepared for official use of the Bank Group and is therefore not widely distributed. However, the report is available for review and does contain considerable economic analysis.

The USAID assessment team reviewed these two documents and consider each to be useful in the overall appraisal of the Nigerian livestock picture. The assessment team did not undertake any economic analysis of the projects reviewed, preferring to concentrate on the present status of the projects and the operational aspects of maintaining projects over time.

<sup>7/</sup> Kemmis, E.L., Carl P. McCrilles, Jean M.F. Dubois, and Howard R. Delano, Land Management Study of Northern Nigeria, Bureau of Land Management, June 1967.

<sup>8/</sup> Ibid. See for example Chapter X "Economic Analyses and Recommendation on Existing Projects" and XI "Economic and Financial Analyses (on) Proposed Projects."

<sup>9/</sup> Worker, N.A., and T.C. Tsui. Appraisal of Livestock Development Project - Nigeria, Western Africa Regional Office, October 9, 1974.

H. Major Occurrences in Nigeria Affecting Range Management Projects

A number of unanticipated events have occurred in Nigeria during the last decade which have affected the progress of range management efforts. These are briefly discussed in the following paragraphs.

1. The Reorganization of the Government

In 1967, the governmental structure in Nigeria was changed. The Federation under which the projects were started was replaced by a Federal Military Government. The Northern Regional Government was replaced by six State Governments. These changes resulted in many administrative changes. More importantly to range management, project personnel were shifted into State Governments and frequently were lost from the projects. Furthermore, the commitment to and the understanding of the project was often lost.

2. The Civil War

The Civil War had adverse effects on the range management projects because the need to support the military effort seriously limited the amount of money that could be expended on nonmilitary matters. Export (cash) crops received priority in the allocation of the limited funds provided for agriculture. Livestock production and, therefore, range management received rather meager budgets during this period.

3. Early Termination of USAID Involvement in Range Management Projects

For various reasons, USAID found it necessary to terminate its involvement in the range management projects several years prior

to the original, planned termination date. At the time of USAID departure, a truly professional staff had not been developed. Those Nigerians studying range management at U.S. colleges had not completed their work and thus had not yet returned to Nigeria. Therefore, there was a period of time between the USAID's departure and the return of professionally trained Nigerians when the projects were in the hands of nonprofessional staffs. Furthermore, when the degree-level men did return, there was no one to provide guidance and on-the-job practical training during the early months of their work.

4. The Drought

Since USAID terminated its involvement in the projects, the area has experienced a major drought. As a result, the project areas received increased numbers of livestock because of the availability of water and grass on the project sites. Consequently, many of the management practices of the projects were abandoned.

I. Summary

This section provided a review of the USAID range management projects which were operational in Nigeria during the past 10-15 years. The projects have changed, technicians have been assigned and reassigned to other areas, young men have been sent to the United States for degree training, the country has undergone a major internal struggle, and the governmental structure has been altered drastically. In the chapters that follow, the impact of these projects will be determined in the light of these major nonlivestock factors that have also had their impact on livestock production.

## VI. CURRENT STATUS OF RANGE MANAGEMENT IN NIGERIA

The assessment team spent approximately 4 weeks in Nigeria traveling to old USAID project sites. Visual inspections of numerous ranges, dams, and livestock herds were made. Discussions were held with past and present range management and veterinary personnel. Visits were made to livestock producers and reports were reviewed. In general, the team was quite impressed with what they saw and heard. In many respects, range management has grown since USAID terminated its involvement. More and better trained Nigerian personnel are involved, additional ranges have been placed under management, and future plans call for even greater efforts in range management.

However, a number of problems were noted. Many sound management practices have been discontinued, and for various reasons there has been a lack of consistency in the projects. Therefore, this section presents a description of each project activity reviewed and site visited, including notation of accomplishments as well as shortcomings.

### A. Range Management Training

Training in range management consisted of three aspects: short-term training for experienced livestock personnel, technician training, and professional level training. The assessment team found that in recent years range management training has not only been continued, but substantially improved.

1. Short-term Training

The assessment team met with a number of persons who had received short-term training and found that the training had resulted in significant contributions to range management over the years. Some of the trainees have played important and active roles in such range management activities as establishing new grazing reserves, building new dams, and helping manage range projects. Others have moved into key decisionmaking positions in government and have remained knowledgeable and supportive of range management projects. More than a decade after its inception, this short-term training is still contributing significantly to the development of range management practices in Nigeria.

2. Technician Training

USAID helped sponsor the establishment of the Mando Road School (the Livestock Services Training Center) to train young men in range management and animal health. The school in its earlier years provided a 2-year certificate-level training. The team visited the school and found numerous improvements in the program. Physical facilities have been expanded and trained Nigerians now teach range management courses. An extremely important development is that the program has been expanded to a 4-year degree-level program and in October 1969 was attached to the Ahmadu Bello University. This reduces the need to send men to the United States for B.S.-level work. Additionally, the amount of practical experience being received has been considerably increased. Not only are the students required



Cattle maintained on the range at Mando Road Training School (the Livestock Services Training Center) Kaduna, March 1975.

to do practical work on the school farm, they are also assigned for 2 months to an existing range management project. The assessment team encountered graduates in responsible range management positions throughout the northern states of Nigeria.

### 3. Professional Level Training

Initially, USAID helped to sponsor degree training for 12 Nigerians in the United States. The assessment team found several of these men in responsible positions such as teachers at Mando Road School and senior or principal range management officers within the states. Several have returned to the United States for graduate level training under the sponsorship of the Government of Nigeria. While increasingly the B.S.-level training is occurring at Mando Road, some states still sponsor students in the United States for B.S.-level work.

The major findings concerning range management training are:

1. *The Nigerian officials who received short-term range management training in the United States have played and continue to play important roles affecting range management.*
2. *The Mando Road School continues to train range management technicians and has been expanded from a 2-year certificate program to a 4-year degree program.*
3. *The 12 Nigerians trained in the United States under the sponsorship of USAID have returned to Nigeria and hold responsible major range management posts.*
4. *The various states continue to send young Nigerians to the United States for undergraduate and graduate training in range management.*

B. Katsina Project - Kukari-Jangari Grazing Scheme

As indicated in a preceding chapter, the Katsina Grazing Project was the first effort at range management in Nigeria. It was a pilot project which was to serve as a model for the development of other projects. At the time USAID terminated its involvement, this project was fully operational with all of the elements of the basic design being implemented in all of the ranges on the project.

The project area of approximately 329,000 acres had been divided into ten ranges. Each range was further subdivided into four pastures. Water supply had been developed in three pastures; the fourth pasture was designated for wet season grazing. Deferred rotational grazing between pastures was necessary as each range was designed to provide year-round grazing. A system of grazing permits was established which controlled the number of cattle on any one range and served to enforce the rotation from one pasture to the other at specified times.

Roads were developed dividing the ten ranges and the four pastures. These roads served as multipurpose access roads, fire-breaks, and grazing boundaries.

To determine policy and to enforce grazing regulations, a grazing committee was established. This committee was composed of key local officials, representatives of herdsmen, and range management staff members. The committee issued grazing permits, enforced rotational grazing, and dealt with problems as they occurred. The project staff initiated extensive efforts to explain to the herdsmen the importance



Earth dam constructed in early 1960's is still functional. Water level shown is an indication that water is still available at conclusion of the dry season. Kukari-Jangari Grazing Scheme (Katsina Project). March 1975.

of rotational grazing and the detrimental effects of annual burning for range improvement. Emphasis was given to the need for livestock management practices such as animal health care, nutrition, and supplemental feeding to improve maturity rate of animals and increase calving percentage in females. By the time that USAID was terminated, year-round grazing was in effect utilizing the deferred rotational grazing pattern.

The assessment team found the Katsina Project still to be functioning in most aspects. The director of the project has a B.S. degree in range management from the United States. He appeared very knowledgeable about the fundamentals of range management and of the project itself.

Regular maintenance has been carried out on all roads and fire-breaks. Additional dams have been built. New facilities have been added and staff quarters constructed. The most impressive addition is a new dairy building which is equipped to process milk that is purchased from local herdsmen. The grazing committee is still operational and meets locally on a monthly basis and semiannually with the Sokoto committee.<sup>1/</sup> It continues to be used as a means to make policy and deal with problems.

There has been a breakdown in the deferred rotational grazing scheme. Apparently the herdsmen were able to convince the grazing committee to discontinue this practice. As a consequence, many of the pastures, especially those with permanent water and those nearest to villages, are overgrazed. Those pastures further removed from the villages have not been as heavily grazed, however. The project personnel have been successful in convincing the traditional herdsmen to

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<sup>1/</sup> See appendix F for copies of the minutes of an recent grazing committee's meeting.



Cattle arriving at water supply provided by earth dam constructed with USAID technical assistance in early 1960's. Kukari-Jangari Grazing Scheme (Katsina Project). March 1975.

refrain from burning the savannahs. As a consequence, perennial grasses are being reestablished.

Another breakdown has been the failure to maintain proper stocking rates. Rather than using the grazing permits as a method to control the number of cattle on a given range, the permits are apparently used to produce income and are issued on request. During the drought, the ranges were opened to increased numbers of herdsmen and cattle. The choice between maintaining a given stocking rate and letting cattle die or permitting overstocking was clear; as many cattle as possible were allowed on the project site. While the numbers of cattle have been substantially reduced since the drought ended, the stocking rates have remained above the optimum carrying capacity of the range. The problem now seems to be that grazing permits are a source of revenue and local officials do not want to lose the income by restricting the number of cattle that is allowed to graze on the ranges.

Supplemental feeding of mineralized salt blocks and cotton seed is continuing, as are herd health practices. The veterinary service has a regular schedule of animal health care practices. Much of the heavy equipment left by USAID for range development and maintenance is inoperative. The shortage of spare parts and the absence of a qualified mechanic result in equipment remaining unusable for long periods of time. The traditional herdsmen, who before the establishment of the reserves were nomadic, have settled on the edge of the reserves in permanent villages. Many of the once nomadic herdsmen have been settled for almost a decade and a half.

One problem that was very much apparent at this project was the lack of staff continuity. USAID personnel left prior to the time the B.S.-level persons being trained in the United States returned. Additionally, when the states were formed, several key project staff members were transferred to other states or promoted into positions of wider responsibility. This lack of continuity probably accounts for the failure of the projects to return to deferred rotational grazing and to enforce the recommended stocking rates after the initial breakdown created by the drought.

One final problem noted was that the professional range management personnel lack the authority to institute or enforce proper range management practices. Range management continues to be under the Veterinary Division and works in association with the Forestry Division.

To summarize, the review of the Katsina project produced the following findings:

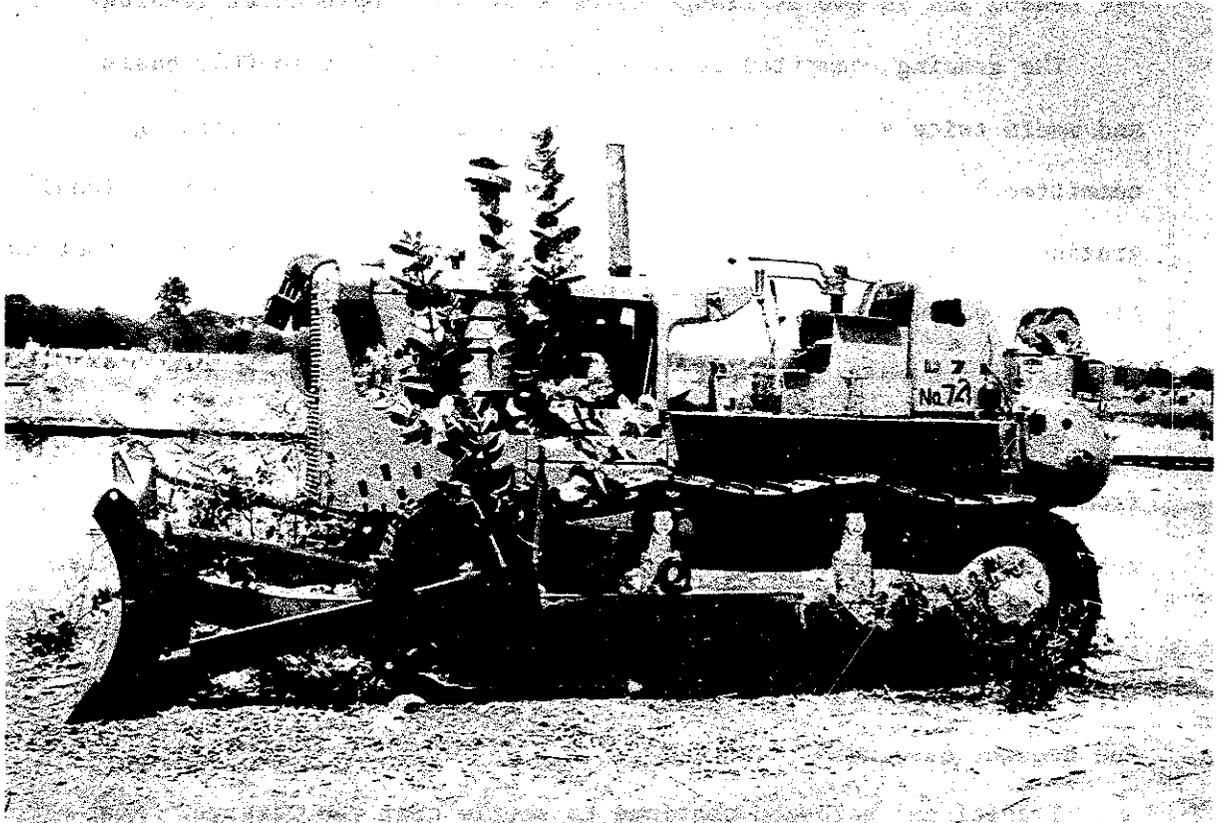
5. *Effective management still continues on the Kakari-Jangari grazing reserves.*
6. *The project manager is a Nigerian with B.S. training in range management.*
7. *Maintenance on dams, roads, and firebreaks continue.*
8. *The North Central State government has made major capital investments in new buildings and equipment.*
9. *The grazing committee is still functional.*
10. *Deferred rotational grazing has been discontinued.*
11. *Due to the breakdown in rotational grazing, ranges near the villages were overgrazed.*
12. *Proper stocking rates are not being maintained on the ranges.*
13. *Supplemental feeding and veterinary care continue on the project site.*

14. *Much of the heavy equipment supplied by USAID is no longer operative due to lack of repair.*
15. *Traditional herdsmen have constructed permanent settlements around the reserves.*
16. *The project has experienced a lack of continuity in leadership.*
17. *Professional range management personnel lack the authority to impose sound range management practices on the reserves.*
18. *Range burning is negligible, and perennial grasses are returning.*
19. *The reserve provided grass and water to large numbers of cattle during the drought.*
20. *A milk collection and processing station has been established on the reserve.*

C. Sokoto Project - Zamfara Grazing Reserve

The Sokoto Project which adjoins the Katsina Project was started in 1962. The project consists of 322,560 acres and was divided into six ranges. It was a replication of the design in the Katsina Project and thus the general project description in the preceding section also describes this project.

The assessment team found that most of the physical improvements made by USAID have been maintained. There was evidence of regular road, firebreak, and dam maintenance. In addition, new ranges have been developed and a number of new dams constructed. New buildings have also been constructed at the project site. While there was some evidence of burning near the project boundaries, the range appeared to be in relatively good shape. There was some overgrazing near the dams. Approximately 50 percent of the trees and shrubs had died on the range, apparently as a result of the widespread drought condition. The project director has met most of the requirements for a masters degree in range



Heavy equipment idled by lack of spare parts, March 1975.

management. Judging from his written reports, he is quite competent and has worked to continue the development of the Sokoto Project. Supplemental feeding and herd health practices continue. The assessment team saw large quantities of hay that had been cut during the wet season and is now available to be sold for supplemental feeding.

The grazing committee continues to function on a monthly basis and meets twice a year in joint sessions with the Katsina grazing committee.<sup>2/</sup> As with the Katsina Project, both the deferred rotational grazing and the maintenance of proper stocking rates have been discontinued. Also observed was considerable expensive heavy equipment that was inoperable due to lack of repair parts and a qualified mechanic.

When the drought came, the project managers allowed herdsmen from the outside to use the ranges for grass and water. Officials report that this action resulted in the saving of thousands of cattle. A negative consequence of this action was that much of the management was suspended, and unfortunately it has not been reestablished since the drought has ended.

Traditional herdsmen continue to settle near the reserve. Most of the herdsmen who use the reserve have become fully sedentary.

The findings of the assessment team for the Sokoto Project were similar to those for the Katsina Project. This is to be expected since the Sokoto Project was a replication of the Katsina Project and for a period of time had the same USAID project manager. Furthermore, the Sokoto grazing committee works in concert with the Katsina grazing

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<sup>2/</sup> See minutes of recent grazing committee meeting given in appendix F.

committee; they meet together and have a joint management program. Because of the similarities with the Katsina Project, findings will not be presented for the Sokoto Project. The only major differences were that the Sokoto Project did not have a dairy and that the Katsina Project appeared to have less financial commitments from the state government.

D. Bornu Ranch

The assessment team was joined for the site visits in the North East State by two members from the Lake Chad Basin Commission and a regional USAID agricultural officer. The enlarged team visited the Bornu Ranch located some 30 miles south of Maiduguri. The ranch continues to be in full operation with an adequate complement of staff. A lengthy and informative discussion was held with the ranch manager who outlined the basic operation of the ranch. Currently, the ranch has 2,411 head of cattle that graze over 8,000 acres. Of the total, some 760 animals are brood cows that form the nucleus of the stock herd. A bull herd that is maintained has been developed by selecting the more promising young bulls on the ranch. It should be noted that the judgment of whether a given bull is promising is basically intuitive since the performance records necessary for a scientific judgment are not kept. Steers and young bulls not retained for breeding stock are sold for slaughter at 4 and 5 years of age when at a weight of approximately 1,000 pounds each.

The Bornu Ranch is currently involved in the Federal Government's efforts to build the national herd of livestock. Government officials have noted that a large number of pregnant animals were being

slaughtered at the abattoirs. The Nigerian Livestock and Meat Authority instituted a program of pregnancy testing for all female animals at the abattoirs and buying cows that are pregnant. Many of these animals are now being sent to the Bornu Ranch where they are pastured until they wean the calves. A herd of some 400-500 of these animals are now at Bornu Ranch. Calves from these cows are being raised and will eventually enter the market stream. As the selection of the cows is based on pregnancy without regard to quality, the quality of the herd at Bornu Ranch is probably not being improved by the addition of these cows or their calves. While the manager maintains the animals in separate pastures, additional demand is nonetheless being placed upon relatively fixed resources. Furthermore, there appears to be a reluctance to sell these cows. They are being maintained in order to obtain additional calf crops from these originally market-destined cows.

A regular vaccination program and animal health program is maintained. Currently there is no dehorning, and castration of young bulls not selected for future breeding stock is relatively infrequent.

The ranch was initially designed to serve as a breeding ranch, but a second purpose has been added which perhaps overshadows the original purpose. The Bornu Ranch was intended to demonstrate the benefits of improved quality in herd production by the utilization of selected bulls for breeding purposes. A plan was devised to distribute bulls that were considered to be of improved quality among traditional herdsmen in the area. This goal has been partially achieved; last year, ten bulls were distributed. However, it is expected that as the benefits of having these improved bulls become apparent, this function of the ranch will become more fully achieved.

Beef production has become an important secondary function of the ranch in recent years. The ranch has begun selling animals for slaughter, and the manager has plans to increase production. It was reported that a number of private ranches will be patterned somewhat after this aspect of the ranch.

The ranch has been subdivided into grazing blocks with cattle being rotated between the blocks. Both dry season and wet season blocks have been designed. Firebreaks and permanent sources of water are also maintained. The ranch has also developed areas devoted to hay production. Last year over 15,000 bales of hay were sold at low cost to traditional herdsmen in the area.

The full usefulness of the ranch is hampered somewhat by the failure to maintain its heavy equipment that is used in road and dam construction and maintenance. Efforts have been made to secure a service engineer to supervise the workshop; but after 5 years of advertising, the position is still vacant.

Overall the ranch has, at least in part, fulfilled its basic objective. However, the beef production aspects is dubious because it is unlikely that the Bornu Ranch could ever be economically operated. Nevertheless, its indirect contribution to local livestock herdsmen and total livestock production may more than offset the net loss that the ranch annually incurs.

In summary, the visit to the Bornu Ranch produced the following findings:

21. *The ranch is still operated with a high level of management.*
22. *The ranch is now being used to pasture trade cattle sold for slaughter that were determined to be pregnant at abattoirs.*

23. *The original goal of providing breeding stock to local herdsmen has only been partially achieved.*
24. *Beef production has become an important function of the ranch, even though the likelihood that this will be a profitable enterprise is doubtful.*
25. *The ranch has maintained proper veterinary care and nutrition.*
26. *A sound range management program is in effect on the ranch.*
27. *Much of the heavy equipment provided to the ranch by USAID is no longer operable.*

E. Borehole Area

The drilling of perhaps as many as 200 deep wells in the area northeast of Maiduguai altered the utilization of the large areas into year-round grazing that once were utilized only for wet season grazing. The drilling of these wells was not a part of a range management plan. The shift in range utilization came about solely as a result of water being made available in an area with a substantial volume of native grasses that were not consumed during the wet season grazing periods. The influx of cattle was tremendous and occurred with little or no planning or preparation with respect to range management. As one would predict, a situation evolved in which the areas within 2 to 3 miles of the boreholes became denuded, and the areas immediately adjacent to the wells became quagmires from the uncontrolled flow of artesian water and the heavy traffic from the herds that come to drink.

The need for range management for the area became immediately apparent. At the request of the Nigerian government, a USAID technician worked in the area for a period of 4 years and, in cooperation with governmental livestock officers, drew up several alternative range



Free-flowing borehole in the area Northeast of Maiduguri. Water provided by these wells is used by people from nearby villages in addition to the cattle herdsman, March 1975.

management plans. However, the vast area contained a tremendous number of herds already on the range. The lack of an effective organization of local governments and the unwillingness of the traditional herds-men to adopt the proposed range management plans, all contributed to the failure of range management programs to be implemented. The only success achieved was the capping of the wells, the installation of control valves on a number of wells, and the construction of concrete water diversion flowways with a series of watering (and storage) tanks to enable larger numbers of cattle to drink at one time. These improvements reduced the area of mud in and around the wells and prevented complete destruction of the area. However, USAID was never successful in implementing a range management program.

The assessment team visited approximately 40 boreholes throughout an area 60 miles east and 80 miles north of Maiduguri. Throughout this area at each borehole a number of herds were observed waiting their turn to water. Most of the wells produced only enough water to barely serve the human and animal populations in the villages in the vicinity. It was reported that watering of the stock continued around the clock. Apparently the flow of water has been gradually decreasing in recent years. The uncertainty of the availability of water in this region has greatly reduced the number of cattle that remain during the dry season. A large number of the herds have migrated toward the recently tsetse-cleared areas in the vicinity of Yola and Mubi, an area south of Maiduguri.



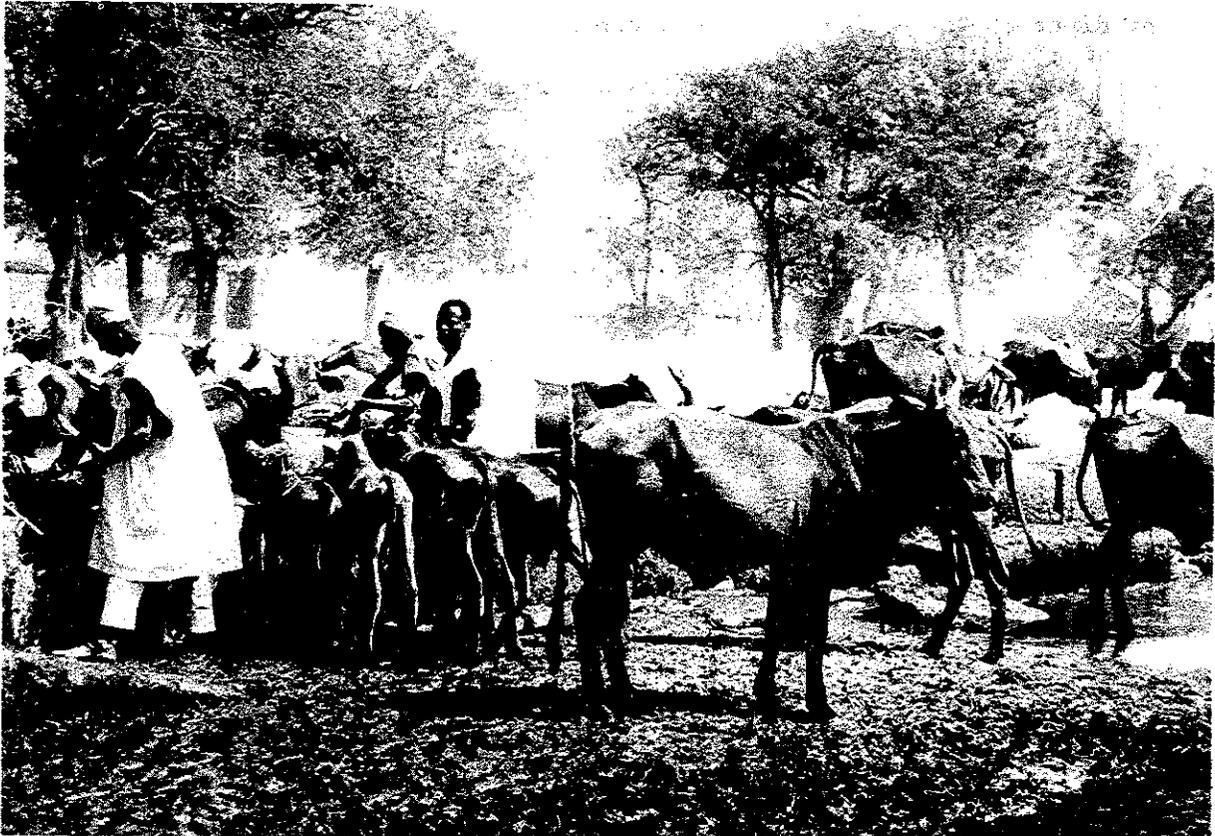
Severely denuded area in the immediate vicinity of a borehole in Northeast Nigeria, March 1975.

As expected, the team found that the condition of the range has not improved in recent years. It remains completely denuded in a 2-to-3 mile radius of the boreholes.

A positive aspect noted by two members of the review team was the change in herd composition that had occurred during the last few years. Several years ago these herds included a large number of older animals--unproductive females and older steers and bulls. Due to the drought and the decrease in the flow of these boreholes, most of the older animals have been marketed. Thus, the herds have been culled so that they are now composed mostly of younger productive animals. The range management specialist and the livestock specialist on the assessment team estimated that currently half of the cattle in the area are under 5 years of age.

In conversations with local officials, it was learned that the government has continued the drilling of boreholes. There is still no attempt to institute range management practices; thus, the new areas are becoming denuded. Furthermore, village leaders are putting pressure on the government to drill even more boreholes. Until range management precedes the development of water, one can expect the deterioration of the range in the borehole area to continue.

Borehole water has been demonstrated to be a factor that can significantly alter the migratory patterns of the traditional herdsmen; when water is developed, herdsmen move into the area. Likewise, the decline of the flow of water has forced the herdsmen to again move south in the search for water during the long dry season. The type of soil and the high evaporation rate will preclude the long-term provision of water by surface storage such as dams and



Cattle waiting to drink at borehole from which the flow of water has gradually diminished, March 1975.

pits in the borehole area. Controlling the flow of water from wells to the volume needed by people and cattle appears to be the most appropriate method to provide for year-round grazing. Considerable interest was indicated by people in the villages as well as by district herds in obtaining additional wells.

The most important lesson learned from the borehole areas with regard to range management is that it is extremely difficult to institute range management practices once an area is occupied by cattle. The government should institute range management practices prior to water development.

In summary, the major findings in the borehold areas were:

28. *Range management has not been successfully implemented in the boreholes area.*
29. *The government continues to drill additional boreholes without concern for establishing management on the range.*
30. *The flow of most of the boreholes has greatly decreased.*
31. *The borehole experience demonstrates that when permanent water is developed, traditional nomadic herdsmen will become sedentary.*
32. *The decrease in the flow of the boreholes necessitated the movement of large numbers of herdsmen to the south.*
33. *Culling procedures during the drought have resulted in younger, more productive herding.*

#### F. Wase Grazing Reserve

The final range management project visited by this review team was the Wase Grazing Reserve in the Benue-Plateau State. This project was initiated by USAID during Phase II of the Livestock Development Project. It was the only Phase II project which was operational at the time that USAID terminated its involvement in range management activities in the North. When USAID terminated its involvement, all of the

physical aspects of the projects had been developed; the roads, fire-breaks, and dams all existed. However, the management had not been initiated, stocking rates had not been determined, rotational grazing was not being practiced, and grazing committees did not exist.

The review team found the project to be almost nonexistent. The project was still a part of the livestock program of the State Ministry of Agriculture, but it was receiving very little financial support. Apparently, the Ministry has decided to emphasize crop production rather than livestock production.

The roads, firebreaks, and dams have not been maintained for several years. Most of the ranges visited had been burned, and the grass was in poor condition. The heavy equipment has been transferred to other agricultural projects such as crop and irrigation.

The establishment of permanent water had resulted in the settlement of once nomadic herdsman. Most of the herdsman who use the range are permanent residents of villages on the edge of the reserve.

An even more disturbing fact is that the reserve may be changed from a livestock grazing reserve to a game reserve. It is reported that the director of the state game program is trying to prohibit livestock from the reserve.

The failure of the Wase Project is in sharp contrast to the situation found at the Katsina and Sokoto Projects. The difference is probably due to a combination of factors: the fact that the Katsina and Sokoto Projects were operational before USAID terminated its involvement; the relative importance of livestock in the various states; and the relatively small financial commitment made by the state government to range management.



Range land that has recently been completely burned, Wase Project, March 1975.

In summary, the major findings at the Wase Project were:

34. *The Wase Project was virtually nonfunctional.*
35. *The physical aspects of the projects were not maintained.*
36. *A management scheme was not operational.*
37. *The heavy equipment of the project had been diverted to other activities.*
38. *The ranges were badly burned and the grass was in poor condition.*
39. *The grazing reserve is in danger of being changed to a game reserve.*

G. Tsetse Eradication Program

The assessment team visited the Tsetse and Trypanosomiasis Research Institute at the institute headquarters in Bauchi.<sup>3/</sup> After discussions with officials in the Tsetse and Trypanosomiasis Division describing the current years operation and a general background of the progress of the program to date, a field trip was made to observe the actual spraying operation in an area some 58 miles north of the Jos-Bauchi Road. At the site, men with spray tanks were observed as they sprayed trees along river and water lines that normally provide cover for the tsetse fly during the dry season. Detailed demonstrations of the training, supervision, and operation of the spraying were given.

The team also visited the helicopter spraying unit that was working in a nearby area. At the present time, two helicopters spray for fly control in this area. The relative cost of the helicopter operation is somewhat higher than the manual spraying, but it has the advantage of easier supply and logistics control.

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<sup>3/</sup> A copy of the latest report describing the activity of this division was obtained and is on file in the Africa Office Development Services (AFR/DS). See Annual Report of the Tsetse and Trypanosomiasis Division 1970-73. Federal Ministry of Agriculture and Natural Reserves, Federal Livestock Development, Kaduna, Nigeria.



Manual spraying for control of tsetse fly in an area north of Bauchi, March 1975.

The tsetse eradication program in Nigeria is an ongoing program that has been operational for a number of years and plans have been formulated outlining annual work plans up through 1986 - 87. The program and schedule, however, has been designed to be flexible as priorities may need to be adjusted to meet changing livestock developments. The total area designated for clearance is approximately 100,000 square miles. During the period 1970 - 1973, some 21,232 square miles were covered by spray units.

The program has a staff of approximately 500 established positions with a large number of day laborers employed in villages as the program moves through an area. The program utilizes 160 vehicles of all descriptions in the field work. The field operations are highly organized with procedures carefully followed in mixing of spraying and in detailed map work to insure that the designated areas are completely covered. When viewed from the perspective of the total work to be anticipated, the impact is overwhelming. Yet in the systematic manner in which the total program is organized and maintained, the ultimate objective of clearing large areas for farming and livestock is attainable.

When an area has been cleared of flies, the word is quickly passed among the traditional herdsmen and among villagers who may be interested in settling and reclaiming land that was infested. Cleared areas are rapidly settled both by farmers (where suitable farmland is available) and by herdsmen. This settlement takes place prior to the establishment of range management practices.

Two factors must be kept in mind when visualizing what actually occurs when land that previously was infected by tsetse fly is cleared. First, the areas that are being cleared are virtually uninhabited prior to spraying for the eradication of the tsetse fly. Uninhabited land in Nigeria that has vegetation normally has an abundant growth of native grasses and other edible foilage that is very attractive to the traditionally nomadic herdsmen that are moving southward in search of water and grasses. Spraying occurs essentially in the dry season when the flies are concentrated along the stream beds and vegetation. Therefore, the herdsmen are practically following behind the spray units with their herds waiting for each ravine or valley to be sprayed. Farmers are considerably slower to move into the cleared areas as they are village residents and tend to farm areas that are within normally walking distance of the village. The more significant impact is the establishment of new villages or settlements within the cleared areas. This is more involved and occurs in the second or third year after the eradication program has moved through an area. Therefore there is no immediate conflict between the herdsmen and farmers, but the conflict does arise as the farmers begin to establish villages in the cleared areas.

The second factor relating to the habitation of cleared areas with respect to government action, is that the establishment of grazing reserves is normally a federal or state responsibility and involves a process that moves slowly. The authorization, implied or actual, for villagers to settle in the recently cleared area is much easier to obtain, normally being the responsibility of local or native authorities.

Finally, the objectives of the Tsetse and Trypanosomiasis Division is to eradicate the tsetse fly. Their organization is directed exclusively at this goal. The impetus for the development of procedures for resettlement and reclamation practices will have to evolve from the state government in order to have the desired impact upon the utilization of the recently cleared areas.

The major findings resulting from the visit to the Tsetse Eradication Project are:

40. *The Tsetse Eradication Program demonstrated that tsetse flies can successfully be eliminated from the sub-Sudan.*
41. *When an area is cleared of the tsetse flies, it is quickly inhabited by agriculturists and herdsmen.*

#### H. Bauchi Meat Plant and Ranch

The assessment team visited the Bauchi Meat Plant and was taken on a complete tour of the plant. The plant was processing beef and selling fresh meat through a local store, shipping frozen meat to cities in the south, and also canning meat. Recent innovations and improvements have been made to process many of the byproducts of the slaughtered animals such as bone meal and blood meal. Under new management, the plant appears to have an opportunity to become a profitable operation.

A ranch is being developed in connection with the meat plant to serve two purposes. The primary purpose is to purchase animals during the dry season when they are available at a lower price and hold them for slaughter when supplies are limited. The second purpose is to

initiate the production of superior quality animals through a selective breeding program with improved sires and local cows for the production of animals for slaughter.

VII. RECENT LIVESTOCK DEVELOPMENT PROJECTS  
AFFECTING RANGE MANAGEMENT

Recent developments in Nigeria should have important results for range management. The most important of these include (1) a substantial loan for livestock development from the World Bank, and (2) increased range management programs by several of the states.

A. World Bank Loan

Nigeria has received a loan from the International Bank for Reconstruction and Development for the development of its livestock sectors.<sup>1/</sup> The project is scheduled to receive \$21,000,000 over the next 8 years. Like USAID's livestock project in Nigeria, it is a many-faceted approach designed to increase livestock production. The basic activities of the project are:

1. Establishing a Livestock Project Unit (LPU) in the Federal Ministry of Agriculture and Natural Resources to carry out the project;
2. Establishing or improving seven breeding ranches;
3. Improving two fattening ranches;
4. Providing credit and technical support to about 50 commercial farmers and settled Fulani to establish breeding/fattening ranches;
5. Providing credit and technical assistance under a pilot scheme for up to 1,500 smallholders to take up beef cattle fattening;

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<sup>1/</sup> A description of this project is contained in Report No. 127a-UNI, Appraisal of Livestock Development Project - Nigeria, Western Africa Regional Office, October 9, 1974. This report is not available for public distribution and was prepared for official use only by the Bank Group.

6. Establishing 1,600 square miles of grazing reserves, and improving the existing 300,000 acre Kukari Jangari Reserve in North Central (NC) State;

7. Carrying out pasture improvement research; establishing a pilot pasture seed production scheme; and providing training facilities for government officials, farmers, and herdsmen in practical cattle and pasture management;

8. Establishing a pool of heavy equipment for project land development, and road and dam construction activities; and

9. Employing consultants to evaluate the project on a regular basis, to conduct appropriate studies, and to prepare further stages of the national beef cattle program.

Item six relates directly to range management activities. It should be noted that the Kukari Jangari project that is to be included is the original USAID-funded range management project. Furthermore, the range management system to be employed on all of the grazing reserves is essentially the one developed by USAID personnel at the Kukari Jangari project. This is evidence that the Nigerian government and the World Bank appraisal team judge the USAID range management design to be worthy of replication.

The grazing reserve activities of the Livestock Development Project are designed with the same objectives in mind as the original USAID project--to provide year-round grass and water for the traditional herdsmen in order to settle them and to protect the ecology of the area. With the exception of the Kukari Jangari project, all of the new grazing reserves activities will be in the North Eastern State.

The new activity on the Kukari Jangari site will be to develop a 1,500-acre improved pasture by reseeding with perennial legumes (*stylosanthes humilis*).<sup>2/</sup> The purpose of reseeding the pastures will be to increase the carrying capacity. The USAID assessment team felt that this could be done by reestablishing good management practices on the ranges. The argument is that good perennial grasses will return naturally when good management is practiced.

The World Bank appraisal report gave a negative assessment of USAID-funded range management training. The report indicated that the training should have taken place in Australia rather than in the United States. The argument was that Australian range conditions are more similar to Nigeria's than are those in the United States. Australian range management consists primarily of pasture improvement employing the introduction of improved grasses and legumes as a basic technique. This is in contrast with the USAID approach which involves the management of native grasses in order to maximize the production of quality native grasses. The range management specialists on the assessment team maintain that in economic and ecological terms this is the more appropriate approach for West and Central African countries.

It should be noted that only a small portion of the Livestock Development Project is being devoted to range management. Only about 9 percent of the funds are going to finance the establishment and development of grazing reserves. The bulk of the money is going to the establishment of private and government-owned commercial ranches.

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<sup>2/</sup> Appraisal of Livestock Development Project - Nigeria, Western Africa Regional Office, October 9, 1974, page 11.

If the Livestock Development Project is successful, one can expect livestock production in Nigeria to shift in importance from small Fulani producers to large commercial producers.

B. Increased Range Management

In recent years range management has begun to receive increased emphasis in the North West and the North East states. This increased emphasis was not noted either in the North Central or Benue-Plateau states.

The North West state has evidenced its commitment to range management by sending personnel to the United States for graduate training. One person is now completing a Ph.D. program in range management. Furthermore, there are plans to remove range management from the Veterinary Division and to establish a separate division of range management within the ministry.

The commitment in the North East state is even greater. The new 5-year plan calls for the expenditure of over 6 million Niara (approximately 10 million U.S. dollars) for range management. The range management staff is being expanded and the government is supporting graduate training for range management personnel in the United States. In addition, over 200 new grazing reserves have been gazetted. Probably the single most impressive thing that the North East government has done is to complete a comprehensive study of the drought in the state. This study was a major undertaking; and while the USAID assessment team was permitted to read the report, it has not yet been printed. A summary of the report is

included in appendix G.<sup>3/</sup> The study team developed a plan for trying to minimize the effects of future droughts, and much of this plan involves range management.

The variation between states with regard to range management suggests the need for federal coordination of range management efforts. Possibly a Range Management Division could be established within the Federal Livestock Ministry.

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<sup>3/</sup> The title of the summary report is The Effect of Drought in the North Eastern State, Dr. I.M. Khalil, March 1974.

APPENDIX A

ITINERARY FOR RANGE MANAGEMENT ASSESSMENT TEAM

ITINERARY FOR RANGE MANAGEMENT ASSESSMENT TEAM

<u>Dates</u>	<u>Location</u>	<u>Activity</u>
February 20-21, 1975	Washington, D.C.	Briefings on objectives.
February 22-23, 1975	Lagos	Travel to Nigeria (two team members).
February 24-25, 1975	Lagos	Travel to Nigeria (two team members); review of AID project files.
February 26-27, 1975	Kaduna	Meetings with Ministry of Agriculture and Natural Resources staff.
February 28, 1975	Kaduna	Field visit to Mando Road School.
March 1-2, 1975	Kaduna	Preparation for field visits.
March 3, 1975	Zaria	Attend meeting of Chief Veterinary officers.
March 4-5, 1975	Sokoto	Discussion with Ministry officials.
March 6-7, 1975	Katsina	Field visit to Gidon Jaja Project, Runica Project, and discussions with Ministry officials.
March 8-9, 1975	Kano	Review of project files and preparation of preliminary drafts for report.
March 10-13, 1975	Maduguri	Discussion with North East State officials, visit to Bornu Ranch, borehole areas, and Grazing Reserves.
March 14-17, 1975	Bauchi	Visits to Bauchi Meat Plant, Bauchi Ranch, Tsetse and Trypanosomiasis Institute, and field demonstration of manual and helicopter spraying operation.

<u>Dates</u>	<u>Location</u>	<u>Activity</u>
March 18-19, 1975	Jos	Discussion with Benue-Plateau State officials, visit to Wase Project.
March 20-21, 1975	Kaduna	Preparation of draft report.
March 22-23, 1975	Back to United States	

APPENDIX B  
PRINCIPLE CATTLE BREEDS IN NORTHERN NIGERIA

PRINCIPLE CATTLE BREEDS IN NORTHERN NIGERIA

Various descriptions of the cattle of Northern Nigeria were found in different publications. The following descriptions of the breed characteristics appeared to be very accurate and worthy of including in this report as an appendix.<sup>1/</sup>

1. Shuwa Arab (Wadara)

Shuwa Arab or Wadara cattle are shorthorned Zebus found south and southwest of Lake Chad, especially in the Dikwa/Maiduguri area of Bornu province in Nigeria's North East State. They are similar to the vast herds of the Baggara Arabs of Kordofan and Darfur in western Sudan. These cattle are semi-nomadic, multi-purpose animals, being used for the main milk suppliers to towns and settled people in the area, as well as for draft, riding and packing. Their coloring is usually dark red or brown, but pied with black or red on white is quite common. Young bulls on a government station average 600-700 pounds at 30 months, with range animals at slaughter weighing up to 800 pounds at five years of age.

2. Kuri (Lake Chad)

The Kuri or Lake Chad cattle are distinguished by gigantic bulbous horns (though some are polled) and the absence of a hump. They are native to the islands and shores of Lake Chad. From there they have scattered in all southern directions. These cattle can be seen frequently in the trail herds arriving in the southern coastal areas for slaughter. Presumably they are best suited to the lake and immediate environs. The most common coat color among purebred animals is white

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<sup>1/</sup> These descriptions have been drawn largely from Range Management and Livestock Industry - Chad Basin, Appendix XI, pages 63-67, prepared for the Chad Basin Commission by USDA cooperating with USAID, Meril G. Garty and George B. McLeroy, August 1968.

but darker shading does occur. The best slaughter animals will exceed 1,100 pounds at five to six years of age and yield a high quality carcass. They are probably the largest indigenous cattle in West Africa and have much to offer the beef cattle industry in this part of Nigeria.

3. Rahaji (M'Bororo)

The Rahaji or M'Bororo cattle, next to the Kuri, are the most distinctive animals in the North East State. These are long-lyre-horned Zebus, intractible and with a nervous disposition, but apparently well suited to the roving nature of their Fulani owners. Today, these cattle may be found from Senegal to the Nile valley in Central Sudan. Hardiness, showiness, red color and ability to walk are the more important characteristics looked for by the nomadic herdsmen in selecting breeding animals. The herds are reared entirely on grazing, and their annual migrations cover hundreds of miles. Animals of this breed can best make the long trek to markets in the south and make up a high percentage of those reaching Ibadan in the Western State of Nigeria. The Rahaji are hardy and adaptable to a wide range of climatic conditions when in the hands of their tribal originators. They are well suited to the present marketing system but probably have little place in a truly developed cattle industry. Slaughter cattle reach 900-1,000 pounds at five to eight years but yield extremely poor carcasses.

4. Yola Godali (Adamawa)

The Adamawa cattle are medium-horned Zebus found mainly in the Mambilla district of Adamawa province in Nigeria. Almost all Adamawa cattle are owned by sedentary Fulani. However, the main herds are

placed in the charge of a section of the stock-raising family or professional herdsmen and are managed as migratory animals. Usual coat colors are brown, roan, red and white and black and white. Perhaps the most outstanding breed characteristic is the very flaccid hump. However, Adamawa cattle vary widely according to location, and many of them in the south blend with the intermediate crosses between humped and humpless animals. The better slaughter animals may reach 900 pounds at five to six years.

5. White Fulani (Bunaji)

The White Fulani or Bunaji cattle, classed as lyre-horned Zebus, are probably the most widely distributed breed throughout Northern Nigeria. Pure animals are bred by nomadic Fulani, and are concentrated in the provinces of Kani, Katsina and Bauchi. Over 90 percent of these cattle are raised by the Fulani. These animals make up a large percentage of the trail herds reaching the southern markets. Cows are fair milkers and slaughter animals under good management will reach 1,100 pounds at four and one-half to five years.

6. Sokoto Guadali

The Sokoto Guadali cattle are shorthorned Zebus akin to the shorthorned Zebus of India and Pakistan, with which they are assumed to have a common origin. They are found primarily in Sokoto province of Nigeria's North West State and are kept chiefly by the Fulani. These cattle are divorced from crop production and depend almost entirely on natural grazing, except some crop residue in the dry season. They

have a characteristic convex profile, slightly pendulous ears and a well-pronounced dewlap and umbilical fold. The musculo-fatty hump is well developed in both sexes. The usual color is white or cream with darker shading at the poll, neck, shoulder and tail. This breed is used for milk, meat and draft. Along with the Kuri and Bunaji, the Sokoto Guadali is among the larger breeds in West Africa. A good slaughter bull at five years will weigh up to 1,100 pounds.

7. Azaouak (Adar)

The Azaouak or Adar cattle are a shorthorned Zebu breed found in West and Central Niger and near the northern borders of Sokoto province in Nigeria. They are kept largely by semi-settled Fulanis, who consider their milking ability important. Coat colors vary but are normally red or a mixture of red, white, and black. Well grown out slaughter beasts will weigh over 900 pounds at four to five years, but average weight at slaughter is much lower.

APPENDIX C

THE GRAZING RESERVES LAW, 1965

**THE GRAZING RESERVES LAW, 1965**

**ARRANGEMENT OF SECTIONS**

**Section**

**PART I—PRELIMINARY**

1. Short title.
2. Interpretation.

**PART II—GOVERNMENT GRAZING RESERVES**

3. Land which may be constituted reserves.
4. Notification of intention to create reserves and appointment of reserve settlement officers.
5. Duties of reserve settlement officer.
6. Inquiries.
7. Reserve settlement officer to have judicial powers.
8. Reserve settlement officer may sever or join claims.
9. Publication of judgment on completion of the inquiry.
10. Appeals from judgment of reserve settlement officer.
11. Rights may be extinguished or modified by Minister.
12. Order constituting the grazing reserve.
13. Reserve may be made to exclude areas over which claims are admitted.
14. Minister may close rights of way and watercourse.
15. Extinguishment of rights.
16. Extinguishment of rights by non-use.
17. Rights in reserves may not be alienated without consent of Minister.
18. No new rights to be acquired in land to be constituted a reserve except with approval.
19. Restriction of entry to reserve.
20. Powers of native to grant land absolutely to Government.
21. Power to de-reserve.
22. Regulations.

**PART III—NATIVE AUTHORITY GRAZING RESERVES**

23. Constitution of native authority grazing reserves.
24. Action precedent to the constitution of a native authority grazing reserve.
25. Order constituting native authority grazing reserve.
26. Approval of Minister.
27. Power of native authority to revise or modify order.
28. Extinguishment of rights in native authority grazing reserve.
29. Control of alienation of rights in native authority grazing reserve.
30. Restriction of entry to native authority grazing reserve.
31. Power to de-reserve.
32. Management of native authority grazing reserves.
33. Rules.



2. In this Law—

“enclave” means an area completely surrounded by a grazing reserve and excluded from that grazing reserve in accordance with this Law;

“grazing reserve” means any area constituted a grazing reserve under this Law;

“lands at the disposal of the Government” means any lands which the Government or the Minister of Land and Survey has acquired or may acquire by agreement or otherwise and includes lands leased to the Government or the Minister of Land and Survey;

“Minister” means the Minister to whom has been assigned under section 37 of the Constitution of Northern Nigeria responsibility for Animal and Forest Resources;

“native community” means any group of persons occupying any lands in accordance with and subject to native law and custom;

“native lands” means lands declared to be native lands by the Land Tenure Law, 1962;

“Provincial Commissioner” means the Provincial Commissioner of the province within which the area or the native authority in question is situated and in the case of Kaduna means the Administrator of Kaduna.

Interpretation.

N.N. No. 25 of 1962.

PART II—GOVERNMENT GRAZING RESERVES

3. The following lands may in accordance with section 12 and subject to sections 4, 5, 6, 8, 9 and 10 be constituted as a Government grazing reserve—

Land which may be constituted reserves.

- (a) lands at the disposal of Government or native lands;
- (b) any lands in respect of which it appears to the Minister that grazing on such lands should be protected or reserved or grazing management should be practised.

4. Before any lands are constituted a Government grazing reserve a notice shall be published by the Minister in the Northern Nigeria Gazette—

Notification intention to create reserves and appointment of reserve settlement officers.

- (a) specifying as nearly as may be the situation and limits of the lands;
- (b) declaring whether the lands are at the disposal of the Government or are native lands or are lands coming within paragraph (b) of section 3;
- (c) declaring that it is intended to constitute such lands a Government grazing reserve, either for the general purposes of Government or for the particular use and benefit, wholly or

in part, of any class of persons or for the benefit of any native community or native authority;

- (d) appointing an officer (hereinafter referred to as the reserve settlement officer) to inquire into and determine the existence, nature and extent of any rights claimed by or alleged to exist in favour of any persons or communities or brought to the knowledge of the said officer affecting the lands or any other rights in or over the lands.

Duties of  
reserve  
settlement  
officer.

5. Upon publication of the notice referred to in section 4, the reserve settlement officer shall—

- (a) cause the particulars of the lands which it is proposed to constitute a Government grazing reserve to be made known in the district or districts in which the lands are situated by causing a notice thereof to be read and interpreted in the local vernacular native language in every native court in the said district or districts and also by, as far as he considers essential, informing in writing the chiefs of the communities dwelling on, and the native authorities having jurisdiction over, such lands;
- (b) fix and, in the manner aforesaid, make known a period within which and a place to or at which any person or community claiming any right or rights in or over or affecting the lands which it is proposed to constitute a Government grazing reserve shall either send in a written statement of claims to him or appear before him and state orally the nature and extent of their alleged rights.

Inquiries.

6. (1) As soon as possible after the expiration of the period referred to in section 5 the reserve settlement officer shall—

- (a) inquire into and determine the limits of the lands specified in the notice referred to in section 5; and
  - (b) determine the nature and extent of any claims or alleged rights affecting the lands which have been preferred or brought to his notice.
- (2) The reserve settlement officer shall keep a record in writing of—
- (a) all such claims and alleged rights;
  - (b) all objections which may be made to such claims or alleged rights; and
  - (c) any evidence in support of or in opposition to any claim or alleged right.

7. For the purposes of an inquiry under section 6 the reserve settlement officer shall have all the powers conferred upon a District Judge.

Reserve settlement officer to have judicial powers.

8. The reserve settlement officer may at any time during the inquiry referred to in section 6 join any number of claims or sever any claims joined and in his judgment may give a decision which may join any number of claims or sever any claims which were formerly joined.

Reserve settlement officer may sever or join claims.

9. (1) Upon the completion of the inquiry referred to in section 6, the reserve settlement officer shall—

Publication of judgment on completion of the inquiry.

(a) deliver his judgment, describing the limits of the lands specified in the notice referred to in section 5 and setting forth, with all such particulars as may be necessary to define their nature, duration, incidence and extent, all claims and alleged rights preferred or brought to his knowledge in respect of the lands and admitting or rejecting the same wholly or in part, and shall file it at the Land Registry in the Ministry of Land and Survey; and

(b) publish a notice in the Northern Nigeria Gazette specifying the land which it is intended to reserve, the privileges conceded in respect of such land and stating the special conditions intended to govern the reservation thereof.

(2) The notice referred to in subsection (1) shall be made known so far as may be practicable to every person who, and the head of any community which, preferred any claim or in respect of which any claim was brought to the knowledge of the reserve settlement officer.

10. (1) Any person who has made a claim on his own behalf, or where a claim has been made on behalf of a community that person or the representative of that community may, within three months of the date of delivery of the judgment, appeal to a District Judge against that portion of the reserve settlement officer's judgment which affects his claim or the claim made on behalf of the community which he represents.

Appeals from judgment of reserve settlement officer.

(2) An appeal shall lie to the High Court from a decision of a District Judge on appeal against the judgment of the reserve settlement officer within thirty days of the date of the decision appealed against.

11. (1) Where the reserve settlement officer has admitted wholly or in part any right or claim and in the opinion of the Minister the exercise of such right or claim or any part thereof—

Rights may be extinguished or modified by Minister.

(a) would stultify the objects of any grazing reserve;

- (b) would seriously hinder the efficient working of any grazing reserve; or
- (c) would do serious damage to any grazing reserve, the Minister may—
  - (i) extinguish any such rights or claims, other than rights or claims in respect of land, with appropriate monetary compensation; or
  - (ii) confine or restrict any rights or claims to certain areas either within or without the grazing reserve or the exercise of such rights to certain times of the year; or
  - (iii) adopt wholly or in part any one or any combination of the above methods of dealing with the matter; andthe Minister of Land and Survey may extinguish any such rights or claims in respect of land with appropriate monetary compensation.

(2) Any person claiming compensation under the provisions of subsection (1) may, if dissatisfied with the compensation awarded, apply to the High Court for the determination of the matter.

Order  
constituting  
the grazing  
reserve.

12. (1) The Governor may make an order constituting the lands in respect of which an inquiry under section 6 has been held a Government grazing reserve at the expiration of a period of not less than three months from the date of publication of the notice published in accordance with section 9:

Provided that no such order shall be made until the expiration of the time within which an appeal against the judgment of the reserve settlement officer may be filed or, if such an appeal has been filed, until such appeal has been determined.

(2) An order under this section shall, subject to the provisions of subsection (3), set forth—

- (a) the limits of the lands which constitute the reserve;
- (b) all rights affecting the same as set forth in the judgment of the reserve settlement officer or established by the court upon appeal from such judgment; and
- (c) such additional rights as the Governor shall consider it just and equitable to allow notwithstanding that such rights have not been allowed in the judgment of the reserve settlement officer.

(3) An order under this section shall not include therein such rights as may have been allowed by the reserve settlement officer but which have been subsequently modified or extinguished as provided by this Law and where the boundaries of the reserve have been modi-

fied as provided by this Law the order shall set forth the boundaries as subsequently determined.

(4) An order under this section shall in addition to being published in the Northern Nigeria Gazette be made known in the same manner as was the judgment of the reserve settlement officer.

(5) From the date of the publication of an order under this section in the Northern Nigeria Gazette such lands shall be a Government grazing reserve.

(6) Any order made under this section may be revised or modified by the Governor by order and such revision or modification may be given retrospective effect.

(7) In any revision or modification made by the Governor under subsection (6) the Governor may, after such inquiry, if any, as he shall think fit—

(a) exercise the powers conferred upon the Minister or the Minister of Land and Survey by section 11; and

(b) add such additional rights as he shall consider it just and equitable to allow notwithstanding that such rights had not been allowed in the judgment of the reserve settlement officer.

13. If the reserve settlement officer has admitted wholly or in part any rights on any area which in the opinion of the Minister could be excised from the reserve without materially altering or stultifying the objects of the reserve the Governor may by order so amend the boundaries of the reserve that such areas are excluded from the reserve or he may create such excluded areas or enclaves within the boundaries of the reserve:

Reserve may be made to exclude areas over which claims are admitted.

Provided that in altering the external boundaries of the reserve the Governor shall not include any area which lies outside the original boundaries set out in the notice of the proposed reserve published in accordance with the provisions of section 4.

14. In any Government grazing reserve the Minister may close any right of way or watercourse where in his opinion another right of way or watercourse equally convenient already exists or is provided.

Minister may close rights of way and watercourse.

15. Subject to any right to compensation, every right in or over land in respect of which no claim shall have been made to the reserve settlement officer, or of which no knowledge shall have been acquired by that officer before delivery of his judgment, shall be extinguished.

Extinguishment of rights.

Extinguishment of rights by non-use.

16. If any right within a Government grazing reserve shall not have been exercised for a period of ten years it shall be deemed to have been extinguished.

Rights in reserves may not be alienated without consent of Minister.

17. No person shall alienate any right affecting land included in a Government grazing reserve, which has been established before the reserve settlement officer or before a court under section 10, by sale mortgage or transfer without the consent of the Minister first had and obtained and any such sale, mortgage or transfer effected without such consent shall be null and void.

No new rights to be acquired in land to be constituted a reserve except with approval.

18. During the period between the dates of the publication by a Minister of the notice of his intention to create a Government grazing reserve in accordance with section 4 and of the order of the Governor constituting the reserve under section 12—

- (a) no right shall be acquired in or over the land comprised within such notice otherwise than by succession or under a grant or contract in writing entered into with the approval of the Minister;
- (b) no new house shall be built; and
- (c) no new lands for farming or cultivation shall be cleared.

Restriction of entry to reserve.

19. No person, other than a Government officer on duty, shall enter any Government grazing reserve unless he is authorised so to do under this Law or regulations made hereunder.

Powers of native to grant land absolutely to Government.

20. Any native, and the chief or head of any native community on behalf of such community, notwithstanding any native law or custom to the contrary, shall be entitled to enter into any agreement to grant and convey absolutely to the Government any lands and any rights in and over any lands, owned by him or them which it is proposed to constitute a Government grazing reserve under the provisions of this Law.

Power to de-reserve.

21. The Governor may by order direct that from a date named therein any lands or any part thereof constituted a Government grazing reserve under section 12 shall cease to be a Government grazing reserve or a part of such reserve and thereupon from such date such lands shall cease to be a Government grazing reserve or a part of such reserve so, however, that the rights, if any, which may have been extinguished therein shall not revive in consequence of such cessation.

22. The Governor may make regulations for all or any of the following matters in respect of a Government grazing reserve— Regulations.

- (a) prescribing the persons who may use the grazing reserve and the number and type of stock which may be permitted therein;
- (b) prescribing the parts of the grazing reserve which may be used and the times when they may be used;
- (c) providing for the issue of grazing permits to persons using the grazing reserve and prescribing the fees for such grazing permits;
- (d) regulating the management generally of the grazing reserve and prescribing the activities which may be carried on therein;
- (e) regulating the conditions of entry to the grazing reserve;
- (f) imposing penalties not exceeding two hundred pounds or imprisonment not exceeding one year, or both, for a breach of any regulation made under this section; and
- (g) generally for the purposes of carrying out the provisions of this Law.

**PART III—NATIVE AUTHORITY GRAZING RESERVES**

23. (1) A native authority may, by order made with the approval of the Minister, constitute as a native authority grazing reserve any land lying within the area of its jurisdiction. Constitution of native authority grazing reserves.

(2) The native authority shall pay appropriate monetary compensation to any person whose right has been extinguished by an order made under subsection (1).

(3) Any person claiming compensation under the provisions of subsection (2) may, if dissatisfied with the compensation awarded, apply to the High Court for the determination of the matter.

24. (1) No lands shall be constituted a native authority grazing reserve under section 23 unless and until— Action precedent to the constitution of a native authority grazing reserve.

- (a) the intention to constitute such lands a native authority grazing reserve has been announced by the native authority in a manner approved by the Provincial Commissioner; and
- (b) the existence, nature and extent of any rights claimed by or alleged to exist in favour of any persons or communities affecting the lands which it is proposed to constitute a native authority grazing reserve has been inquired into and determined by or under the direction of the native authority.

(2) The announcement referred to in subsection (1) shall require all claimants to put forward their claims within three months.

(3) Subject to any right to compensation, all claims not put forward within three months of the announcement referred to in subsection (1) shall be invalid.

(4) If the inquiry made in accordance with paragraph (b) of subsection (1) discloses the existence of any rights in any area which in the opinion of the Minister could be excluded in whole or in part from the reserve without materially altering or stultifying the objects of the reserve, the Minister may so amend the boundaries of the reserve that such areas are excluded from the reserve or he may create such excluded areas as enclaves within the boundaries of the reserve:

Provided that in altering the external boundaries of the reserve the Minister shall not include any area which lies outside the boundaries of the proposed reserve as announced in accordance with paragraph (a) of subsection (1).

(5) At any time either before or after an order has been made under section 23, the Provincial Commissioner, after reference to the Minister, may cause a further inquiry to be held by or under the direction of the native authority or by any other person for the better determination of the rights affecting the land which it is proposed to constitute or which has been constituted a native authority grazing reserve.

Order constituting native authority grazing reserve.

25. Every order under section 23 constituting a native authority grazing reserve shall be published in the Northern Nigeria Gazette and shall set forth the limits, situation and approximate area of the lands which constitute the native authority grazing reserve and all rights affecting the same as determined under the provisions of section 24.

Approval of Minister.

26. No order under section 23 constituting a native authority grazing reserve shall be published in the Northern Nigeria Gazette or be of any effect unless and until it has received the approval in writing of the Minister, which approval may be granted or withheld or granted on such conditions as the Minister may in his absolute discretion consider necessary.

Power of native authority to revise or modify order.

27. (1) A native authority may by order revise or modify any order made by it under section 23 so that the rights affecting the lands set forth in the order constituting the reserve shall accord with the determinations of any further inquiry held under the provisions of subsection (5) of section 24 and any rights which become invalid by subsection (3) of section 24 may be revived by an order under this section.

(2) The provisions of section 26 shall apply to an order made under this section in like manner as they apply to an order under section 23.

28. Every right in or over land within an area constituted a native authority grazing reserve under section 23, other than the rights set forth in the order constituting such reserve, shall be extinguished upon the coming into operation of the order, save as provided in section 24.

Extinguish-  
ment of rights  
in native  
authority  
grazing  
reserve.

29. No person shall alienate any right in or over land within an area constituted a native authority grazing reserve under section 23 by sale, mortgage or transfer without the consent of the native authority which constituted such native authority grazing reserve or within whose jurisdiction it is situated and any such sale, mortgage or transfer effected without such consent shall be null and void.

Control of  
alienation of  
rights in  
native  
authority  
grazing  
reserve.

30. No person, other than a Government officer on duty or an officer of the native authority which constituted the reserve shall enter any native authority grazing reserve unless he is authorised to do so under this Law or rules made hereunder.

Restriction of  
entry to native  
authority  
grazing  
reserve.

31. A native authority may by order made with the approval of the Minister direct that from a date named therein any lands or any part thereof constituted a native authority grazing reserve under section 23 shall cease to be a native authority grazing reserve or a part of such reserve and thereupon from such date such lands shall cease to be a native authority grazing reserve or a part of such reserve:

Power to  
de-reserve.

Provided that the rights, if any, which may have been extinguished therein shall not revive in consequence of such cessation.

32. (1) The protection, control and management of a native authority grazing reserve shall be undertaken by the native authority constituting it, or within whose jurisdiction it is situated, subject to the supervision and control of the Provincial Commissioner, exercised with the advice of the Minister.

Manage-  
ment of  
native  
authority  
grazing  
reserves.

(2) Such protection, control and management may, upon a notification to that effect being published by the Minister in the Northern Nigeria Gazette, be placed temporarily under the guidance and direction of the Chief Animal Husbandry Officer of the Ministry of Animal and Forest Resources either at the request of the native authority concerned, or upon the instructions of the Minister if he is of the opinion that such a step is necessary or expedient for ensuring the proper and sufficient protection, control and management of such native authority grazing reserve.

(3) Any native authority grazing reserve placed temporarily under the guidance and direction of the Chief Animal Husbandry Officer in pursuance of the provisions of subsection (2) shall be protected, controlled and managed on behalf, and for the benefit, of the native authority concerned.

**Rules.**

33. A native authority with the approval of the Minister may make rules for all or any of the following matters in respect of a native authority grazing reserve—

- (a) prescribing the persons who may use the grazing reserve and the number and type of stock which may be permitted therein;
- (b) prescribing the parts of the grazing reserve which may be used and the times when they may be used;
- (c) providing for the issue of grazing permits to persons using the grazing reserve and prescribing the fees for such grazing permits;
- (d) regulating the management generally of the grazing reserve and prescribing the activities that may be carried on therein;
- (e) regulating the conditions of entry to the grazing reserve;
- (f) imposing penalties not exceeding two hundred pounds or imprisonment not exceeding one year, or both, for a breach of any rule made under this section; and
- (g) generally for giving effect to the objects and purposes for which the grazing reserve was established.

*Objects and Reasons*

This Bill introduces a Law to provide for the establishment and control of grazing reserves.

Part II deals with the establishment of Government grazing reserves, and clause 4 requires the Minister to publish a notice of the intention to create a grazing reserve in the Northern Nigeria Gazette together with details of such reserve and appointing a reserve settlement officer. Clause 6 empowers the reserve settlement officer to inquire into and determine the limits of the lands to be made a grazing reserve and determine the nature and extent of such reserve. Clause 9 provides for the reserve settlement officer to deliver and publish a judgement describing the limits of the lands to be made a grazing reserve and setting forth all claims in respect of such lands. Clause 10 gives a right of appeal from the judgment of the reserve settlement officer to the District Court and thence to the High Court. Clause 11 empowers the Minister of Land and Survey in certain circumstances to extinguish or restrict any right in lands to be constituted a grazing reserve and empowers the Minister to extinguish or restrict other rights. Clause 12 empowers the Governor to constitute lands, in respect of which an inquiry under section 6 has been made, as a Government grazing reserve. Clause 21 gives power to the Governor to de-reserve any grazing reserve by order. Clause 22 enables the Governor to make regulations for Government grazing reserves.

Part III deals with native authority grazing reserves, and clause 23 empowers native authorities with the approval of the Minister to constitute grazing reserves by order. Clause 23 provides that the native authority before constituting a grazing reserve must announce its intention of doing so in a manner approved by the Provincial Commissioner and must inquire into and determine all rights claimed in the lands which it is proposed to constitute a grazing reserve. Clause 25 requires every order by a native authority constituting a grazing reserve to set forth the limits, situation and approximate area of the reserve and clause 26 requires the approval of the Minister to be given to such order. Clause 27 deals with the powers of a native authority to revise or modify such order and clause 31 deals with the powers of a native authority to de-reserve. Clause 32 deals with the management of native authority grazing reserves and provides that in certain circumstances such reserves may be placed under the control of the Chief Animal Husbandry Officer of the Ministry of Animal and Forest Resources. Clause 33 enables a native authority with the approval of the Minister to make rules for a native authority grazing reserve.

I. M. LEWIS,  
*Attorney-General,*  
*Northern Nigeria*

Attorney-General's Chambers,  
Kaduna, 1st February, 1965

APPENDIX D

LAND MANAGEMENT STUDY OF NORTHERN NIGERIA \*

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\* The following pages have been taken directly from Land Management Study of Northern Nigeria, U.S. Department of the Interior, Bureau of Land Management, June 1967.

## KATSINA PROJECT

### DESCRIPTION

#### 1. Area

Location of the grazing project is in the northwest corner of Katsina Province, entirely within the Ruma, Kukari/Jangari Forest Reserves. It borders the Sokoto Project to the west.

Size approximates 329,000 acres, or 7% of the total estimated grazing land in the province.

A three to four month wet season occurs in the north, between June and September, with a total of 20" to 30" of precipitation. Southward, three to five months of rain may occur, with a total of 30" to 40". Temperatures range from 50° to 120°.

Vegetation is open scrub woodland, within the Sudan zone. Range condition within the scheme for grazing, and for watershed, is generally good.

#### 2. People and Government

Katsina Province is approximately 6,000,000 acres in size, and has a population of 2,500,000 people. Cotton, groundnuts and cattle are the basis of the agricultural economy.

Livestock population in the province is estimated at 400,000 cattle, 200,000 sheep, 1,000,000 goats, plus 145,000 donkeys, horses and camels. There is considerable movement of livestock from the Niger Republic, because of nomadic grazing and movement of cattle to markets to the south. The number of cattle recorded as utilizing the Katsina grazing project for 1966-1967 was 18,885; 1964-1965 was 21,170 and; 1965-1966 was 20,878. These figures average about 5% of the total cattle population for the province.

The grazing scheme lies entirely within the Emirate of Katsina Native Authority. The N.A. is to eventually assume all administration of the scheme and is very interested in it. A grazing committee has been formed to advise on administration and use of the scheme, consisting of GONN, NA, district and village representatives. At the field level, local control is being established. Field personnel regulate use, control trespass and burning, and aid in livestock licensing and inventory. A dairy project of centralized milk collection has been initiated. Housing within the scheme is to be provided for field personnel.

3. Land Use

The primary land use is grazing. The harvesting of forest products is allowed by permit from the Native Authority. Such uses include gathering of firewood, cutting of "farm trees" for construction of farm implements, hunting, cutting thatching grass, and gathering honey.

4. Katsina Program

Construction Costs

Accomplishments through March 31, 1967

(Demarcation miles-258; Reservoirs-cu.yds. 150,000 (18); Wells-each-2)

			<u>Total Actual Costs</u>	
			<u>£</u>	<u>\$</u>
		1962-63	1,832	5,130
		1963-64	10,950	30,660
		1964-65	14,500	40,600
		1965-66	14,100	39,480
		1966-67	2,500	7,000
<u>Description</u>	<u>Units</u>	<u>No. of Units</u>	<u>Total Programmed Costs</u>	
		1967-68		
Wells	Each	2	400	1,150
		Subtotal	400	1,150
		1968-73		
Reservoirs	Cubic yd.	112,000	16,800	47,040
Well	Each	8	4,600	12,900
Transp. fuel lube, labor		2500/yr.	12,500	35,000
Guard qtrs.	Site	2	6,000	17,000
Clinic	Each	1	600	1,700
Horse Stables	Each	3	2,100	5,900
1968-73 Total Capital Costs			£ 42,600	\$ 119,280

Annual Costs - Maintenance

	<u>£</u>	<u>\$</u>
a. Demarcation - 230 mi. @ £ 3/mi	690	1,932
b. Reservoirs - £ 400/yr.	400	1,120
c. Wells/mills	200	560
d. Buildings	500	1,400
e. Fences	100	280
f. Equipment	1,500	4,200
g. Labor	1,500	4,200
h. Transportation, fuel, lube	<u>2,000</u>	<u>5,600</u>
	6,890	19,292

Personnel Costs (Permanent)

a. GONN	<u>4,329</u>	<u>12,121</u>
Total Annual Recurrent Costs	£11,219	\$31,413

GONN Staffing Required for Katsina Project

<u>Position</u>	<u>Number</u>	<u>Annual Salaries</u>	
		<u>£</u>	<u>\$</u>
Provincial Range Officer	1	660	1,850
Livestock Superintendent	1	660	1,850
Range Management Assistant	3	594	1,665
Grazing Control Assistant	6	936	2,620
Fire Control Officer	1	156	435
Clerk-Typist	1	213	595
Storekeeper	1	198	555
Work Supervisor	1	273	765
Mechanic	1	225	630
Vehicle Driver	2	258	721
Engineering Assistant	<u>1</u>	<u>156</u>	<u>435</u>
<b>Total</b>	<b>19</b>	<b>£ 4,329</b>	<b>\$12,121</b>

## 5. Management

Establishment of the Katsina Project was begun in late 1960 as a pilot grazing demonstration program. Purpose was to demonstrate that a sustained high level of livestock production could be achieved over a long period of time by combining range management techniques, such as proper stocking and deferred rotational grazing, with livestock management practices, such as supplementary feeding, salting and adequate veterinary care. Development of year long water was a part of the total program. By 1963 the project had been expanded to a full fledged grazing program including a second adjoining project within Sokoto Province.

Grazing licenses have been issued, and grazing fees collected at 1/-(14¢) per head for the season the last two years. Apparently, the collection of a grazing fee has not seriously affected the number of livestock using the scheme. There are four districts involved, and each issues a grazing license. Ear tagging has been done. A free supplementary feeding and salting program was initiated in 1963. For the 1966-67 season, feed and salt are being made available at 25% of cost.

The scheme has been divided into six ranges, each to provide 12 months grazing, and each range further sub-divided into four pastures. Four three month grazing seasons are used under a deferred grazing system. Pasture A, is utilized July to September; Pasture B, October to December; Pasture C, January to March; and Pasture D, April to June, of each year. Development was premised on using natural water in the wet season pastures (A and B), and developed water in the dry season pastures (C and D). Hence, Pasture D, used for the last three months of the dry season, required the greatest amount of water development. The first phase of the development program was completed in 1966; however, demarcation lines are maintained each year. A base camp was established at Runka with temporary living facilities for the AID range management advisor. As the scheme is completely within existing forest reserves no gazettement is necessary.

The grazing year starts shortly after the beginning of the rainy season in July. At this time, at least to date, there has been the greatest concentration of livestock within the scheme. Whether there is a correlation between estimated grazing capacity and the numbers of cattle actually using a specific pasture is unknown. Assuming an average pasture size of 13,700 acres, average annual stocking rate of the growing season use pasture could be estimated at 1.3 acres per animal unit month.

Assuming that complete control could not be achieved and that all cattle were not taxed plus added grazing pressure from Fulani sheep, goats and beasts of burden, the estimated use would exceed the stocking rate of 1.3 acres/animal unit month.

Following 4 to 6 months of wet season grazing many of the herds drift out of the scheme to utilize farm aftermath and/or trek southward. Some herds remain and are moved to the dry season pastures. Other herds begin moving back into the scheme towards the end of the dry season. However, use of pastures C and D has had to be adjusted to meet the problems of dwindling or lack of water supplies and fields which have been fully or partially burned. Because of the decrease in cattle numbers following the rainy season, to date there has been ample dry season forage to allow for demand and modifications in use. Cattle are also trailed through various parts of the scheme in moving from and to outside locations.

Indiscriminate burning is a major problem. Firing usually begins in early November, and continues through the dry season. Attempts have been made at increased patrolling of the scheme and control of herds-men. The extent of burning is difficult to determine. Reportedly, it is less prevalent now than it was previously.

The entire watershed drains in a northwest direction into the Burnsuru River or its main tributary, the Gagere. Rivers and streams are ephemeral, remaining dry from October through early June. Ground water is found adjacent to the stream channels. With abundant grass, shrub and tree cover, evidences of erosion are slight; however, some headcutting has been reported. There is no current erosion control program, it has been planned to give this program more emphasis.

Forestry programs, if any, for the Ruma and Kukar Jangarai Forest Reserves are not known. The forests provide firewood for local use.

The forest reserves are also game preserves. Wildlife is present throughout the area. Elephants, deer, antelope, baboons, monkeys, bush hogs and various abundant birdlife are known to exist within the scheme. Recently, large numbers of elephants have moved into the area, causing concern to local residents. Several game personnel have been assigned to report elephant movements. All edible wildlife is hunted for food.

Recreational use of the scheme is not known, but is probably insignificant at present. Some fishing has been observed within the project.

#### 6. Animal Husbandry

The cattle are largely White Fulani with a mixture of Ayaouak and a few other breeds. The Kano brown goat is predominate in the area. A few camel are found in Katsina Province. Present livestock management on the project is similar to that described for Northern Nigeria.

7. Tsetse

The Katsina Project is generally a tsetse free area. The northern limit of *G. tachinoides* extend into the project. It is free of *G. morsitans*. Some problems may occur from cattle moving from tsetse fly areas in the south.

8. Marketing

The Katsina area, although not linked by rail to other markets, is near the main highway to Kano, about 110 miles distant. Kano is one of the largest central markets in Nigeria. Primary crops grown and marketed in the Katsina area are groundnuts, millet and guinea corn. 12,473 head of cattle, 10,599 sheep and 11,477 goats were slaughtered in Katsina Province in 1964. Approximately 36,000 head of cattle were marketed in the province in 1964. An estimated 5%, or 1,800 head, can be attributed to the project area. Approximately 430,000 gallons of milk is produced annually in the project.

KATSINA PROJECT 1968 - 1973

<u>Year</u>	<u>Personnel GONN</u>	<u>Maintenance</u>	<u>Equip. Supplies</u>	<u>Buildings</u>	<u>Project Construction</u>	<u>Totals</u>	
	£	£	£	£	£	£	\$
1968-69	4,329	6,890	2,500	8,700	21,400	43,819	122,694
1969-70	4,329	6,890	2,500			13,719	38,413
1970-71	4,329	6,890	2,500			13,719	38,413
1971-72	4,329	6,890	2,500			13,719	38,413
1972-73	<u>4,329</u>	<u>6,890</u>	<u>2,500</u>	—	—	<u>13,719</u>	<u>38,413</u>
<b>Total 1968-1973</b>	<b>21,645</b>	<b>34,450</b>	<b>12,500</b>	<b>8,700</b>	<b>21,400</b>	<b>98,695</b>	<b>276,346</b>
	<b>Total Recurrent Costs</b>		£ 56,095	\$157,066			
	<b>Total Capital Costs</b>		<u>42,600</u>	<u>119,280</u>			
			£ 98,695	\$276,346			

## SOKOTO PROJECT

### DESCRIPTION

#### 1. Area

Location of the project is in the northeast corner of Sokoto Province, entirely within the Zamfara Forest Reserve. It borders the Katsina Project to the east.

Size approximates 895 square miles or 322,560 acres, or 2% of the total grazing land in the province.

The climate and vegetation is similar and nearly identical to that described in the Katsina Project.

#### 2. People and Government

In area and population Sokoto Province is second in Northern Nigeria. Approximately 4,000,000 people live in an area of 23,345,000 acres. It is the best watered area immediately south of the Sahara and has the greatest proportion of land under forest reservation in the country (58 reserves). Its wealth comes mainly from rice, cotton, tobacco, groundnuts, and fish, but above all, from its cattle, of which over 100,000 head are exported annually. Estimates of livestock populations within Sokoto Province vary. Roughly there are a total of 800,000 cattle, 200,000 sheep and 1,000,000 goats plus 200,000 beasts of burden (donkeys and camels). The 1965-66 inventory showed a cattle population of 9,200 head using the grazing scheme area. 1966-67 season inventory was 4,600 cattle involving 162 operators. Assuming lateness of the season at the time of inventory, movement of herds, etc., possibly 10,000 cattle utilized the scheme at least during parts of the years. This would approximate less than 2% of the estimated total province cattle population. In addition, the project was utilized by other livestock.

The grazing scheme lies entirely within the Emirate of Sokoto Native Authority. The NA is to eventually assume the administration of the scheme and is participating in development and management at present. NA organization and supervision is similar to that described for the Katsina project with the exception of the dairy project, and housing for field personnel.

#### 3. Land Use

The primary use is grazing. The harvesting of forest products is allowed by permit from the Native Authority. Such uses include gathering of firewood, cutting of "farm trees" for construction of farm implements, hunting, cutting thatching grass and gathering honey.

4. Sokoto Program

<u>Construction Costs</u>		<u>Total Actual Costs</u>	
		<u>£</u>	<u>\$</u>
	1962-63	7,000	19,600
	1963-64	6,500	18,200
	1964-65	9,890	27,690
	1965-66	2,400	6,720
	1966-67	2,900	8,170

<u>Description</u>	<u>Units</u>	<u>No. of Units</u>	<u>Total Programmed Costs</u>	
		<u>1967-68</u>		
Demarcation	Miles	25	375	1,050
Reservoirs	Cu. Yds.	10,000 (1)	1,500	4,200
Calf Pasture	Acres	80	400	1,120
Well & Windmill	Each	1	225	630
Windmill	Each	1	150	420
		Subtotal	2,650	7,420
		<u>1968-73</u>		
Demarcation	Miles	180	3,700	10,360
Reservoirs	Cu. Yds.	252,000 (34)	37,800	105,840
Wells	Each	12	9,300	26,040
Transp., fuel, labor		(2,500/year)	12,500	35,000
Range Mgmt. Off. Qtrs.	Each	1	3,000	8,400
Range Mgmt. Ass't Qtrs.	Each	1	2,000	5,600
Grazing Control				
Ass't	Each	1	1,000	2,800
Guard Qtrs.	Site	4	12,000	33,600
Clinic	Each	1	600	1,680
Treatment Center	Each	2	6,000	16,800
Recreation Room	Each	1	600	1,680
Horse Stables	Each	4	2,800	7,840
		1968-73 Total Capital Costs	91,300	255,640

SOKOTO PROGRAM

ANNUAL COSTS

Maintenance

a. Demarcation - 405 miles	£ 1,215	\$ 3,402
b. Reservoirs	600	1,680
c. Wells/Mills	330	924
d. Buildings	500	1,400
e. Fences	50	140
f. Equipment	1,500	4,200
g. Transport, fuel lubc.	2,000	5,600
h. Labor	1,500	4,200
	<u>£ 7,695</u>	<u>\$21,546</u>

Personnel Costs

CONN	£ 4,329	\$12,121
Total Annual Recurrent Costs	12,024	33,667

CONN Staffing Required for the Sokoto Project

<u>Position</u>	<u>Number</u>	<u>Annual Salaries</u>	
Provincial Range Officer	1	£660	\$1,850
Livestock Superintendent	1	660	1,850
Range Management Ass't	3	594	1,665
Grazing Control Ass't	6	936	2,620
Fire Control Officer	1	156	435
Clerk-Typist	1	213	595
Storekeeper	1	198	555
Work Supervisor	1	273	765
Mechanic	1	225	630
Vehicle Drivers	2	258	720
Engineering Ass't	1	156	435
	<u>19</u>	<u>£ 4,329</u>	<u>\$12,120</u>

Expenditures through March 31, 1967

<u>Year</u>	<u>Expenditure by GONN</u>	
	<u>£</u>	<u>\$</u>
1962-63	7,000	19,600
1963-64	6,500	18,200
1964-65	9,890	27,690
1965-66	2,400	6,720
1966-67	<u>2,900</u>	<u>8,120</u>
Total	£28,690	\$80,330

Accomplishments through March 31, 1967

<u>Description</u>	<u>Units</u>	<u>No. of Units</u>
Demarcation	Miles	294
Reservoirs	Cu. Yds.	135,000 (12)
Wells	Each	5

## 5. Management

Establishment of the Sokoto Project began in 1962 and has been established on the same principle as the Katsina Project. A written plan has been prepared as a guide to development and management.

An Advisory Committee, as on the Katsina side, participates in administering the scheme. Grazing licenses have been issued and grazing fees of 1/- (14¢) per head have been collected on a limited basis. Tagging of livestock has not been initiated to date. A subsidized supplementary feeding and salting program has been initiated, also on a limited basis. Three districts are involved and each has responsibility of collecting grazing fees.

The scheme has been divided into six ranges and the present grazing patterns are the same as described for the Katsina Project. There is a definite livestock trail area from Niger Republic through the northern part of the scheme.

The first phase of the development program has been completed. Demarcation lines are maintained each year. A base camp was established at Gideon Jaja with temporary living facilities and radio communication for the AID range management advisor. As the scheme is completely within a forest reserve no further gazetting is necessary. However, as the forest reserve boundaries extend beyond those of the grazing scheme, the NA has indicated an interest in expanding the scheme to match those of the reserve.

The grazing year generally begins in July. Fulani have been assigned the range in which they first settled and an attempt has been made to maintain assignments. Enforcement has been in effect in the north half for about three years and for less time in the south half. From estimates available it appears that the Sokoto Project has been stocked, during the growing season at half of that on the Katsina side, or 2.5 to 3 acres per animal unit month.

Burning is a problem in the Sokoto Project, the same as on the Katsina side with some control being initiated.

With abundant grass, shrub and tree cover evidences of erosion are slight, however, some headcutting has been noted. It is planned to give erosion control more emphasis.

Forestry programs, if any, for the Zamfara Forest Reserve, are not known. The wildlife and recreation situation is nearly identical to that described in the Katsina Project.

6. Animal Husbandry

White Fulani cattle are the most numerous breed. Sokoto Gudali are also prevalent. The type of animal husbandry practiced on this project is similar to that described for Northern Nigeria as a whole.

7. Tsetse

The Sokoto Project is considered a tsetse fly free area.

8. Marketing

The two principal market centers in the area are Kaura Namoda and Gusau. Both are on the railroad spur line from Zaria and are served by the main highway as well. Principal export crops are groundnuts, onions and cassava. Guinea corn and millet are also produced locally but for the most part are also consumed locally. Animal products marketed include goat skins, milk and beef. Gusau is the primary beef market in the area and is the main railroad shipping point and inspection station. It is estimated that 56,526 cattle were slaughtered in the province in 1964 and a total of 136,000 head were marketed. Roughly 2% or 1,130 slaughter animals can be attributable to the Sokoto Grazing Project. It is estimated that about 300,000 gallons of milk are produced annually within the project. Most of this is either consumed by the Fulani or in nearby villages.

Significant villages in and adjacent to the project are Gusau, Kaura Namoda, Zurmi, Gubin Baure, Jibiya, Dumburum and Shamsella. The latter two are farming enclosures within the scheme. Kaura Namoda is an important shipping point for cotton, groundnuts and hides. The main road between Gusau and Katsina traverses the northern most range of the scheme, along with a major stock trail from the Republic of Niger to the livestock shipping center and market at Gusau. Gubin Baure and Jibiya are convenient markets for milk disposal and commodity purchase by the Fulani utilizing the grazing scheme.

SOKOTO PROJECT 1968 - 1973

<u>Year</u>	<u>Personnel GONN</u>	<u>Maintenance</u>	<u>Equipment Supplies</u>	<u>Buildings</u>	<u>Project Construction</u>	<u>Total</u>	
	£	£	£	£	£	£	\$
1968-69	4,329	7,695	2,500	28,000	25,400	67,924	190,188
1969-70	4,329	7,695	2,500		25,400	39,924	111,787
1970-71	4,329	7,695	2,500			14,524	40,667
1971-72	4,329	7,695	2,500			14,524	40,667
1972-73	<u>4,329</u>	<u>7,695</u>	<u>2,500</u>			<u>14,524</u>	<u>40,667</u>
<b>Total 1968 - 1973</b>	<b>21,645</b>	<b>38,475</b>	<b>12,500</b>	<b>28,000</b>	<b>50,800</b>	<b>151,420</b>	<b>423,976</b>

Total Recurrent Costs £ 60,120 \$168,336

Total Capital Costs 91,300 255,640

£ 151,420 \$ 423,976

## WASE PROJECT

### DESCRIPTION

The Wase Project is located in Plateau Province. It is approximately 150 miles southeast of Jos by road. The total area encompassed by the Scheme is about 465 square miles or 297,000 acres, and includes the Wase Grazing Reserve and Central Wase and Zok-Gaji Forest Reserves consisting of 260,591 acres.

### MANAGEMENT PROGRAM

#### 1. The Area

In sharp contrast to the Jos Plateau, which rises to elevations exceeding 5,000 feet to the northwest of Wase, the project area ranges in elevation from only 600 to 1,000 feet from south to north. These are the lowlands of Plateau Province. The entire grazing reserve drains southward into the Benue River. The area is smoothly rolling with indistinct drainages, many of which have slopes of less than one percent. Mean annual rainfall in the area ranges from 40 to 50 inches, most of which falls between the first of May and the middle of October. The dry season extends from mid-October to May and is marked by dry north winds between November and March.

The area is located within the transition between the Sudan and Guinea zones. Vegetative types are generally the same throughout the area, but density increases from north to south.

#### 2. The People and Products

About 80,000 people live in the area with most of the population located in towns and villages surrounding the project. Less than one person per square mile is located within the scheme. The people derive practically all of their livelihood locally from their own farm and livestock operations. Principal farm crops are sorghum, millet, rice, groundnuts, cotton, and maize. Fulani livestock owners also inhabit the area and provide a local supply of beef and dairy products.

#### 3. Government

The local governing body includes the Native Authority Council at Wase, which is under the leadership of the Emir. The Emirate is subdivided into districts, each with a district head, and each village, in turn, is under the leadership of a village head.

4. Land Uses

Grazing is a primary use. There is some farming being carried on by surrounding villages on a shifting cultivation basis. Small farms located within the scheme will be removed at the request of the Emir. Guinea corn and millet are often cultivated on a large scale, with the first the more extensive of the two. Groundnuts, cotton and rice are grown on a small scale, mainly as cash crops. Only the village of Tunga, which is well established, will remain within the scheme.

There is some wildlife in the project area and hunting occurs. The forests provide firewood, poles, thatching grass, and some food for local use.

5. Wase Program

PROGRAMMED IMPROVEMENTS

1965 - 1966

<u>Description</u>	<u>Units</u>	<u>No. of Units</u>	<u>Total Programmed Costs</u>	
			<u>£</u>	<u>\$</u>
Demarcation	miles	136	2,140	5,990
Reservoirs	cu. yds.	74,054 (9)	<u>5,210</u>	<u>14,590</u>
		Sub-total	7,350	20,580

1966 - 1968

Well, W/Mill	each	2	1,800	5,040
Wells only	each	2	1,750	4,900
Admin. Site Well	each	3	2,250	6,300
Admin. Site W/Store	quarters	18	4,100	11,480
Reservoirs	cu. yds.	69,000 (9)	4,935	13,820
Demarcation	miles	127	1,905	5,330
Clinics, W/Well	each	2	<u>3,000</u>	<u>8,400</u>
		Sub-total	19,740	55,270

After 1968

Reservoirs	cu. yds.	129,000 (16)	12,875	36,050
Well W/Mill	each	2	1,800	5,040
Wells Only	each	6	5,700	15,960
Transp., Fuel, Lube, Labor - Equipment	---	---	12,500	35,000
Clinic W/Well	each	1	<u>1,400</u>	<u>3,920</u>
1968-73 Total Capital Costs			34,275	95,970

Annual Costs

Maintenance

a. Demarcation - 250 miles		1,000	2,800
b. Reservoirs		600	1,680
c. Wells/Mills		300	840
d. Buildings		500	1,400
e. Equipment		1,500	4,200
f. Transportation, fuel, lube		2,000	5,600
g. Labor		<u>1,500</u>	<u>4,200</u>
		7,400	20,720

Personnel

GONN		3,144	8,805
1968-73 Annual Recurrent Costs		<u>10,544</u>	<u>29,525</u>

GONN STAFFING REQUIRED FOR THE WASE PROJECT

<u>Position</u>	<u>Number</u>	<u>Annual Salaries</u>	
		<u>£</u>	<u>\$</u>
Livestock Superintendent	1	660	1,850
Range Management Assistant	3	594	1,665
Grazing Control Assistant	4	624	1,750
Fire Control Officer	1	156	435
Storekeeper	1	198	555
Work Supervisor	1	273	765
Mechanic	1	225	630
Vehicle Driver	2	258	720
Engineering Assistant	1	156	435
	<u>-</u>	<u>-</u>	<u>-</u>
Total	15	3,144	8,805

WASE PROGRAM

Accomplishments through March 31, 1967

<u>Description</u>	<u>Units</u>	<u>No. of Units</u>
Demarcation	miles	162
Reservoirs	cu. yds.	76,842 (10)

## 6. Management

Establishment of the Wase Grazing Reserve began in the fall, 1965, involving meetings, authorizations, formation of a plan, and eventual initiation of boundary demarcation and development work. A base camp was established at Kadarko with temporary living facilities for the AID range management advisor. Demarcation has been completed on all of the south half exterior and interior boundaries and the north half exterior boundaries. Development work has now been halted pending a tsetse fly inventory by the Tsetse Fly Section of the Ministry of Animal and Forest Resources. Gazetting, to officially publish boundaries and establish the area as a grazing reserve is now in progress. Two forest reserves - Zok Gaji and Central Wase are a part of the project.

An advisory committee for the scheme held its first meeting in January 1967, involving GONN, NA, and district and village representatives. One district is involved. Salt is now being provided free of charge to Fulani stockmen to demonstrate salt value and to obtain statistical data on herd sizes and locations. No licensing, grazing fee collection or ear tagging of cattle has been done, though it was anticipated that registration and tagging would begin next dry season (November 1967).

Generally the condition of the area for grazing and watershed, appeared satisfactory. Original plans were to divide the scheme into four ranges, each to provide year round grazing. Each range was further sub-divided into four pastures, A, B, C, and D. Pastures A and B were to be used in the wet season (A, June through August; B, September through November), and C and D during the dry season (C, December through February; D, March through May), of each year on a deferred grazing system. Current plans are to use the two southern ranges for the dry season grazing location, and all the north half consisting of two ranges as the rainy season grazing location. Estimated number of cattle generally utilizing the scheme area is 19,000 head, plus 6,000 sheep and goats. Assuming that all livestock were using the scheme this would require an estimated average dry season grazing capacity of less than 1.5 acres per animal unit month (171,000 acres), and a wet season grazing capacity of about 1.0 acres per animal unit month (126,400 acres). Numbers of livestock actually grazed within the scheme for the 1966-67 season is not known. Livestock numbers in the dry season area were determined as 6,000 head in 1966-67.

Indiscriminate burning is a major problem. Firing usually begins in December and continues through the dry season. Where water is available, burned areas are grazed as soon as green growth starts. It is estimated that 50 - 60% of the area is being burned annually.

The water courses are ephemeral, drying up in November and not flowing again until May. Ground water is found adjacent to the stream channels; however, it does not maintain a sufficient level to develop shallow

wells except near the lower extremities of the rivers. Cover is excellent, with grasses ranging from a height of six feet in the north to ten feet in the south. Evidence of erosion is slight to moderate, even in the drainages. There is no specific erosion control program but the need is recognized and is included in future plans.

#### 7. Animal Husbandry

The animal husbandry practices are quite typical to that described under Land Use Practices for Northern Nigeria. Because the grass is in excellent condition during the wet season cattle are generally in good condition by the beginning of the dry season. Cattle are predominately White Fulani with some mixtures.

#### 8. Tsetse

The Chief Veterinary Tsetse Officer, Ministry of Animal and Forest Resources reports that *G. tachinoides* extends into the project on the southern and eastern edges. This infestation is limited along the lower reaches of the principal rivers. Infestation may have some effect on the grazing management of the area. It is contended that *G. morsitans* has been held down through human activity,

#### 9. Marketing

A large share of the products of the study area is consumed locally, and part of the local consumption does not go through market channels, since many products are consumed by the families who produce them. In the case of rice, groundnuts and cotton, cash markets exist and the small amount that is produced finds its way into the larger markets through Wase, Jos and then on to the larger market centers. Guinea corn and millet, when marketed, are usually either exchanged directly for other goods and services in the local market, or sold for cash which is converted directly into the consumption of other local goods and services.

Milk and milk products are produced by the Fulani livestock people and sold locally and in the larger, more distant markets. In 1966, it was estimated that 334,000 gallons of milk was being produced annually from the Wase grazing reserve. Milk and milk products sold locally are distributed directly to the local markets by the Fulani. That which is distributed in the larger markets is sold and then transported by lorry to a central processing station, for example, Nigerian Creameries, Ltd., at Vom.

It is estimated that about 1,300 head of cattle are being marketed annually from the project area to local and major markets combined.

WASE PROJECT 1968 - 1973

<u>Year</u>	<u>Personnel</u> <u>GONN</u>	<u>Maintenance</u>	<u>Equipment</u> <u>Supplies</u>	<u>Buildings</u>	<u>Project</u> <u>Construction</u>		<u>Total</u>
	£	£	£	£	£	£	\$
1968-69	3,144	7,400	2,500	1,400	10,188	24,632	68,970
1969-70	3,144	7,400	2,500		10,187	23,231	65,047
1970-71	3,144	7,400	2,500			13,044	36,523
1971-72	3,144	7,400	2,500			13,044	36,523
1972-73	<u>3,144</u>	<u>7,400</u>	<u>2,500</u>	_____	_____	<u>13,044</u>	<u>36,523</u>
1968-73 Total	15,720	37,000	12,500	1,400	20,375	86,995	243,586

Total Recurrent Costs £	52,720	\$147,616
Total Capital Costs	<u>34,275</u>	<u>95,970</u>
	86,995	243,586

APPENDIX E

SUMMARY OF LIVESTOCK RELATED PROJECTS  
PROJECT NUMBER: 620-11-130-774

LIVESTOCK RELATED PROJECTS

Country: Nigeria      Project Title: Livestock Development, Northern Nigeria  
(Overall)

Project Number: 620-11-130-774

Initial Obligation FY 1961      Estimated Completion Date FY 1970

<u>U.S. Inputs</u>	<u>Expenditure Through FY 68</u>	<u>Estimated Total Cost</u>
Grants	\$4,531,000	\$5,440,000
Technical		685,000
Participants		325,000
Commodities		1,508,000
Other Costs		922,000

Host Country Inputs

About 14 million dollars in livestock improvement spent by Northern Nigeria Region before States created, however, about 6.4 million was spent as counterpart funds for USAID involved projects.

Other Donors

1. Federal Republic of Germany - Makwa
2. United Nations Dairy Project - VOM
3. UK - Tsetse and LIBC stations
4. U.N. Pasture Research

Project Goals/Objectives

To assist the Ministry of Animal and Forest Resources in Northern Nigeria to develop livestock and poultry industries. Activities aided by AID include (a) introducing range management techniques, (b) increasing poultry production, (c) demonstrating cattle fattening techniques, (3) establishing livestock breeding stations to upgrade stock, (e) constructing and operating a demonstration abattoir and two retail outlets, and (f) helping train livestock and veterinary technicians.

Problems

See sub-projects.



### Accomplishments

1. Trained middle level livestock and range management personnel at the rate of 25 to 30 per year during most of the life of the school.
2. In 1971 the school graduated 29 livestock assistants and 10 range management assistants.
3. Under the KSU contract a major curriculum reform was initiated.

### Constraints to Success

1. Very few of the students previously trained or presently in-training are from nomadic cattle producer families and do not have a background of nomadic cattle production, therefore, do not have ties with these producers that is needed to have the desired influence in changing traditional production, grazing and animal health practices.
2. Technicians provided by USAID generally did not remain at post long enough to effectively develop teaching guides and lessons applicable to African conditions.

### Impact

Provided the six Northern States with badly needed livestock and range management assistants to help the States implement and carry out extension works with livestock producers.

### Lessons Learned from Project

1. Continuity of instructors is essential in developing curricula suited to train students under conditions in which they will be expected to perform. Experiences gained by instructors under local environmental conditions are essential in developing lesson plans adapted to conditions students will experience in performing their duties in their respective fields of training.
2. Effectiveness of trained personnel in working with African livestock producers is directly related to background on initial ties to livestock production.



Problems (Continued)

2. Imported exotic bulls did not adjust to climatic and disease problems common to the area.
3. Host government and others expected rapid results from a program which normally requires a long period of time to produce results.
4. Inadequately trained personnel to serve as counterparts in development and management of the ranch.
5. Inadequately planning for distribution of bulls to local cattle owners.

Livestock Related Projects

VOM Research - LIBS, A.B.U. Veterinary Faculty and Shika Research Station, Mando Road School, and Range Management AID assisted project.

Accomplishments

1. Established a ranching unit capable of sustaining a foundation breeding herd of 500 to 600 of breeding cows and necessary replacement animals.
2. Produced cross-bred bulls and females which were selected for upgrading the foundation herd.
3. Produced and stored supplemental forage which was fed to livestock during the dry season.
4. Initiated a range management system which led to increase production of high quality native forage.
5. Demonstrated modern ranch management techniques.

Constraints to Success

1. Inadequately trained Nigerian personnel to serve as counterparts.
2. Harsh climatic conditions in the area selected for the ranch compared to other climatic areas of Nigeria made the production of exotic cross-breeds more difficult.
3. Continuity of U.S. personnel in planning and implementing the project lead to divergencies in the goals of the project.

Impact

1. Demonstrated to Nigerian Government officials the feasibility of commercial ranching in the Sihael and Sudan zones as evidenced by recent request for development loans for this and similar ranching operations from I.B.R.D. by the GON.

Lessons Learned from Project

1. Genetics improvement of indigenous livestock in most instances can be accomplished through utilization of local genetic superior animals followed by selection and culling rather than introduction of exotic breeds which may show a negative production effect unless disease and low plains of nutrition is removed.



### Livestock Related Projects

1. Livestock Service Training Center (Kaduna).
2. ABU Veterinary College.
3. Federal Department of Research (VOM).
4. Tsetse Research and Eradication.

### Accomplishments

1. Developed and established management systems on two pilot project areas of approximately 1,600 square miles (Sokoto/Katsina).
2. Trained 12 participants BS degree level in Range Management at U.S. universities.
3. Demonstrated to Fulani cattle owners the possibility of increasing both quantity and quality of beef production through development of arid range areas followed by improve herd management and animal health.
4. Trained intermediate level Nigerians in development and operation of grazing projects.
5. Introduced grazing fees on developed project areas to replace former cattle taxes.

### Constraints to Success

1. Inadequately trained Nigerian personnel, especially at high level.
2. Civil disturbances shifted trained personnel from project areas; reduced local authority involvement in administration of project areas caused general lack of interest or involvement in development and management of project areas by Federal Government officials; (division of former Northern Region into states split development teams and equipment into 6 fragments which made them uneconomical to maintain and operate).

### Impact

1. Demonstrated to Nigerian Government the feasibility both economical and technical for developing SIHAEL and SUDAN ecological zones into commercial producing enterprises. This is evidenced by application to IBRD for loans for similar developments in Northern Nigeria (recent application).

### Lessons Learned from Project

1. Fulani cattle producers are willing to participate in and support through cash payments projects designed to improve the potential production of range livestock.

2. Continuity of personnel (USAID direct-hire versus contract or PASA) is essential in planning, designing, developing, and establishing operation and management of projects if they are to be successful.
3. Increased production can be achieved with favorable benefit cost ratios by developing Sihael and Sudan climatic zones into commercial beef ranches.
4. Livestock development projects should be package oriented including all aspects of production, disease control, marketing, and personnel training and phased over a longer period of time to allow each phase to be implemented in a planned sequence. Fragmented projects for short durations should be avoided.
5. Surface water developments can provide year round supplies of water for domestic livestock production in the Sihael and Sudan zones if properly located and designed.

APPENDIX F

MINUTES OF THE KATSINA-SOKOTO JOINT GRAZING  
COMMITTEE MEETING HELD AT GUSAU ON 16/5/73

MINUTES OF THE KATSINA-SOKOTO JOINT GRAZING  
COMMITTEE MEETING HELD AT GUSAU ON 16/5/73

Members and Representatives Who Attended

1. Alh. Garba Gusau Sarkin Fada Sokoto - Chairman
2. Alh. Bello Ingawa Magajin Rafi Katsina - Vice Chairman
3. Mr. H. Dyeri Provincial Forest Officer Katsina - Secretary
4. Alh. Lawal M/Fashi Sarkin Dawa Katsina - Hausa Secretary
5. Dr. Moh. E. Mufarrih Provincial Vet. Officer Katsina - Member
6. Alh. M. Kasimu Abdul Jalil, Province Secretary Katsina - Member
7. Alh. Abubakar Mashegu Divisional Secretary Sokoto
8. Addahim Dangaladiman Waziri Sokoto
9. Mal. Altine Tambawal Wakilin Fulani Sokoto
10. A.T. Bakaya Divisional Veterinary Officer Sokoto
11. Habibu Suleiman Range Management Officer Runka
12. M.B. Aliyu Range Management Officer Gidan Jaja

Cooperate Members Special Invitees and Observers

1. H.P.J. Barr Chief Conservator of Forests, Kaduna
2. Aliyu Danyaro Barau, Principal Husbandary Officer, Kaduna
3. M. Balarabe Sokoto Sarkin Gandu
4. M. Sulaimanu
5. Alh. Dahim Dangaladima Wazirin Sokoto
6. Alh. Isyaku represent Iyandaka
7. Alh. Mu'azu Distric Head Ruma Batsari
8. Amodu K. Katsina Safana District Head Safana
9. Alh. Moh. Lawal Sarkin Pawa District Head Kankara
10. Alh. Rabin Sarkin Arewa District Head Jibiya
11. Alh. Abdu Madawakin Pawa
12. Alh. Mohamed Tasin Magajin Mallamawa
13. Alh. Muhammadu Runka Village Head Runka
14. Alh. Atiku W/Dan Ali Maidabino
15. Abdu Omar Forester i/c Runka Forest Reserve

16. Sarkin Fada Yarima Safana
17. Umaru Bukar Galadiman Kunkuma
18. Alh. Abdul Aziz Malamin Magaji Runka
19. Maiungwa Guzarawa
20. Musa na Barau Safana
21. Hamza Moh. Kaura Nomada Veterinary i/c Clinic Gidan Jaja
22. Sani Bungul G/C/A Gidan Jaja
23. Mamman Gusau Ag. Madawakin Daji Gusau
24. Ahmed M. Shika Livestock Superintendent Katsina
25. Samu Na dabo Range Management Officer Kachia
26. Representative of Sarkin Fulani
27. Alh. Shanu Sarkin Fulani Runka
28. Sarkin Fulani Daro Range 5 Runka
29. Sarkin Fulani Gambo Range 3
30. Sarkin Fulani Nakagora Range 6
31. Sale Maidawa Range 5
32. Sarkin Fulani Kadu Range 4
33. Sarkin Fulani Hanazuwa Range 7
34. Alh. Audi Snr. Agricultural Officer Gusau
35. Sani G/Baure Range 3 Sokoto
36. Sarkin Fulani Dan Alje Range 4 Sokoto
37. Sarkin Shanu Range 5 Sokoto
38. Alh. Yahaya Sardaunan
39. Alh. Gatarin Rudukawa
40. Magaji Usman Kwashabawa
41. Sadi Akilu Information Officer Gusau
42. Idi Dauran Assistant Supervisor Z.G. Scheme
43. Mah. A. Bonu Asst. Forest Superintendent Sokoto
44. Alh. Garba Kware Wakilin Dabbobi Sokoto
45. Marafan Zurmi Muhammadu
46. Sarkin Fulani Muhammadu Zurmi
47. Galadiman Daji Muhammadu Kaura Namoda
48. Alh. Barau Wakilin Gatarin Zakka
49. Alh. Mohamadu Sani Magajin B/Duhu.

Agenda

Items on the agenda for the meeting consisted of:

- (a) Confirmation of the minutes of the last meeting.
- (b) Matters arising from the last meeting.
- (c) Progress report.
- (d) Other business.

Opening the Meeting

1. The meeting opened at 10:30 a.m. When the Chairman called on one of the members to say some prayers before the meeting was declared opened. He then welcomed the entire members to the meeting and wished the meeting success.

2. The Chairman informed the meeting that he had delivered their message of appreciation to the Sultan for addressing the previous meeting.

3. Confirmation of the minutes of the last meeting:

The Chairman asked whether the minutes were to be read before they were confirmed. It was later agreed that the minutes were to be read and were read by the Sarkin Dava Katsina the (Hausa Secretary).

After the minutes were read the Divisional Agricultural Officer, Gusau made a correction on paragraph 15 section (a) on what he was alleged to have said.

He said that he did not mean that all the cotton seed should be left untouched but that it's evacuation to other places should be controlled.

The minutes were then confirmed. The Counsellor for Rural Development Katsina suggested getting a minutes register for signing by Chairman.

4. Matters Arising:

(a) The Sarkin Dawa Katsina inquired if the Sokoto Local Grazing Committee had met before this meeting. He was assured it had. At this point the Provincial Secretary Katsina suggested that members introduce themselves one by one for the benefit of the new members.

(b) The Sarkin Dawa asked what part the farmers and Fulanis were playing in the grazing scheme.

(c) The Wakilin Fulani Sokoto replied that Committees have been arranged from district to village levels and rules and regulations to safeguard the interests and welfare of the people had been introduced.

(d) At this point the Counsellor for Rural Development Katsina Magaji Rafi inquired as to the nature of these Committees and was told that the Committees were set up to deal with the control of movement of Fulanis on grazing areas. Each hamlet was given vested powers to deal with problems on the spot between themselves.

(e) The question was raised as to whether there were any rules set up for grazing control. The reply was that the rules had been set up a long time ago and were being followed.

(f) The question was also put to the D.V.O. Sokoto whether the veterinarians have now got an effective drug to be used on cutting cattle tails. He said they had not yet got such a drug.

(g) It was asked whether the 25 dams proposed for Runka had been built and the remaining 23 have yet to be built. He further explained that the slow rate of progress in construction of dams was due to lack of adequate equipment to work with. Aliyu Barau also explained that the Ministry had ordered the equipment but the company had not delivered them. The alternative arrangement was that the Range Management Officer, Kachia should transfer his equipment to Range Management Officer, Runka for use after he has finished with them. On the question of grazing control the Sarkin Dawa, Katsina asked why grazing couldn't be controlled in Runka.

The Range Management Officer then explained that it was not that grazing couldn't be controlled but that due to availability of water and food in certain areas and their inavailability elsewhere it was not possible to effectively control grazing until you have an even distribution of water and food all over the ranges. He was asked whether he would have the staff for control if conditions improved. He said the district heads would help in that aspect.

(h) At this juncture the Rural Development Counsellor, Katsina Magajin Rafi asked whether Sokoto had started his own diary form. The Divisional Veterinary Officer, Sokoto replied that they hadn't due to lack of equipment and that they have hope to start next year.

Provincial Forest Officer, Katsina asked whether there was any set procedure whereby Fulanis movement in the ranges was controlled. The Range Management Officer, Runka replied that the Fulanis had their own way of movement. Sarkin Ruma then suggested that the movement of Fulanis be checked on both Sokoto and Katsina sides for the purposes of jangali receipts and that the Fulanis should help in this.

5. Progress Reports:

(a) The Range Management Officer, Gidan Jaja, M. Bello Aliyu read his report first a copy of which was given to everybody that attended. He accompanied the report with a map showing the amount of progress that had been achieved since the last meeting. The Range Management Officer, Gidan Jaja then put it to the meeting that there was rampant illegal fellings in the ranges. The Provincial Agricultural Officer, Sokoto then suggested that protection of Forest Reserves and Ranges be stepped up.

(b) The Provincial Forest Officer, Katsina then appealed to the Range Management Officers to help in educating the Fulanis as to the detrimental effects of indiscriminate fellings bringing them sheet erosion and gradual removal of fertile top soil rendering the ground infertile.

(c) It was agreed that forestry had too few protective staff to take care of the reserves and Sarkin Sandu Sokoto further enlightened the meeting on the multitactics of these illegal fellers and how difficult it was to devise means fast enough to prevent the illegal activities.

(d) As a preventive measure, he said he has set up teams to check on these illegal activities between Sokoto and Gusau. The Divisional Veterinary Officer, Sokoto was of the idea that Forestry Department had rather ask for funds to embark on large scale plantation establishment rather than seek protection of the existing natural bush.

(e) The Sarkin Dawa, Katsina asked if Sokoto had increased on their previous years range areas. The reply was that there was no increase. He also suggested changing the name of Zamfara Grazing Scheme to Zamfara Forest Reserve Grazing Scheme.

At this idea the Chairman suggested that copies of this meeting minutes be sent to the different local authorities for scrutiny and consideration as to issues raised pertaining to forestry.

It was noted at the meeting that there is not enough cooperation between forestry and veterinary on account of protection of ranges and reserves.

(g) An issue was raised by one of the Fulani Chiefs on the sale of supplementary feed to Fulanis in Sokoto Province. The Fulani delegates then appealed to the meeting to help in asking the North Western States Ministry of Natural Resources to give them the feed free as it is practiced in North Central State.

M. Aliyu explained that the supplementary was Federal Government aid and saw no reason for selling it. The Divisional Veterinary Officer Sokoto replied that since this was an issue that touched on headquarters instructions there was little they could do except to refer their request to State Headquarters for consideration. To this end the meeting asked the Secretary to write to the appropriate Ministry on behalf of the Committee.

The Sarkin Dawa Katsina inquired as to what steps had been taken by the Range Management Officers to curb the damage caused in the ranges by elephants. To this they replied that there was little they could do except shoot the elephants.

It was then suggested that trained elephant shooters who had been specially trained to scare away elephants should be employed to carry out this exercise. It was suggested that fencing be done as it was done in Katsina.

The progress report on Runka Range was read by Mallam Habibu the Range Management Officer, copies of the report were distributed to all who attended. In his report several items came under questioning, e.g., whether the culverts that were constructed have started being used or not. These he said were yet to be used since other constructional jobs have to be completed to enable the use of the culverts.

The Fulanis complained of the general shortage of feed on the ranges and asked if the government could come to their rescue. Replying to this the Divisional Veterinary Officer, Sokoto assured them of the government's readiness to help, but unless there is rain nothing could be done. It was then suggested that Fulanis could help in protecting and improving the pastures by adhering to the advise of the Range Managers and doing some personal grass planting themselves. It was also suggested that community effort between the district heads and Fulani chiefs could be used in establishing pastures. The Sarkin Kudu then explained that Fulanis were difficult to approach and their representatives to the meeting did very little to enlighten them on what had been discussed at the meetings. The Chairman closed the topic by appealing to the Fulanis to cooperate. On the whole the two progress reports of the Range Management Officers were praised and classed as thorough and well presented.

The Sarkin Dawa, Katsina sought to know the impression of the meeting on their last visit to Runka. He was assured by the Sarkin Kudu, Sokoto that the Committee was impressed and the Sokoto delegates sought the possibility of introducing the method of cross breeding practiced at Runka in Sokoto.

To this the Divisional Veterinary Officer, Sokoto disclosed that they were planning to embark on artificial fertilization by injection. The Fulanis were satisfied about this.

#### Other Business

(a) Magajin Rafi suggested that names should not be stated in minutes, general opinions were divided on the issue. It was decided to leave the Secretary to write the minutes as he sees fit.

The Sarkin Dawa, Katsina brought the issue that it should be arranged so that Sokoto and Katsina maintain the boundary on alternate years. But the two Range Management Officers said they already had a plan by which they maintained the boundary mutually.

(b) The common boundary maintenance issue was raised as to who should maintain what portion. It was agreed that the two Range Management

Officers would maintain the boundaries on alternate years. At this point it was decided that the trip to Gidan Jaja be postponed and the next meeting was scheduled for November, 1973 the venue being Katsina but both delegates are to first meet at Gidan Jaja and then move to Katsina for the meeting.

The Agriculture Officer, Sokoto proposed that the meeting be adjourned and was seconded by Sarkin Fada, Sokoto.

The Chariman then declared the meeting closed at 2:00 p.m.

APPENDIX G

THE EFFECT OF DROUGHT IN THE NORTH EASTERN STATE  
BY DR. I.M. KHALIL

THE EFFECT OF DROUGHT IN THE NORTH EASTERN STATE

BY DR. I.M. KHALIL

FOR THE SYMPOSIUM ON DROUGHT IN NIGERIA

25TH - 28TH MARCH 1974

I. INTRODUCTION

Water is responsible for the very existence of all living creatures and vegetation. An animal can lose all its fat, and over half of its protein and lives, but a loss of a tenth of its water could result in death - so water is life and without it no life.

We are now discussing drought which is an abnormal shortage of water, a condition quite distinct from aridity. It is important, therefore, to distinguish between these two phenomena.

Strictly speaking drought can only occur in areas which normally receive adequate rainfall, capable of sustaining established agricultural practices. When such areas suffer from shortage or abnormal distribution of rains, resulting in partial or total crop failure, the condition is described as a drought condition. Whereas an arid area is an area normally characterized by scanty erratic rainfall, incapable of sustaining established agricultural practices, but could support a pastoral economy.

The so called drought affected area in the North Eastern State is a transitional area lying between the Sahara Desert with its scanty rainfall, and the tropics with high humidity. It comprises the arid Sahelian Zone along the northern boundary with Niger Republic and the semi-arid zone further south, bordering the tropical region. It is more than 340 Km deep.

Examination of the rainfall records in this area for many years show that the rainfall is cyclical, and at present we are at the lowest point of the cycle, hence the drought condition which caused much suffering to both man and beast. It is most likely, however, that the rainfall would readjust to the normal mean average within the next few years or so.

(See Annex V.)

The level of Lake Chad has been abnormally low since 1972. Although the lake does not depend on rains for its re-charge, yet its lowest level for several years has coincided with the drought, making a bad situation much worse. Many Hippos were reported to have died by sticking in the mud.

Also, River Ebeji and River Yobe did not flow for two seasons 1972/73 and 1973/74. This resulted in complete failure to the pilot experimental irrigation schemes at Ngala and Yau respectively.

Maiduguri rainfall for the past 42 years (1930-1972) has been very erratic and normally below the mean average. This fact should be noted when planning for proper land utilization so that only land use capable of survival under the lowest rainfall conditions should be allowed, particularly in the arid zone.

According to Winstanley 1973, the isohyets moved southwards at the rate of eight km per year between 1960 and 1970, compared with the much lower rate of 0.8 km per year during the period 1926-1961. This is very serious, as it indicates that the Sahara desert is moving southwards.

Moreover, man activities in this area have contributed greatly to the encroachment of the desert. These involve indiscriminate cutting of plants for fire wood and building poles, destruction of vegetation by

bush fires which retard plant growth and destroy any possible regeneration of perennial species, and over-grazing by livestock, particularly goats. If these activities are not controlled serious consequences are to be expected.

This reminds me of a famous saying that goes: "A nation deprived of its liberty may win it, a nation divided may untie, but a nation whose natural resources are destroyed must inevitably pay the penalty of poverty, degradation and decay."

## II. THE LOCATION OF THE DROUGHT AFFECTED REGION IN THE NORTH EASTERN

STATE: (Map Enclosed)

The drought affected area in North Eastern State comprises the whole of Bornu Province, and the northern parts of Bauchi, Sardaunar and Adamawa Provinces, about 98,600 Km<sup>2</sup>. An area immediately south of this area - about 77,600 Km<sup>2</sup> is indirectly affected due to the great pressure exerted on it by vast migration of herds and people from the North.

Therefore one can safely say that about two-thirds of the State is directly or indirectly affected by the drought.

It is necessary however, to divide the drought affected area into three zones, depending on the severity of the drought conditions. These are:

### 1. THE DISASTER ZONE

North of Latitude 12° 30"

comprising an area of 41,600 Km<sup>2</sup>

Human Population is 1,944,172

Livestock Population is 2,000,000 animal units

In this zone the rains come during July and August, but they are erratic and scarce and they hardly continue for more than one month particularly in the North Eastern Corner of the zone.

The animal population appears to be high in this zone, but most of them migrate southwards early in the dry season on account of the very limited amounts of fodder and water resources.

Over-grazing is a common feature in this zone, but it was at its worst in 1972/73 season.

The natural grasses are generally annual grasses, of rather poor quality, and they are available only during a short period.

In 1972/73 crop failure was 80 percent to 100 percent in this zone, including Fodder.

## 2. THE SEVERELY AFFECTED ZONE

Between 11<sup>0</sup> and 12<sup>0</sup> 30" parallels  
comprising an area of 57,000 Km<sup>2</sup>

Human Population is 1,794,525

Livestock Population is 1,000,000 animal units

The majority of the people in this zone are sedentary farmers, but the crops they can grow are limited, namely Guinea Corn and Millet, and these out of the people that do not migrate with the herds southwards. Even the farmers, most of them keep livestock.

The fodder in the ranges of this zone is normally adequate, but unfortunately a large part of it is destroyed by bush fires every year.

Because of uneven distribution of water, many areas in this zone are severely over-grazed, due to the concentration of stocks near the watering points. The situation here was made worse by the influx of herds from Niger Republic.

The rainfall in this zone is generally adequate, but in 1972 it was low. Nevertheless, our survey showed that even in a bad year like 1972 many grazing areas could not be fully utilized on account of lack of drinking water for livestock.

Such areas are now earmarked for water development.

In this zone crop failure in 1972 was ranging from 20 percent to 60 percent including fodder.

3. VULNERABLE ZONE

Between 9° and 11° parallel  
comprising an area of 77,600 Km<sup>2</sup>, with  
Human Population of 3,795,266.

The Livestock Population in this area  
cannot be determined because of the  
continuous movement of herds into and  
out of this area.

However, permanent animal population in this zone is about one million animal units, but it is estimated that during the dry season the zone carries more than 2,000,000 animal units.

The rainfall in this zone is always good, and it was not directly affected by the drought, but most of the livestock from the other two zones and also from Niger Republic migrated there, taxing the pastures very heavily--specially near watering points.

Many localities of this zone cannot be fully utilized during the dry season due to lack of water. For this reason indications of over-grazing are noticeable in certain areas with abundant water supply, while other areas with no water in the dry season, look intact, being luxuriously covered with vegetations.

Here again bush fires, which are usually started by bush meat hunters, cause enormous losses of valuable fodder annually.

Intensification of water development and proper management of ranges are needed in this zone, which is of great importance as a grazing resort for livestock from the north during the dry season, specially in bad years.

### III. LOSSES DUE TO DROUGHT

#### 1. Livestock Losses

It was rather difficult to estimate losses in livestock as many died or slaughtered in the bush. In cattle, however, the losses were estimated at about 400,000 including about 120,000 heads emergency slaughtered, valued at ₦12,000,000.00.

This represents about 20 percent of the cattle population in the area affected with drought.

Again these losses also included cattle which migrated from Niger, the number of which cannot be determined, but it is likely that most of these cattle slaughtered for salvage, if not all of them, came from Niger.

#### 2. Losses in Food Crops

The main food crops grown in the drought area are Guinea Corn and Millet. The average annual production of these in the drought area is about 2,351,000 tons. As it was mentioned above, losses due to drought in 1972/73 ranged from 20 percent to 100 percent with an average of 50 percent total loss due to drought, i.e., 1,175,500 tons, valued at ₦82,250,000 (₦70 per ton) - See Annex III.

In many localities in Bornu Province, there was acute grain shortage in 1972/73, and when some grain could be found, the prices were too high--10-16 Naira per bag. For this reason the government had to come into active Drought Relief Operation, making grain available in those areas.

#### IV. MEASURES TAKEN BY THE GOVERNMENT

The government has set up a high powered Drought Relief Committee to deal with the immediate problem of drought. The activities of this Committee have been directed mainly towards the distribution of grain for human consumption in the affected areas, provision of water in the form of dug up wells, boreholes, dams, tapkis, and the distribution of supplementary feeds to the livestock owners in the affected areas.

About 28,000 tons of food stuffs, mainly grain were distributed from April 1973 to January 1974. Likewise the supplementary feeding program for livestock was intensified and during the dry season of 1972/73 (October 1972 to July 1973) more than 8,000 tons i.e., 160,000 bags of feed were distributed to livestock owners in the affected areas, at a nominal price of 30 K per bag.

The high powered Committee has set up a Technical Committee to study the situation and formulate long term measures for dealing with such drought conditions in the future.

The Technical Committee is still sitting, and it is hoped that its report will be out in the very near future.

V. RECOMMENDATIONS

Since it is evidently clear that the rainfall in the drought affected area is cyclical, and therefore a similar drought condition may be faced within a span of time, it is essential to plan for certain long term measures which would help to alleviate the effect of such a drought condition in the future.

The losses caused by the drought, particularly in livestock were very serious indeed, and we have to take all possible measures so that similar losses should not occur again in future.

Therefore the following measures are recommended:

1. The creation of as many reserves as possible, i.e., Grazing Reserves, Forest Reserves and Game Reserves (see Annex II and IV).
2. Intensification of the Water Development Program in the Grazing Reserves and in certain grazing areas (see Annex I).
3. Improvement of pastures and proper control and management of the ranges, by reseeding, deferred grazing, etc.
4. Control of bush fire - by fire traces and mounted guards.
5. Introduction of quick maturing varieties of grains into the drought area.
6. Intensification of large-scale mechanized food crops production south of the drought area where rainfall is reliable.
7. Introduction of cattle farming where suitable, particularly in the southern regions of the State.

8. Creation of grain storage facilities in strategic points throughout the State, where grain reserves are purchased and stored annually by the government for emergency situations of this nature, and for price stabilization of grain.
9. Mechanized fodder conservation (cutting and baling) early in the dry season for use later in dry season.
10. An intensive afforestation scheme aiming at checking desert encroachment, production of fuel wood, production of poles for construction, shelter belts, etc.
11. Prohibition of cutting fodder trees such as Gawo (Acacia Albida), and a joint Forest - Range Management Program should be established for propagation of fodder plant and fodder trees in the area.
12. Introduction of improved agricultural and soil techniques.
13. Intensification of extension work to educate the local people in the proper management of their environment.
14. Conservation of rain water for crop and pasture irrigation where feasible.
15. Construction of dams in certain suitable rivers for irrigation purposes, etc.
16. Creation of a high Powered Land Utilization Board, to make sure that land is properly utilized for the purpose it is most suited for.
17. Last but not least, establishment of meteorological stations in all districts for proper data collection.

In planning a general economic development for the Drought Affected Area, the Disaster Area comes out as a very critical zone. This area is suited for livestock development during the wet season only, although in some particular cases one or two more months can be added. Very few agricultural crops can be successfully grown because of growing days.

While raising livestock is the most suitable and desirable business in the area, an increase in the number of animals will bring about more ecological problems, and hence the need to migrate in mass to the south during the season.

Therefore, it is recommended that the livestock development program should be well planned and controlled as to reduce the number of migrating animals and to attach the cattle farmers and the herdsmen to the land, by providing them with watering facilities, fodder and suitable crop seeds.

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Chief Veterinary Officer,  
North Eastern State.

Maiduguri  
20th March 1974

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A. PRESENT SOURCE OF WATER SUPPLY

1. Boreholes	256
2. Dams/Tapkis	100
3. Wells	<u>36</u>
TOTAL	<u>392 Water Points</u>

B. PROPOSALS FOR EXPANSION (FOR LIVESTOCK) IN GRAZING AREAS

	<u>Province</u>	<u>Division</u>	<u>Number of Boreholes</u>	<u>Additional Wells</u>	<u>Dams</u>	<u>Remarks</u>
a)	Bauchi	1. Bauchi	8	8	20	a) Based on 40% boreholes, 55% dams, 60% wells for the whole province of the total.
		2. Gombe	12	12	25	
		3. Misau	8	8	7	
		4. Ningi	9	9	8	
		5. Katagum	14	14	26	
		6. Jama'are	9	9	14	
b)	Borno	1. Borno	14	6	17	b) Based on 50% boreholes, 40% dams, 30% wells, for the whole province of the total.
		2. Biu	20	6	18	
		3. Fika	20	8	15	
		4. Bedde	11	5	15	
		5. Dikwa	10	5	15	
c)	Sardauna	1. Gwoza	15	10	10	c) Based on 50%, 40%, and 30% as above respectively for the total.
		TOTAL	<u>150</u>	<u>100</u>	<u>200</u>	

NOTE:

1. The distribution for the Divisions is judged on the type of water development that best suites a particular locality.
2. Boreholes in Bauchi and Sardauna Province may require some geological information being sunk.

## ANNEX II

TOTAL NUMBER OF GRAZING RESERVES AND AREAS BY DIVISION

Province	Division	Number of Grazing Reserves	Total Area Square Miles	New Proposals
Borno	1. Borno	15	487.79	16
	2. Biu	8	472.87	4
	3. Bama	9	46.68	21
	4. Fika	9	191.85	3
	TOTAL	42	1,509.19	44
Bauchi	1. Bauchi	5	336.98	4
	2. Gombe	9	362.00	5
	3. Katagum	5	132.87	16
	4. Tangale/Waja	3	29.12	8
	5. Ningi	1	4.00	4
	6. Jama'are	1	17.00	3
	7. Misau	2	11.04	6
TOTAL	26	893.01	46	
Adamawa	1. Adamawa	8	783.44	10
	2. Numan	3	194.00	5
	3. Muri	3	101.50	5
	TOTAL	14	1,078.94	20
Sardauna	1. Mubi	7	75.30	5
	2. Gwoza	7	120.96	10
	3. Ganye	6	73.64	5
	TOTAL	20	269.90	20
GRAND TOTAL		102	3,744.04	130

	<u>Number of Grazing Reserves</u>	<u>Total Area Square Miles</u>
Borno Province	42	1,509.19
Bauchi Province	26	893.01
Adamawa Province	14	1,078.94
Sardauna Province	20	269.90
<b>GRAND TOTAL</b>	<b>102</b>	<b>3,744.04</b>

ANNEX III

Authority	Total Area Square Miles	Area Under Food Crops in Acres	Estimated Yields in Tons
Adamawa	8,723	857,280	277,184
Bauchi	14,516	1,299,860	539,958
Bedde	2,000	248,000	74,400
Biu	2,900	359,600	107,880
Borno	32,005	3,968,620	1,190,586
Dikwa	4,220	523,280	156,978
Fika	1,669	207,080	62,124
Gombe	4,481	554,280	166,184
Gwoza	1,000	124,000	37,200
Jama'are	149	18,600	5,580
Katagum	5,000	620,000	186,000
Misau	890	111,600	33,480
Mubi	1,600	198,400	59,520
Nigi	1,000	124,000	37,200
<b>TOTAL</b>	<b>80,053</b>		<b>2,352,988 tons</b>

ANNEX IV

AREAS OF FOREST AND PROPOSED FOREST RESERVES IN  
DROUGHT AFFECTED AREAS OF NORTH EASTERN STATE NIGERIA

IN SQUARE MILES

Province and Local Authority	Area 1	Forest Reserve 2	Percent of Area 3	Proposed Forest Reserve 4	Percent of Area 5
<b>A. BORNO PROVINCE</b>					
1. Borno L.A.	32,005	2,261.0	7.1	551.0	1.7
2. Bedde L.A.	2,000	77.5	3.9	54.0	2.7
3. Fika L.A.	1,669	128.3	7.7	-	-
4. Dikwa L.A.	4,220	49.4	1.2	-	-
5. Biu Div. L.A.	2,198	189.4	8.6	-	-
Province Total	42,092	2,705.6	6.4	605.0	1.4
<b>B. SARDAUNA PROV.</b>					
1. Gowza L.A.	1,000	63.0	6.3	-	-
2. Mubi Div.L.A.	1,076	-	-	5.0	0.5
Province Total	2,076	63.0	3.0	5.0	0.2
<b>C. BAUCHI PROVINCE</b>					
1. Ningi L.A.	1,000	93.0	9.3	52.6	5.3
2. Katagum Div.	5,000	215.4	4.3	26.3	0.5
3. Misau L.A.	890	39.1	4.4	-	-
4. Jama'are	149	0.7	.45	-	-
Province Total	7,039	348.2	4.9	78.9	1.1
<b>TOTALS</b>	<b>51,207</b>	<b>3,116.8</b>	<b>6.1</b>	<b>688.9</b>	<b>1.3</b>

APPENDIX H  
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