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**Evaluation of the National Range  
and  
Ranch Development Project  
USAID Project No. 615-11-130-157**

**Report**

**by**

**Utah State University**

**Evaluation Team**

**under**

**Contract No. AID/afr-c-1120**

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## BACKGROUND

The National Range and Ranch Development (NRRD) Project is part of a larger one, the Kenya Livestock Loan Program (KLL) to which a number of international donors participate. The purpose of the loan project is to assist the Government of Kenya (GOK) in its efforts to increase its agricultural production, specifically in that segment of agriculture related to animal production from the vast rangelands of Kenya, about three-fourths of the land area. Assistance is in the form of loan funds and technical aid. Specific activities entered upon were:

- (a) Credit for ranching activities
- (b) Livestock marketing facilities
- (c) Rangeland development
- (d) Livestock disease control

The project began in 1968 with Phase I.

The Phase II project was approved in the field in 1972, but the KLL project document making funds available was not agreed upon and signed until late in 1974. Consequently, loan funds were not available for more than two years, and GOK participation in the project was hampered.

The United States participates through the Agency for International Development (USAID) by providing funds which are made available to ranches for purchase of livestock through the Agricultural Finance Corporation (AFC/GOK) and by providing technical assistance. This is in the form of skilled personnel who are assigned to duty in GOK, support for training of Kenyan nationals in the technical skills needed for administering a range development program and equipment for AID planning teams. Training has included both university

level work in the United States and through workshops at the field level for Government of Kenya employees and pastoralists. The donors to the KLL program and the amounts are as follows:

	<u>Millions</u>
International Development Association (IDA)	\$21.5
Government of Kenya (GOK) and Ranchers	24.8
US Agency for International Development (AID)	9.3
Canadian International Development Agency (CIDA)	2.4
United Kingdom Overseas Development Ministry (UKODM)	<u>3.7</u>
	<u>\$61.7</u>

## GOALS AND ACCOMPLISHMENTS

### Phase I Program Goals

The goals originally enunciated for Phase I were to:

1. Assist in the establishment and further development of a range management division within the framework of the Ministry of Agriculture at national and provincial levels and to provide technical advice to its staff of fifty senior officers.
2. To provide technical advice and assistance in the establishment of organized ranching operations in the existing pastoral areas up to a minimum of fifty units annually.
3. To provide U. S. academic training for two Kenyans to ensure that a nucleus of a trained staff is available to carry out Kenya's future range development program.
4. To assist with training 200 local field staff in extension methods, procedures for conducting practical field demonstrations and sound management principles.
5. To assist in gathering technical data on water resources, bush control, forage utilization, conservation and other data beneficial to range development.

Subsequent modifications were made in these and new ones added as conditions changed and other needs developed but the overall purpose remained unchanged.

### Phase I Accomplishments

Considerable progress was made towards the attainment of these goals and objectives. A range management division staffed by

university graduates in range management from U. S. universities under AID's participant training program has been established. Additionally, six are employed by GOK at provincial levels in four provinces. Others are found at research stations and at two academic training centers, Egerton College and the Animal Health and Industry Training Institute (AHITI). A total of fifteen participant trainees in range management were employed in various governmental agencies as of April, 1975. Four were otherwise employed. The employment status of participant trainees in range management and related fields as well as those receiving training at certificate and diplomate levels are shown in Table 1.

Range planning and water development in the Pilot Project area near Mado Gashi, N. E. Province was extended into over four grazing blocks covering 966,000 hectares, although certain shortfalls occurred with respect to completing and making operational a number of the boreholes planned. At the time the Evaluation Team visited the area, water was available at only one pan. Developments made under Phase I are shown in Table 2.

### Phase II Goals

The overall goal of Phase II of the NRRD Project was to increase livestock production in Kenya sufficiently to meet growing domestic demand at reasonable prices and to earn foreign exchange through exports of livestock and livestock products.

More specifically it was hoped to:

1. Provide improved means of gaining a livelihood to pastoralists and ranchers.
2. Provide better quality stocker and feeder animals to farmers.

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More specifically it was hoped to:

1. Provide improved means of gaining a livelihood to pastoralists and ranchers.
2. Provide better quality stocker and feeder animals to farmers.

3. Provide consumers with protein at reasonable prices.
4. Provide expanded employment opportunities throughout all stages of the livestock and meat production process.
5. Increase the level of commercialization of the livestock sector and consequently increase foreign exchange.

Table 1. Present employment in GOK and place of training of persons trained in range management and related fields, April 1975

Present Employment	Egerton	AHITI	Participant Trainees in U.S.	Nairobi University
RMD Headquarters Nairobi	1	-	4	2
Egerton College	1	-	2	
AHITI	2	1	1	
N. E. Province	12	31	1	
Rift Valley Province	18	46	1	
Coast Province	8	29	1	
Eastern Province	10	27	1	1
Kiboko/Buchuma Range Research Station	5	18	3	4
Sheep and Goat Project	-	3	-	
Group Representative	1	-	-	
AFC	5	1	-	
Private Ranches	3	4	-	
Current Trainees, Range Management	-	-	9	
Animal Husbandry	-	-	4	
Agricultural Economics	-	-	3	
Other	2	17	4	2
<b>TOTAL</b>	<b>68</b>	<b>177</b>	<b>34</b>	<b>9</b>

## Phase II Accomplishments

We found no means by which the degree of attainment of these goals could be measured. Indeed they are not measurable, practically, since statistics which might be developed from secondary sources are so imprecise as to make definitive assessments virtually impossible. As for the realities of the contribution of AID's effort in pursuit of these goals, there is even less chance for documentation. The NRRD Project is such a small part of the total livestock and meat production enterprise in Kenya that its impact would be rendered obscure. Countrywide and area statistics on livestock numbers and quality of offtake, and marketing at a level which would reveal these impacts are not available.

The effect on pastoralists is even less subject to objective assessments. Moreover, the accomplishments toward objectives in terms of work units completed have been so far short of projections that little in the way of concrete progress toward achievement of goals can be expected at this stage of the project. The progress so far made toward the accomplishment of work projections during Phase II is shown in Tables 2 and 3.

Despite this poor showing, there are subjective indicators that progress is being made toward a more viable livestock industry. Some of the company ranchers appear to have established sound enterprises; others which were poorly planned and less skillfully managed are in difficulty. We have no means of knowing the proportions of each among the ranches that have been established.

Similar progress is shown by group ranches. Some according to AFC credit supervisors, are developing sound managerial skills. Im-

Table 2. Water facilities completed under Phases I and II in N.E. Province and their operational status as of April 1975

	<u>Phase I</u>	<u>Phase II</u>
<u>Boreholes</u>		
Projected	-	37
Being planned or under construction	-	37
Completed	43	0
Currently operational	3	0
<u>Pans</u>		
Being planned or under construction	-	174
Completed	116	14

Table 3. Status of Management Plans as of April 1975

	<u>In Preparation</u>	<u>Completed</u>	
		<u>Phase II</u>	<u>Phase I</u>
<u>Grazing Plans</u>			
Blocks, N. E.	3	0	5
Group Ranches, Narok, District	17	0	0
Kajiado District	7		
Kwale District	-		
Company and Cooperative Ranches,			
Kwale District	3		
Commercial Ranches			
Miles of Trace Completed, N. E.	-	340	1250

provement has come from better animal management, disease control and better quality animals. Whether rangelands are being improved we could not ascertain, since there has been no system established whereby changes in range conditions are being monitored.

The progress in N. E. Province is similarly mixed. Despite adequate rains in the vicinity of Mado Gashi in the short-wet season in 1974, pan water was virtually exhausted by mid-March. By mid-April range officers reported only one pan which contained water, and one borehole that had been seen in operation a month earlier in the Pilot Project was no longer functioning. Sedimentation of the pans was substantial, and in consequence of poor maintenance, equipment was largely inoperative. Such pan cleaning as was being done was by hand labor with shovels under the supervision of the Resident Engineer at Wajir.

Near Giriftu two pans constructed in 1973 that were visited showed no evidence of having filled to more than half their capacities. Whether this was due to subnormal precipitation or unfavorable soil conditions and poor location could not be ascertained.

As for range conditions, it was not possible to draw firm conclusions. Aside from one area currently scheduled for rest in Block 1 of the Pilot Project, forage utilization was everywhere complete. Although there was evidence of some grazing in the pasture designated for rest, unused stubble indicated it had indeed been given some relief. Since no rain had fallen in the part of the N. E. Province we visited, there was little chance to draw inferences. The fact all standing herbaceous forage had been removed is not of itself cause for alarm. The use made during the growing season and the nature of the vegetation that appears with the coming of rains must be known if range evaluations are to be made. No such evidence nor records from which they could be inferred were available to us.

## FINDINGS AND ANALYSIS

During the course of our evaluation we consulted files, project documents and background papers. USAID personnel at all levels were interviewed as were officers in the various departments and ministries, GOK, having any responsibilities in connection with NRRD Programs and some representatives of other donors to KLL were consulted.

Field trips were made into the N. E. Province (twice visited by the team leader), the Narok and Kajiado districts, Rift Valley Province, and the Taita/Taveta district in the Coast Province. Personnel from the Range Division and the Range Water Section of GOK/ Nairobi accompanied us to the Northeast. In excess of 25 local Kenyan range and water officers were encountered while in the field, ranging from Range Assistants to Provincial range, water and agricultural officers.

Our interviews, field trips, and review of records led to the identification of 10 problem areas or potential problem areas affecting the performance and the success of the NRRD Project. Some of these have several facets; they form the basis for our analysis.

1. Lack of basic data and inadequate utilization of that available.
2. Difficulties encountered in adapting grazing schemes to Kenyan conditions.
3. Ineffective integration of PASA planning teams into Project and GOK structure.
4. Lack of documentation of accomplishments and results.
5. Too intensive water development in a limited area

6. Failure to mount an effective means of coordinating the activities of donors and participants in the KLL Program.
7. Divided responsibility for administration and operation of the range and ranch planning and development functions in GOK.
8. Inadequate logistical support to planning and construction teams.
9. Inadequate maintenance of vehicles and equipment.
10. Uncertainties in acceptance of improved grazing practices by pastoralists.
11. Insufficient numbers of technically trained Kenyan personnel.
12. Relationships between NRRD Program and other donors and participants to the Livestock Development Program.

#### Adequacy and Utilization of Basic Data

Basic data from which range plans can be made are insufficient for successful planning. Although precipitation data covering several years are available for five stations in the N.E. Province, they are insufficient to define the limits which nature imposes on range development. The mathematical probabilities of low precipitation occurring at any one station can be assessed, but the size of the area that any particular rain-gauging station represents is not known. Some investigators report that rainfall in N.E. Province is characterized by storms of considerable intensity and short duration which cover limited areas.<sup>1</sup> Although data are available for a number of stations, the frequency with which these storms occur and the area that they cover is only generally known.

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<sup>1</sup>Swarzenski, M. V. and M. J. Mundorff, Geohydrology of North Eastern Province, Kenya, Contribution to the Hydrology of Africa and the Mediterranean Region, Geol. Survey Water Supply Papers.

Data for 1968, a year of unusually high precipitation, indicated that during April more than half the stations received rain simultaneously. The chance for this occurring would be diminished in less favorable years. These factors have great significance for range planning for it is important to know the probable size of the area likely to be affected by storms which are adequate to produce livestock water and a crop of forage. Only those areas receiving precipitation can be utilized, and if they are not those scheduled for use, no previously prepared grazing management plan can be followed.

These considerations have particular significance in determining the size of grazing blocks. It does not appear that an adequate block size to compensate for the vagaries of weather has been determined. Block 1 and 2 in the Mado Gashi area together total 504,453 ha (1 1/4 million acres); Block 1 is less than 162,000 ha. Blocks subsequently planned have been larger, the most recent ones approaching 800,000 ha (about 2 million acres). Insofar as we could determine, there was no documentary basis for deciding upon the larger block size, it is based upon a "seat of the pants" judgment. The move appears to be in the right direction, but there is little in the way of data to support the desirability of any particular block size.

Although the precipitation characteristics generally were considered in the design of the project at the outset, there is no evidence that careful analyses were made. Had there been, it would have been evident that the period during which the plans were being made was an especially favorable one and not likely soon to be duplicated. Analyses of daily rain fall records during the rainy seasons at the stations in the N. E. for which records are available would be instructive

in developing guidelines for the planning processes and confirming optimum block size and configuration, though they would not be definitive.

An even more rewarding course would be the use of aerial photography and satellite imagery. Infrared coverage over the area would reveal not only the percentage of the area affected by storms but the size and configuration of those areas receiving sufficient precipitation to produce vegetal growth. Some satellite data already are available from which tentative judgments at least might be made, and more may be forthcoming when the monitoring unit planned by Canadians is implemented.

It appears that maximum use is not being made of the ecological data that are available, in particular, the range management reports prepared by UNDP/FAO. Although these do not deal specifically with the areas now being developed, the material in them can be of great value.

Ground water supplies are imperfectly known but existing information has not been used fully. Known techniques relating to planning, designing, constructing, and maintaining small dams, have not always been exploited. Procedures developed by the U.S. Soil Conservation Service for estimating runoff from small watersheds have not been utilized in the planning process. These could be used to develop procedures applicable to Kenyan conditions. The importance of careful engineering is evident in view of the erratic nature of precipitation which may produce sufficient runoff to fill pans only half the time or less. Soil conditions also affect pan filling; some of the soils are pervious and produce little runoff.

In contrast to the incidents cited above, with respect to designing pans there was an over emphasis on design and especially in drafting elaborate plans. Once an acceptable pan design is agreed upon and

general specifications determined, there would appear to be little need for anything but simple sketches showing dimensions, shapes, back slopes, etc. Armed with such a sketch skilled machine operator and an experienced construction foreman could proceed; there are not many variations on how to excavate a hole. In some cases it was reported that despite elaborate plans, there were pans that failed to fill. These were made effective by the simple expedient of digging a few collector ditches to the pan intake. This indicates that practical experience is more needed than sophisticated designs.

#### Suitability of American Grazing Systems to Kenya

Central to the plans for the Pilot Project and to Phase II ranch and range development effort is the assumption that grazing schemes can be implemented that will have beneficial effects on range forage output and range conditions and, consequently, increased animal take off. The problems of doing so are both sociological and physical in origin. The first will be treated later; the physical obstacles and constraints to achieving these objectives are dealt with here.

The grazing plan thus far developed are adaptations of schemes first proposed in America by Sampson<sup>2</sup> which he called, deferred-rotation grazing and as later modified and publicized by Hormay<sup>3</sup> which he termed rest rotation grazing. The essential difference in these schemes is in the period of nonuse. Sampson provided for protection from grazing until forage had matured and set seed; Hormay protects the rest area

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<sup>2</sup>Sampson, Arthur W. (1913) : Range Improvement by Deferred and Rotation Grazing, U.S. Dept. Agr. Bull. 34.

<sup>3</sup>Hormay, August L. (1970) : Principles of Rest-Rotation Grazing and Multiple-Use Land Management. U.S. Department of Interior, Bureau of Land Management, and U.S. Department of Agriculture, Forest Service, (TT-4) 2200).

for an entire year. Rest or deferred-rotation grazing systems were developed in a temperate climate with a nongrowing season during which no grazing is possible due to snow and cold temperatures. Grazing, therefore, can occur only during the growing season, except it may continue into the fall months after plant growth has been completed. Schemes which employ rotations of use and nonuse in the climate of Kenya with two growing seasons a year and access to the range year round must be modified. This has been done where yearlong grazing is possible as in the Southwestern U.S., Australia, and elsewhere. Kenya's conditions pose additional complications; a rainy season and shortage of livestock water at other seasons of the year. The dormant period is not determined by frost, and growth is limited only by lack of soil moisture. Most of the work with forage crops in the tropics has been on improved pastures in high rainfall areas where agronomic practices apply. There is little information available on the ecological responses of herbaceous growth in the dry tropics for use in designing a grazing system, although various schemes have been proposed.<sup>4,5</sup>

Because of the near absence of research information on responses of vegetation to rotational grazing systems in tropical areas, there is no scheme which has general acceptance. Thus each person can be equally persuaded for the merits of his own solution. This has led to differences of opinion among range technicians. Since there is no unique solution to a rest rotation system, and since experience has

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<sup>4</sup> Abercrombie, Frank D. (1974): Range Development and management in Africa. Office of Development Services Bureau for Africa, Agency for International Development.

- <sup>5</sup> Heady, Harold F. (1960): Range Management in East Africa. Kenya Department of Agriculture and African Agriculture and Research Organization cooperating with the U.S. Education Commission, Government Printer, Nairobi.

not yet provided firm proof of the results to be obtained from them under Kenyan conditions, there seems little basis for disagreeing with any scheme proposed so long as it attempts realistically to provide relief from grazing during the plant growing season in individual pastures in rotation so that plants may remain vigorous. Certainly we do not propose to do so. There should, however, be agreement on the plan that is used until such time as better information is forthcoming.

It may be worthwhile, nevertheless, to point out certain factors which bear on the method selected. First, since there are two growing seasons a year, each year presents two growth-rest cycles each of which can be thought of as being equivalent to a year in temperate climates or in tropical areas where there is only one growing season. Secondly, precipitation is low and erratic with inadequate amounts in some years either to provide adequate forage or water where surface supplies must be depended upon. Thirdly, the scheme of water development for the Pilot Project combines temporary and permanent water service. The first condition is advantageous. It is the last two conditions that impose constraints and limit the options available to the range planner. As has been shown, drought periods in the N. E. recur often and occasionally extend through two or more years.

Analyses of rainfall records which cover 17 to 27 years at three stations in N.E. Province (Wajir, El Wak and Habaswein) show the following:

Percentage of years in which 5 inches was received:

In one or the other of the wets	48%
In one or both wets	66%
In neither wet season	34%

Considering the fact the years of record used in this analysis included a decade (1951-60) in which precipitation was much above normal, these data are of even greater significance. Thus one year of three will provide little forage growth. When, as occurred at Habeswein during the period of record, there are two years in succession in which no "wet" receives as much as 3 inches, no grazing scheme can be adhered to. Herd reductions and use of whatever forage is present irrespective of grazing plan requirements become necessary at such times. Flexibility is a necessity and the need for it must be recognized by planners and administrators alike.

Where temporary water must be depended upon, livestock can be grazed only during the growing season. These areas are the ones for which a deferment or rest period must be provided. Those areas with permanent water can be grazed either during the growing season or in the dry season. In normal, or better than normal years, these areas would always be rested and no provision for rest need be made for them except to keep livestock from them during wet seasons. When water is insufficient in the wet-season grazing areas, those supplied with permanent water must be grazed during both wet and dry seasons. The point is that it may not be possible or even wise to utilize traditional rest-rotation systems under these conditions. When the physical and biological conditions become better known, deferred or rotation systems can be adapted to them and the need of pastoralists.

Unfortunately, the areas best suited to provide forage during the dry season are those where perennial grasses are now present. These are the ones where inadequate water exists. Thus, there is the temptation to develop permanent water in these areas. If control of grazing, either

through acceptance by herdsmen or through control of water, is achieved there are no problems. Should control not be obtainable, the capacity for deterioration in these more productive and stable range areas is enormous. If on the other hand, only temporary water is developed, there may be no possibility for grazing the areas served during the dry season and those areas where permanent water is available must support the livestock.

### PASA Planning Teams

Problems Encountered by Planning Teams. The progress of the range planning teams has not matched projections. (See Table 3). There are several reasons for this. In the case of one team, there was no water engineer until quite recently. Adjudication of land in the coast Province has been slow, consequently little work could be done there, and the team that was to be assigned there has been working in the Magadi area, Kajido District.

Logistical support has been inadequate. Vehicles were slow in coming; only one member of the Rift Valley team has received the truck-camper outfit required for field quarters in Narok where the work is located, a distance of 100 km from Nakuru where family quarters are available. The third team that was assigned to the N.E. Province has been compelled to travel great distances between the work area and Nairobi where they are domiciled.

Despite some obstacles, the Rift Valley Team has made good progress in the Narok district. Of 21 group ranches so far identified for development, 17 plans have been formulated and are to the point of being put in shape for review and approval. One has been essentially completed since early in 1974. Inadequate secretarial help is the reason given for these plans not having been in condition for review at an

earlier date, though a number of plans were being assembled for submission to reviewers at the time the Evaluation Team visited Narok. Eight group ranch plans have been submitted to the Coordination Unit for review and approval.

The proper functioning of the planning teams is greatly influenced by how their jobs are perceived and the place accorded them in the government bureaucracy. They feel that they have no place in determining policy or work procedures with GOK officials in Nairobi, and that they are utilized in a lower capacity than their training and experience qualifies them for. In the N.E., tracks must be made before planning can take place. Because of slow progress in track construction, range planners found themselves marking time.

We do not want to give the impression that all the problems related to the planning teams are external. There are indications that many of the problems and frustrations they encountered had their roots within themselves. Despite lack of companions, counterparts, and equipment, we feel much could have been done that was not done that would have contributed to success of the project. Plans were being made with little knowledge of the taxonomy and value, both as forage and as indicators, of local plants. Existing sources of range data were not exhausted, and systematic plans for developing condition and trend data, upon which successful range management depends, were not developed. There was much that could have been done which would have been useful and contributed to a sense of accomplishment.

Location of Planning Teams. Location of the planning teams has presented some problems. Only one team, that in the Rift Valley Province,

now live outside Nairobi and they are located in Nakuru, the Provincial headquarters, almost equidistant from Narok, where their work is centered, as to Nairobi. This arrangement provides no advantages with regard to travel between home and work, but it does place them close to the Provincial Range and Water Officers. Because of the need for close working relationship between planning teams and Kenyan personnel at the provincial level, this arrangement appears to be desirable. Moreover, there is little evidence that planning teams do in fact, nor are they now expected to, work closely with government officials in Nairobi.

The other two teams are stationed in Nairobi, one because insufficient progress has been made in land adjudication to permit them to begin work in the Coast Province as was intended and because of delay in recruiting a second team member. The provincial headquarters, Mombasa, provides adequate housing and amenities for locating planning personnel there. Schools present problems for families with school age children.

The N.E. Province presents more serious problems. It is far removed from Nairobi, 6 to 7 hours to the closest point in the Province over secondary-standard roads. It is another 2 hours to provincial headquarters at Garissa and 4 hours more to the district office at Buna, and even further to Mandera. Teams are thus faced with consuming two or more days of the week in travel getting from their home station to the field with additional travel being required wherever contact is made with provincial officials.

There are only two places within N.E. Province where even the minimum of amenities are available, Wajir and Garissa. The former is well located within the Province being somewhat central; the latter lies toward one end of the Province. In this case the additional travel

time must be offset by the advantages of being in closer contact with provincial officers. In neither place is housing available at present.

Other than being more centrally located, Wajir is less desirable than Garissa. Water from the wells there is not potable although it is drunk by pastoralists. Electrical service is available only during the evening hours at the quarters of the expatriate couple who now live there where he serves as Resident Engineer. They are older persons with no children at home.

Garissa is located on the Tana River where water is available for limited agriculture. The main streets are hard surfaced, there is a water treatment plant, (although it may not be adequate to provide portable water without further treatment), there is 24 hour electrical service, and there is a general hospital. A new provincial headquarters building is just being completed, where, presumably, a planning team could be officed. Schools would present difficulties if school-age children were involved.

The climate is much less desirable in Garissa, than at Nairobi and other places at higher elevation, but the presence of electricity makes air conditioning possible. It is no more undesirable climatically than many places in the United States which are accepted and even preferred by some. Isolation from other U.S. personnel would make this location undesirable and recruitment might be difficult. If the decision were made to locate planning teams there, younger persons without school age children or older persons should be recruited. Although the possibilities of recruits is thus narrowed and may be difficult there is no reason to think it would be impossible to find qualified persons to work under the conditions prevailing there. These conditions should be fully presented, however, so that they would be clearly understood during recruitment efforts.

It would be necessary to construct housing there since none exists at present. The time required for doing this may be such that it is impractical, especially in view of our recommendation regarding continuation of participation in the planning process.

Role of Range Planning Teams. For a number of reasons, planning personnel have not been effectively utilized. Aside from delay in supplying them with equipment and inability to recruit a full complement of team members, there is no agreed-upon role for them. In contrast with their job assignments in Phase I where training was considered part of their mission, there is now a disposition on the part of higher-up Kenyan officers to regard planning as the only function of Range Planning teams. Neither training nor implementation of plans once they are made are considered part of the team's duties. In practice at the field level, a considerable amount of mixing of the planning, implementation, and training functions exists, but there is no general recognition of this wider role.

This policy that separates these functions seems unrealistic for several reasons. Although we agree that is the major responsibility of Kenyan personnel to deal with pastoralists and supervise the implementation of plans, we feel that there are considerations that make it important that strict separation of the planning and implementation functions should not be followed. In the first place, local Kenyan officers are largely inexperienced and at the lower levels may have had little to do with the preparation of the management plans. It is too much to expect that one person can take a plan in which he had no input and implement it. He would not fully understand the rationale behind it

and may be reluctant or unable to make the adjustments to it that are required when, because of the lack of precipitation or other reason, the plan cannot be adhered to. Moreover, separation of planning and implementation short circuits the "feed-back" mechanism.

Considering the slow pace at which water development is proceeding, fully equipped teams could in a short time provide enough plans for years of development effort. If we are correct in this assumption, there is need for expanding the role of the planning teams to utilize more fully their experience and expertise. We think that constant and continued contacts with Kenyan officers at the district and block level is imperative. We are not suggesting that PASA personnel should take over administration of grazing plans; we do feel strongly that they could give guidance to local officers in this regard. Despite the fact that we are favorably impressed by many field personnel at junior levels, they are quite noticeably lacking in experience and may have limited chance for guidance from higher-ranking district and provincial officers.

Closer contacts between local officers and planning personnel would be mutually beneficial. The local officers could profit from the greater experience of the planning teams; the planners could become better acquainted with the difficulties that arise from implementing their plans. This is especially important in view of the fact that AID personnel are working under conditions with which they are unfamiliar, and this device would be a means of their becoming better acquainted with local conditions. Better planning would ensue. Some Kenyan range officers share this view.

Lack of Policy Guidelines. Many of the difficulties that have arisen in the operation of the project, especially in relation to the

planning teams, have their roots in the absence of clear policy guidelines. Inevitably when individuals with different training and background and representing different arms of government are thrown together there will be differences of opinion as to priorities and procedural methods. There is no unique solution to the problems and conditions presented by a particular grazing block or ranch. The number, type and distribution of water developments and the size and configuration of grazing units are matters of individual judgment. It is unlikely that any two individuals will come to the same decision respecting the best among alternative solutions.

The relationship between the water planning and the range management functions are not articulated at present, and friction sometimes develops between the range and water planners. As it now stands it is not clear what the priorities are, whether to develop the best possible plan from the range management standpoint, whether economy of water development should take precedence, or what consideration be given to improving water for human consumption. The problem is exacerbated when team members represent separate agencies in GOK with differing objectives and operational procedures. We think this is an unwieldy arrangement that poses a threat to success of the ranch and range planning effort and that some means should be sought to improve the organization and operation of the planning units.

There is a clear need for developing some guidelines under which the planning teams operate. Otherwise each instance wherein differences arise must be dealt with on an ad hoc basis. These guidelines would deal with such things as: preferred types of water development, consideration to be given to improving quality of water for human consumption, weight to attach to costs of development and costs of operation,

whether and under what conditions the requirements of good range management might be modified in the interest of economy in water development, and team leadership. By this is meant that as it now stands the planning team members are co-equals. Even among equals one must, for good administration, be more equal than the others; one member of the team should nominally be in charge so that there is a basis for decision making after various alternatives have been considered and discussed. In the past, insofar as we could determine, there has been no statements of policy to provide guidance in these matters. Although this fact has been recognized, there seems to have been no firm articulation of this policy so that all understood it.

Not all the misunderstandings are between planning and team members; they can arise as well between planning team members and government officers. Clearly defined policies are as much needed to smooth the working relations there as within planning teams.

The position of USAID personnel visa vis AID and GOK needs review and clarification. Although there are arguments to be made for integrating AID personnel into the governmental infrastructure, certain problems are raised by this procedure. Policies governing the deployment and utilization of AID personnel should be clearly articulated and agreed upon. A balance should be struck between attachment to GOK and supervision by AID. AID should not be in the business of supplying bodies without maintaining some supervisory and regulatory controls. If expatriate personnel are to be completely under GOK control, their services should be negotiated directly by GOK.

#### Documentation of Accomplishments and Results

One of the more glaring shortfalls in the project performance has to do with the failure to document accomplishments and develop

data from which planning and implementation could be improved. There was no place where project accomplishments could be determined. We were confronted with fragmentary and often conflicting data from a great many sources. In order for us to get data it was necessary to devise forms which were widely distributed to Ministry offices and team members to obtain the data from which the accomplishments are presented. The Rift Valley Planning team was the exception. They had developed a reporting form that provided an accurate record of the progress being made.

We have discussed this problem elsewhere in connection with the Coordination Unit whose responsibility it is, in our opinion, to develop adequate monitoring and reporting procedures. In the event that this is not forthcoming there is clearly a need for AID to develop a reporting and documentation system of its own. Whatever course this takes, there are two areas in which formalized and regular documentation should take place - precipitation and vegetation - for these are fundamental to the development program.

Although a considerable effort was spent in analyzing precipitation data, the stations of record available to us were too few to predict the dependability of adequate water and forage supplies. Nor were we able to find that data relative to these were being accumulated on the Pilot area. In the absence of rainfall records it is possible to fill the gap from pan-filling histories. By maintaining records showing the degree to which each catchment is filled during each wet season and the period during which water remains available, it will be possible to draw some inference as to a minimum block size that can be expected to provide adequate short-season water upon which grazing plans are dependent.

Another area of deficiency relates to lack of records on vegetation. At a minimum, species lists of the principal plants in each major plant community should be part of every management plan. We could find no evidence that records are being made of changes in vegetation following development and implementation of plans. In view of the fact there are no well developed guides to range condition and trend for Kenya, we think it imperative that information be compiled from which they can be developed. Reference points should be established and plant inventories taken in each grazing unit in sufficient detail that reasonably good records of vegetational changes can be compiled. By these means a body of knowledge will be accumulated which will be useful in developing range condition guides which can be extrapolated to other similar areas. Because of their experience, range planners could be of invaluable assistance to range officers in performing this task.

An equally serious handicap to the supervision of grazing lands is the lack of knowledge of the numbers of animals present. We see no reason why it is not possible to develop reasonably good estimates of animal numbers and kinds. During the dry season, especially, counting herds, observing numbers and noting brand markings of all herds encountered could lead to estimates of animal populations sufficiently accurate on which plans could be based and compliance ascertained. That it need be done surreptitiously makes it no less practicable.

#### Intensity of Water Development

Water development in the Pilot Project in our estimation was too intense, a viewpoint in which others concur. There were 23 pans developed in Block 1, West Mado Gashi unit, which with the two existing pans totaled 25. An area of 154,000 ha, this amounts to one water source for every 16,00 ha. The mean distance between water holes within

individual pastures is 7.8 km (4.85 mi) and only slightly more among pastures. These are reasonable distances for achieving proper use, and had large areas been developed simultaneously, things would probably have worked out well. Circumstances were such, however, that the intense development led to overuse of the range and premature exhaustion of water supplies.

Precipitation was exceptionally high in 1968 and the entire period from 1957-1969 was one of unusually favorable rainfall. Animal numbers may have increased in these years because of favorable conditions. The year, 1973, was a particularly adverse year; at Buma, El Wak, Habaswein and Mado Gashi it was the next to the poorest year on record. The result of these factors was a heavy influx of livestock into the Pilot Project, no data could be obtained to a certain how great this influx was, which resulted in general breakdown of the planned grazing schedules and extremely heavy use.

In retrospect, it was evidently a mistake to develop limited areas so intensively. To continue to develop limited areas in this fashion undoubtedly will lead to a repetition of what took place in the Pilot area - over concentrations of livestock and range deterioration which ultimately will extend over the entire area that is developed. The need is to reduce livestock movements and to keep each pastoral group within its traditional grazing land insofar as possible. Initially, more widely spaced facilities distributed over entire districts or several districts might achieve this result. Track construction would be minimal, and preliminary grazing procedures implemented with this first stage. Later, the intensity of development could be increased at which time more sophisticated grazing management plans would be developed and implemented based on accepted range management principles and techniques.

Such a course would likely not be popular with those charged with water development, since it would lead to inefficiency in use of equipment. Travel time would be increased and repair and maintenance would be made more difficult. These increased costs and inconveniences would be minor, however, as compared to the costs imposed by range deterioration which is likely to result under present schedules and plans.

Other benefits might accrue under this course. Subsequent developments could better be made based on experience of pan filling and water retaining experience gained in the first stage. Size and location of additional units could be tailored to best complement those installed in earlier stages of development.

#### Coordination Unit

Because of the number and complexities of the interfaces between agencies participating in the Kenyan Livestock Development Program, a Coordination Unit was formed to coordinate the separate programs. It is headed by a director and an assistant director. There is also a Coordinating Committee composed of representatives from participating agencies. Other staff members are under consideration, a loan officer and statistical clerk among them. It is anticipated also that frequent inspections of project activities will be made if vehicles and operational funds are made available.

To date no fully developed list of functions and plan of procedures have been formulated. Although the unit, by virtue of the agreement with IBRD, has considerable authority to direct actions of individual members it has not at this point moved to assume the authority granted it. There is some uncertainty as to just what the role of the CU should

be and what role participant members will accord to it. Its major contribution to date is to provide a means of keeping participant agencies informed of progress made and problems encountered through periodic meetings of the Committee. At present, attention is being given to what records should be maintained and what procedures for reporting accomplishments of program participants can be implemented. There appears to be some apprehension, however, that even a unified reporting system can be made acceptable, and that participating departments will cooperate to the extent of supplying the information needed.

There are reasons to question whether the Coordination unit can be fully effective as it is now constituted and as its duties are now perceived. We are apprehensive that the Coordination Unit is not functioning and cannot function effectively. As an example, the failure to keep boreholes operative in the Pilot Project Area (none was operative on 10 April 1975) makes impossible adherence to a grazing plan. Dead cattle were observed during a tour of part of the area and it appeared to be only a matter of time, unless rains came, until the few remaining temporary water sources would fail. Emergency measures would under such circumstance be required to prevent animal losses. These measures would be crash programs to get boreholes in operation coupled with a stepped-up purchase program. We know of no plans for these and other emergency measures, and it is difficult to see how such emergencies could be met through the present coordinating system.

#### Divided Responsibility for Range Development Between Ministries

The present situation wherein the responsibility for planning and implementing ranch and range developments between two GOK ministries (the Ministry of Agriculture and the Ministry of Water Development) seems particularly unfortunate, since in the planning and implementation

process, development of water and obtaining proper range management are so intertwined that they can only go forward together. So long as these two functions are located in separate ministries, problems of coordination will remain and disagreements will inevitably occur. The planning process is delayed; the whole planning effort is aborted when boreholes fail to function, the precise situation we found. This problem while important in the planning process is even more critical with respect to carrying out range management schemes. Inestimable range damage can result when animals are forced to a few water sources in greater numbers than the range can support. Some plan which will bring the water and range management functions together administratively is much needed.

Although both the Range management and the Range Water Division have met with difficulties in meeting their commitments, the latter agency can particularly be singled out. A major problem has been cumbersome procurement procedures it must follow which have delayed obtaining equipment and spare parts. In addition, as compared to other functions of the Ministry of Water Development the ranch and range water program is a minor one. Inevitably, NRRD needs become lost among the larger, traditional programs. It seems unlikely that the NRRD program can fully succeed with responsibilities for the development program divided as they now are within GOK.

#### Inadequate Logistical Support

One of the more acute problem areas that emerged was that of inadequate logistical support which was caused by lack of adequate financing. Both the agencies within Water Ministry and the Range Management Division found it difficult to meet their obligations to the Project with the funds made available to them. Although donor

funds were not immediately available, they are now said to be adequate. The procedures wherein Kenyan funds are allocated to government agencies and reimbursement claimed from donors after expenditures have been made causes difficulties and hampers operations. Funds allocated to the agencies have not been adequate and rules of procurement are such that inadequate service of the project resulted. Consequently, vehicular and logistical support feel short of needs, travel was restricted and progress of the work suffered. These problems were found in the case of all planning teams, but they were especially acute in the N. E. where distances were greater, the project more advanced and the need for equipment and supplies much greater.

Another impediment was found in governmental regulations covering vehicle assignment. Vehicles are made available under government-wide tables of equipment allocation guidelines. Petrol allotments are similarly made. These are not realistic as regards the needs of the NRRD activities. It seems there is no recognition that the needs of the range project for vehicles is extraordinarily great as compared to other departments, due to the far flung nature of the operation and the travel required for supervision.

In consequence of these restrictions both planning and implementation have suffered. The problem is particularly acute at the field level where junior range officers are inadequately provided with means of transportation to carry out the required supervision. The severity of these problems will intensify as more areas are brought under development, and unless these problems are resolved it is difficult to see how the project can proceed smoothly and successfully.

### Poor Maintenance

Maintenance of construction equipment, borehole equipment and pans has been entirely inadequate. In consequence, construction and development is delayed, boreholes are idled, and pans are undergoing loss in capacity and effectiveness through siltation. At the time the Evaluation Team visited the N. E., only three of the eleven boreholes completed and equipped under the NRRD Project in Phase I were operative; no boreholes have been made operative under Phase II. At the construction camp near Buna only two pieces of heavy equipment were in operation.

These conditions should be improved upon completion of the maintenance and repair shop under construction at Wajir. It appears, however, that even then there may be a need for recruiting an experienced construction foreman who is well acquainted with the operation and first echelon maintenance of heavy equipment. So far as we could determine this expertise is lacking at present.

There is evidence that there is need for more experienced personnel with respect to drilling, developing and equipping boreholes. Reportedly, the expertise exists within Kenya for this phase of development, but performance to date does not bear this out. Although several cases of borehole failure were reported to be from faulty installation, it is possible that the cause of many failures are not from shortcomings in installation but in faulty operation and maintenance. Wherever the problem lies, unless better maintenance is forthcoming, boreholes should be sparingly attempted.

There is need for careful consideration of priorities with respect to types of water development. There are advantages and disadvantages of each type. Boreholes, where they can be developed and kept in operation, provide certain water supplies at any season which

facilitates developing and implementing grazing systems, the quality of water for human consumption is improved, they constitute a source of water during droughts, and they provide control so that pastoralists can be forced to leave an area when a grazing system demands it. Disadvantages are their greater costs, initial and operational; they are subject to equipment failures; and, if not equipped and pumped properly, to deterioration.

Pan-stored water structures can be more widely developed, and costs are less than for boreholes permitting the development of a greater number of water points. On the other hand, they cannot be depended upon in times of drought, water supplies may be inadequate for grazing in the dry season thus limiting the management alternatives, the quality of water for both livestock and humans is poor especially toward the end of the dry season, and they cannot be developed everywhere due to unfavorable topography or soils.

Because of these advantages and disadvantages, wherever possible, a careful balancing of boreholes and pan development should be sought with enough boreholes so that pastoralists would not be forced to migrate to other areas in times of any but the most severe drought.

Whether with respect to boreholes or surface water development, unless equipment operation and maintenance problems are resolved there is real danger that the whole range development program in the N. E. will be jeopardized. Development will take place at such a slow pace that the experience of the Pilot Project will be repeated leading to deterioration of the range bit by bit. Resolution of the maintenance problem is a first priority goal. Alternative strategies for development should be considered. These are dealt with in detail elsewhere.

### Native Acceptance

We are unable to assess the wholeheartedness with which range management practices and water discipline are being accepted by pastoral people. Our contacts were too brief and means of communication too inadequate for definitive assessments. Certain impressions were formed, based upon information obtained through Kenyan interpreters and evidence found on the ground.

There is some basis for optimism that progress is being made, although it is still too early to draw firm conclusions. We found no convincing evidence in the vegetation itself that demonstrated adherence to a scheme of nonuse for range protection. The fact that precipitation in 1973 and 1974 was below normal may, however, have contributed to a breakdown in grazing discipline. Wholesale migrations into the Pilot area, and failure to keep many of the boreholes operational prevented following planned grazing schedules. Although this might have been expected to provide some protection from grazing, in very few instances did the lack of water prevent use. By travelling longer distances from adjacent pans, almost the entire area came under use.

The evidence is not yet convincing that nominally strict adherence to set grazing schedules can be maintained in the N. E. Rainfall may not be sufficiently adequate or reliable to ensure adequate water within the grazing blocks outlined. Based upon rough analysis of existing records, no pan can be certain of receiving rain of sufficient amount to fill it more than one year of two. Because of unfavorable soil and drainage, many will not be this reliable. Probably, grazing plans must be considered as goals to strive for rather than to be attained.

We have reservation about the rapidity with which pastoralists in the N. E. will accept the concepts and tools of the management schemes

developed for them. There is more than a little likelihood that expressions of good faith may be designed to obtain the conveniences that water developments bring, and upon which they are sold, as suggested by Chambers.<sup>6</sup> This still must be considered a possibility. This attitude, if it exists, could be countered by devising schemes for involving pastoralists in the venture, perhaps by contributing to the development or maintenance of the project.

There is somewhat less upon which to judge the performance of the Masai, since the program involving them is less far along. There was some skepticism found as to how fully group ranch members understood the implication of borrowing funds. They have agreed readily to the schemes, since by doing so they are made secure in occupancy of the land. Certainly, nothing in the immediate vicinity of bomas and permanent water sources gives reason for optimism. In many areas in the Magadi area vegetal cover was reduced to the overstory of trees; the ground surface was entirely bare. It seems doubtful that even annual plants could survive in the most maltreated areas we saw. Contrasted to this we saw some areas with a reasonably good cover of perennial grasses at far distances from water. One can only be apprehensive as to the fate of such areas when water becomes readily and permanently available there. Wherever possible, at boreholes or with tank storage, provision should be made for strict water control to compel adherence to planned grazing schedules.

#### Insufficient Technically Trained Personnel

Technical Training. There are three sources of trained manpower available to the Ministry of Agriculture in the effort to accomplish

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<sup>6</sup> Chambers, R. H. J. (1969): Report on Social and Administrative Aspects of Range Management Development in the Northeastern Province of Kenya. Mimeo.

institutionalization of the Range Management and Ranch Development Project. These include Animal Health and Industry Training Institute, (AHITI) Egerton College, and the USAID participant program. All have contributed to a level of competence found among Kenyan officers that is far above most African countries, but the system is not complete enough nor well enough coordinated to serve as a permanent system considering the extensive development under way in Kenya. The numbers of trained personnel available are too small now and will be far too small for the needs that will develop. Shortages occur because of the limited numbers of people trained, and because of the high rate of attrition to other jobs. A major factor in this loss lies in the fact that advancement up the ladder within GOK is not possible for those persons without BS degrees.

AHITI, located at Kabete, Kenya, provides para-professionals who have two years training, principally animal subjects. Many are employed in the Range Management Division as Range Assistants. Normally, there are two RA's assigned to each grazing block under the supervision of a Range Officer.

Most range officers employed at the District or Block level are trained at Egerton College at Njoro, Kenya, near Nakuru, a three-year diploma-granting school that has performed well. The program in range management at Egerton can be pointed to as one of the most significantly successful training ventures in Africa. Its success has been due to the fact that high quality standards were enforced from the beginning. Although not originally intended as a university feeding program, Egerton diplomats have proven that they can enter U. S. universities

and move on to become graduates. In addition, they have performed well in the field.

Nominees for training at AHITI and Egerton College are selected on the basis of examinations in English and the basic sciences. After undergoing interviews, approximately twenty of the top applicants selected for study at Egerton College for three years. The Ministry of Agriculture provides scholarship support for those selected to study range management. A limited number of those not placing at Egerton are admitted to AHITI for a two-year course. The numbers of students in Range Management entering Egerton in recent years are shown in Table 4.

Table 4. Numbers of Range Management Students  
Entering Egerton College and the Country of  
Origin, 1972 - 1974

	1972	1973	1974	1975*
<u>Country of Origin</u>				
Kenya	14	15	21	28
Tanzania	5	4	7	0
Malawi	2	0	0	0
Uganda	0	2	0	0
TOTAL	21	21	28	28

\*Estimated

Nontechnical Training. Extension-type educational services are offered to pastoralists through several channels, the more formal of which is the Giriftu Range Training Center in the N.E. Province. This center was established on an area of four thousand hectares about fifty kilometers northwest of Wajir.

Participants are village and tribal chiefs, county councilers, religious leaders, and government workers. In addition, ministry employees from various districts conduct practical training meetings, range tours, and discussion groups for pastoralists. The ministries cooperate with agricultural groups and churches in sponsoring training courses.

Participant Training. There is no degree-granting program in East Africa that can produce the number of graduates needed for the range management program. In order to get professional people to staff the range management projects, students must be sent overseas or recruits must be made from allied fields of training that are available in-country and given range management training on the job. Neither approach is fully satisfactory.

The most advanced training is provided through the USAID participant-training program in the United States in which bachelors or masters degrees usually are earned by recipients. During previous periods other international agencies provided assistance in training at this level, but these programs have been discontinued. Thus, AID provides the only substantial means for training at the B.S. and higher degree levels. USAID participant training recipients are selected from among Egerton "diplomates" after a period of years of commendable work as ministry employees.

The USAID participant training program has been a key factor in the development of the top level technicians and administrators needed

in the Range Management Division and a number of former trainees are working in leadership positions. (See Table 1.)

Training Needs. Although the basic framework exists for supplying the trained manpower required as range development and management progress, there are some evident shortcomings. These are:

1. Shortages in the areas of hydrology and soil and water conservation.
2. Inadequate training programs within Kenya in range management.
3. Poor representation of tribal and cultural components among various Kenyan pastoralists.
4. Inadequate attention to administrative and extension training.

The training programs in the field of water development are much less adequate than are those in range management and related fields. There is one participant trainee in water and soil engineering at the present time; there was only one trainee during the period 1956 through 1974. It has often not been possible to find suitable candidates and get them accepted into universities in the United States. This situation is possibly related to the lack of training in Kenya directed to soil and water conservation engineering. In consequence of this, trained counterpart personnel for the engineering member of planning teams are sometimes not available. Only three participant trainees are currently employed in the Ministry of Water Development (MWD); there is one in the Ministry of Finance and Planning.

Although a training program exists within the MWD, it is primarily directed to skills other than those required to service and implement range water systems. Specialties given consideration are: surveying, drafting, water quality, hydrology, sewage and drilling.

A particular shortage in skills has to do with equipment operation and maintenance and construction supervision. Supervisors do not themselves know how to operate equipment and those persons able to operate equipment well are not well enough educated in English and mathematics, particularly, to handle the training courses provided. Table 5 shows the specialities being pursued by current groups of MWD trainees.

Table 5. Number and Specialities of Trainees  
Currently Enrolled in the MWD Training Program

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Kenya Polytechnic - various specialties*	23
Water Supply (operation)*	17
Water Supply (construction)	22
Ground Water Geology <sup>+</sup>	5
Hydrology <sup>+</sup>	12
Water Facilities <sup>+</sup>	11
Drafting (Mombasa Polytechnic)	6

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\*Three in each of these groups are following specialties directed to range development.

+Participating in the so-called Sandwich Course which is training twice a week while receiving on the job training. The normal sandwich course is for six months.

Degree Training. Although the training programs at AHITI and Egerton provide a source of trained junior range management officers, the numbers being turned out may not be sufficient to provide for the

the expanded needs as the range and ranch program proceeds. For each grazing block that is brought under improved management, present staffing would require three officers, one from Egerton and two from AHITI. There are additional needs for district and assistant district officers. When the needs for ranch and range managers for the company and group ranches which are being developed are taken into account, the numbers now being trained for these positions will likely be greatly inadequate.

A major shortcoming in the education and training program has to do with the position of AHITI and Egerton graduates in the government hierarchy. Not holding B.S. degrees, they are not eligible for higher positions and cannot, therefore, aspire to better and more responsible jobs than they now hold, whatever their abilities. Two courses are available to open the way for advancement of capable junior officers and provide the more highly trained skills required by the jobs at district and provincial levels. One is an expanded participant training program at overseas universities. The other is to develop a B.S. degree program in range management within Kenya at the University of Nairobi. The latter course seems more desirable. It offers more promise of providing the numbers of graduates needed, variously estimated to be 12 to 20 a year by Kenyan officials. Moreover, a program developed in Kenya could be more directly tailored to in-country conditions and needs. It is not intended that the out-of-country training would cease, but that it be directed to providing training at the M.S. level and to fill particular and special needs not provided by the program at the University.

There are two range programs now being considered at the University of Nairobi. One is a program designed to take graduates from other fields (primarily botany, zoology, and agriculture) and give them a

"taught M.Sc." program containing approximately 400 contact hours of range management. The leadership for this program is centered in the Plant Science Department and is under the leadership of Dr. Robinson (a New Zealand forester being paid by the Australian Government). The program favored by the Dean of Agriculture is a proposed B.Sc. program that would produce about 12 graduates per year. The leadership of this program is vested in a faculty committee headed by Dr. P. M. Ahn of the Soil Science Department.

Some course descriptions for both programs have been developed. Syllabi are being prepared, but neither has been approved.

Some consideration was given to expanding the program at Egerton College in the event that a program failed to develop at the University. This is a possibility, but we think a distinctly second choice alternative. It is doubtful that the supporting programs needed for standard level B.S. degree work could be accomplished at Egerton.

Whatever programs are developed there would appear to be a need for closer coordination of programs at AHITI, Egerton, and the University, so that it would be feasible for a person to proceed through one program into another without unnecessary duplication of work and lost time. In this way the more able students would be able to advance to higher positions and responsibilities.

Cultural Representations. There appears to be inadequate attention and consideration to the need for ensuring that the various cultural and tribal groups found among pastoralists in Kenya are represented within the range management training programs. Unquestionably, the gaps among these different subcultural groups are sufficient to cause problems in credibility between range officers and pastoralists. A concerted effort

to enroll trainees representing each cultural group where range developments are being made or are anticipated, so that communication between officers and pastoralists is fostered and suspicions minimized would facilitate the adoption of good range practices and improve the chances for success of the NRRD Project.

Public Administration and Extension. There appears to be a need for giving greater emphasis in the participant training programs to public administration. Persons completing courses in the United States, and especially those that receive advanced degrees, are likely to fill top administrative jobs in the GOK. Often they have had minimal training in public administration and the newness of range management programs in Kenya has not provided the training that comes from experience that these jobs require. More emphasis could well be placed on training for administrative responsibilities for those receiving training in the United States. Programs in which university training was combined with on-the-job training with land management agencies might well be considered. It is not suggested that the B.S. and M.S. degrees in range sciences and related fields be eliminated, for there will still be need for this sort of training to fill educational and research posts. All these needs should be recognized if the needs of Kenya are to be met.

Another area of emphasis not heretofore receiving sufficient attention is that of extension. Principles of good range management must be conveyed to pastoralists by persuasion. Thus, range officers at all levels, and particularly at junior levels, are essentially engaged in extension activities. In order to upgrade skills in this area some participants should be selected for training in educational and extension techniques to assist the USAID supplied training officers and to continue

At present, LMD operates a complement of holding grounds near Isiolo of 500,000 acres and another in three coastal areas of 250,000 acres. Recently two ranches comprising 120,000 acres in Laikipia near the Isiolo holding area have been purchased. There are also numerous holding ground outposts throughout the North East Province. Water facilities are less than adequate at these holding areas during normal years and critically deficient during drought. Upgrading of these areas is necessary to prevent use of and damage to developed grazing blocks.

The LMD is establishing eight new improved buying centers in the Province. These are to be provided with adequate water supplies and weighing stations. Probable numbers and locations will be two in Garissa District, four in Wajir District and two in Mandera District.

Attempts to obtain an adjudication of water from the Ewaso Ng'iro River for the irrigation of 2,000 acres in the Isiolo holding grounds has not received favorable consideration and it will not likely be possible until such time as control of the river flow is provided through reservoir storage. Two sites for dams and reservoirs have been surveyed. These are the Archers Post Site with 90,000 acre feet of storage capacity and the Bensalinga Site with 51,000 acre feet of storage capacity.

The buying program is currently hampered because purchases can only be made when water is available along the stock routes. Water is available during the wet seasons and for some weeks into the dry season, but they fail during drought periods. In order to circumvent these difficulties, LMD has in operation three double trailer cattle transport units, has five more on order, and plans the purchase of ten single units. These 18 units will provide a capacity to transport an estimated 50,000 head per year.

Since July, 1974, a total of 53,000 head of livestock have been purchased, most of them immature steers. Purchases during 1975 total 32,600 of which about 23,000 were from the North Eastern Province, and purchases of 15,000 to 20,000 head are planned for May. Purchases of 75,000 are projected for next year. Thereafter they will gradually be increased to 125,000 per year after five years. Purchases and sales by LMD for a nine year period are shown in Table 6.

Table 6. Purchases and sales of cattle by LMD in Kenya, 1956 - 1974

YEAR	Number Purchased	Ave. Price (Shillings)	Number Sold	Ave. Price (Shillings)
1956-66	31,989	204	24,905	245
66-67	27,703	240	29,006	256
67-68	26,790	266	29,123	280
68-69	35,789	274	15,383	307
69-70	25,307	227	31,558	284
70-71	52,068	218	28,861	245
71-72	45,432	253	50,115	279
72-73	53,972	356	57,260	335
73-74	23,043	397	13,905	452

Agricultural Finance Corporation (AFC). AFC is the agency through which funds are channeled to group, commercial, and cooperative or company ranches. Funds are made available for ranch development, ranch equipment, or purchase of livestock.

AID participates directly in AFC operations by providing technical assistance, a credit specialist and three area supervisors and credit, the use of which is limited to purchase of livestock. AID provides 4.1 million dollars to AFC operations; funds for development purposes are provided by IDA. Indirectly, the success of the ranch development program engaged in by AID depends upon the manner in which AFC functions. This is the rationale for and the view point from which AFC was examined.

Commercial and company ranch loans in the past have been made upon the information supplied by ranch officials by the District Agricultural Supervisor. The information was generally inadequate for definitive assessments of viability of the ranch enterprise and, hence, soundness of the loan. Nor were there sufficient details of the purposes of the loans to permit supervision of loan accounts. These short comings are being overcome through new forms and procedures which provide sufficient details for projecting ranch income and judging the financial soundness of the ranch enterprise. The data are subjected to careful accounting analysis before loans are recommended for approval and sent to the Project Coordination Unit (PCU) for approval by the Coordinating Committee.

Changes have been made in procedures during the early stages of loan processing. Application forms are completed by AFC personnel together with ranch representatives which ensures more complete and accurate information. Moreover, this procedure provides an opportunity for making the loan applicant fully aware of the conditions and terms of the loan and the obligations he is incurring. These procedures appear to be adequate for accounting and loan supervision purposes.

In the Phase I operations, no provisions were made in these procedures for inputs from qualified range technicians. Proposed stocking rates are set by the owner or manager. Keeping livestock members to productivity of the range is attempted to some extent by the device of having a base herd judged to be within the capacity of the ranch to produce in unfavorable years and add purchased steers in favorable years. Although this device provides the project a degree of flexibility, range analyses and range production data are needed to ensure more realistic projections of ranch capacity from which more accurate economic analyses can be made. This is provided for in Phase II wherein ranch plans are made by ranch planning teams based upon forage production capabilities, and grazing schemes made part of the ranch plan. Phase II has not been in operation long enough to demonstrate whether proper stocking capacities and good grazing practices will be required by AFC. The progress made in executing ranch loans under Phase II is not great as can be seen (Table 7).

Table 7. Ranch loan projection by AFC and accomplishments to end of calendar year, 1974

Type of Ranch	Projected Loans, FY			Actual Loans
	TOTAL IN 1973	1974	1975	
Group	60	20	20	0
Company & Cooperatives*	22	7	7	7
Commercial	100	40	30	8
Feedlots	3	1	1	0

\*Totals and incremental data from different sources.

Loans for company and cooperative ranches amounted to seven million, and loans to commercial ranches were more than six million for a total of Shs. 13,741,600. The group ranch loan program has not been particularly successful. Funds were not immediately available, and demand for them has not equaled projections. In addition, the development of ranch plans has been slow. Some group ranches, for example, are large; one contains 300 or more members and getting quorums present to review and accept ranch plans and loan terms is a formidable undertaking. Planning teams have not been staffed, equipped and given the support needed to proceed as planned. As for the commercial ranches, the amount of funds allocated was too small to satisfy the needs. Perhaps, the success of the loan program cannot be measured from the standpoint of the lending function but must be justified from the standpoint of impact on the range and social welfare.

Department of Veterinary Services (DVS). The importance of the DVS to the success of the NRRD Project is great though it is somewhat indirect. Its impacts are felt through the constraints that animal disease control measures impose on livestock marketing procedures. Most of the range and ranch development in which AID participates takes place in areas where livestock diseases are present. In order for animals from these areas to reach markets and enter the disease-free zone as stockers or feeders they must be determined free from disease. This necessitates the establishment by LMD of quarantine areas (holding grounds) near to the disease-free zone where vaccination and screening programs can be carried out by DVS. The prescribed vaccination and testing programs require a minimum of three months.

In the past the Department has been hampered by inadequate support for its mobile testing and vaccination units. Only two such units exist; one of these was acquired only recently. Three are judged necessary for adequate conduct of the DVS Mission. Providing adequate housing for mobile unit personnel remains a problem.

We found no indication that the animal disease programs have imposed obstacles to effective operation of the livestock program other than the delay imposed by the need for a quarantine period during the disease-screening process. Should the numbers of animals being produced and marketed increase as a result of NRRD efforts, the present level of operations may be inadequate to meet needs.

Wildlife. To the present, wildlife programs appear to have had little effect on the NRRD Project. In large part, this is due to the fact that progress with the Phase II development has not been great. As the project proceeds and additional lands are, "settled," land use becomes more intense, and possibly, populations increase, concern for the presence of wildlife on pastoralists' grazing lands will intensify. Although wildlife is potentially an issue on all lands now under development under the NRRD Project, at the present time, there are three areas where it is emerging as an issue - the area adjacent to Amboseli National Park, that adjoining Nairobi Park, the Kitengela in Kajiado District, and the area adjoining the Masai Mara Game Reserve in the Narok District.

At present, two different agencies of government and a quasi-governmental body are involved, the Game Department in the Ministry of Tourism and Wildlife, the County Councils who administer game reserves and the National Parks which are administered by the National Parks Trustees. A move to consolidate all matters relating to wildlife

administration in a single agency, the Wildlife Conservation Service, which was to administer game law and National Parks, was considered by the Assembly in 1975 but it failed adoption.

Three sources of friction between pastoralists are present: threat of disease transmission from wildlife to domestic livestock, competition for forage and threats to livestock and human life from dangerous wild animals. A special problem involves the recently designated Amboseli National Park. This arises from the need to discontinue livestock use within the park and the consequent need to pump water from sources in the park to group ranches outside the park, water being the principal reason for livestock entering Amboseli. Compensation is required under law when human use is terminated as National Parks are established. The Masai Mara Reserve is administered by a county council.

In general the solution of these problems would appear to be in the direction of providing incentives by way of compensation to pastoralists from fees generated by wildlife, either for viewing or hunting. These sums can be substantial as indicated by the amounts returned to county councils in three districts in 1969 from fees collected at National Parks:

<u>District</u>	<u>Amount Returned, SHS.</u>
Kajiado	189,405
Narok	161,050
Samburu	123,985

The total of such fees in 1969 in Kenya was 729,395 Shs. Trump.<sup>7</sup> Another source of compensation is fees for hunting licenses which in the case of one company ranch, the Lualeini, amounted to 100,000 Sh. a year. Equitable distribution to pastoralists of the proceeds from these sources would go far toward reducing antagonism to the presence of wildlife on ranch grazing lands.

A more difficult problem is presented by the wildbeests in Masailand where group ranches are being developed in Kajiado and Narok Districts. The numbers of wildbeests are so great and the preference shown toward them by hunters so low that normal hunting cannot be expected to maintain a proper level of harvest. Despite its unpopularity, game cropping by government or by licensed private concerns may be required to manage this species.

The intricacies of the problems wildlife present are such that experts trained and experienced in wildlife management techniques are needed for effective resolution of these problems.

Ministry of Lands and Settlement. A potential source of delay in the planning program is with the organization of the Masai into groups, allotment of lands among the groups and surveying the land areas allotted. These all must be completed before planning can proceed.

No shortage of adjudicated areas was evident, although in the Narok district some of the groups tentatively identified were judged too large and plans were being made for dividing these into smaller group ranches. Some ranches were awaiting surveys. There are group

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<sup>7</sup> Trump, E. C., 1970. Rangeland Surveys of Kenya, Vegetation and land use survey of Samburu District, UNFAO Teck, Report 5, AGP: SF/Ken 11.

ranches awaiting the planners both in Kajiado and Samburu districts, although there are few in the latter district.

One planning team has been slowed due to lag in setting up ranches in Coast Province. This is reported to no longer be an obstacle, although water problems may slow development in that area.

We could find no impediments to the progress of the NRRD effort in the related program that were examined that could not be resolved with effective coordination and adequate financial support.

## RECOMMENDATIONS AND ALTERNATIVES

In the "Findings and Analysis" section we identified and discussed some problem areas and areas needing strengthening if the NRRD Project is to be successful. The recommendations present the Evaluation Team's views of the corrective measures that are needed and some alternative means by which solutions to the problems encountered may be achieved. Some of these may go or seem to go to other donors and participants in the Kenya Livestock Loan, rather than strictly to the NRRD Project. Under the premise that whatever affects the success and jeopardizes attainment of its goals is of concern to USAID, we have felt this to be a proper part of the evaluation process. Because of the close integration of GOK and USAID efforts, we have felt it proper to suggest alternatives and solutions to problems affecting mutual interests even though the major responsibilities for taking corrective action lies with GOK. We do not presume to direct in these matters, but wish to identify them so that participants may work toward their solution through normal processes and channels.

### Documenting Results and Accomplishments

The importance of adequate record keeping will be discussed in connection with recommendations for the Coordination Unit. There is an even more basic need for monitoring the impacts of the entire livestock development program. The Canadian monitoring program, once it is in operation, will be able to supply much useful information; however, the information developed through satellite imagery is not fully useful in the absence of base data which must be developed on the ground. Moreover, it may be sometime before this program becomes operational and there are many areas in which satellite imagery and aerial surveys cannot provide

useful data. For these reasons we recommend increased emphasis be placed on accumulating base data against which progress can be assessed and establishing a system for continuous monitoring of impacts of the Project.

We see a need for an indepth analysis of the results achieved thus far, both on the Pilot Project and ranches developed under Phase I by an interdisciplinary team. Attention would be given to range condition and productivity, adequacy and maintenance of water sources, financial records, and management expertise.

Specific needs with respect to USAID programs with respect to range conditions and sociological impacts are dealt with later.

#### Grazing Systems

We support attempts to design projects that will allow for periodic rest or deferment from grazing and we believe that the basic concept of a rotation grazing system which provides for periodic relief from grazing is sound. We are concerned, however, that grazing systems are advanced in the absence of research data which show their effectiveness in tropical environments or their applicability within the sociological and political realities of pastoral people. We believe there are several ways in which plans developed in the future would be made more effective.

The schemes should be as simple as possible in the outset and closely related to customary tribal livestock grazing patterns. Provision must be made for alternative schedules when lack of precipitation makes pre-designed schedules impossible to follow.

A systematic program of collecting data on which better and more sophisticated plans could be based should be instituted. Range planners together with provincial and district officers should develop reporting forms for completion by local range officers on a systematic basis for

each grazing block and pasture. Periodic summary reports compiled from these records and submitted to district and provincial range officers, would in time provide the data necessary for effective planning. Items to be included are rainfall amounts and distribution, forage production, forage utilization, records on pan filling, length of water availability, and estimates of livestock numbers coming to water. One of the major deficiencies at present is uncertainty as to number and kind of livestock present. By attention to brands of animals being watered during the dry seasons, it would be possible to develop usefully accurate estimates.

Research should be stepped up on the effects of rotation grazing systems in the major tropical ecosystems in Kenya.

#### PASA Planning Teams

We believe that the PASA Planning Teams are not being effectively utilized at present. Consequently, their jobs are less challenging and rewarding than they might be and full use is not being made of their skills and expertise. The project suffers and benefits to GOK are diminished. We see a danger that plans will be made beyond the capacity of those responsible for development and maintenance to construct and beyond the abilities of those charged with implementation to supervise. We recommend that a broader role for planning personnel than is at present envisioned be worked out with GOK Officials, one that makes maximum use of their expertise and experience. Kenya has less need for range plans than it has need for persons skilled in drafting and implementing them. Ways in which needs might be met are:

1. Provide for liason and consultation between planning personnel and junior and district officers concerning problems that arise in the implementation of plans. To the maximum degree possible,

- both GOK and PASA personnel should participate in discussions with planners as ranch or range plans are formulated.
2. Recognize the valuable role planning team members can play in training inexperienced Kenyan personnel charged with the implementation of grazing plans, and utilize them in the training role. There is the need for providing continuing dialogue between planners and administrators after the plan is made. This is important to the mutual understanding of the objectives and limitations of range plans that is required in making necessary adjustments to them, but even more important, by thus working closely together the opportunity for training is maximized. This is of particular importance in view of the fact many of Kenyan range officers have limited training and are inexperienced. They should be given maximum exposure to the experience possessed by the members of the planning team.
  3. Wherever suitable facilities exist or can be provided, the planning teams should be located in provincial headquarters so that there is maximum opportunity for close association and frequent contacts with provincial officers. If adequate facilities to meet the needs of the families involved cannot be found, teams should remain in Nairobi. We see nothing to be gained by banishing planning teams from Nairobi if it does not result in their being within the area where they are assigned and in contact with those with whom they are to work.
  4. Develop a formal statement of policy governing range development priorities for the guidance of planning teams. The policy statement should deal with work procedures, relationship between planning team members and Kenyan officers, reconciliation

of differences of opinion with regard to water development and range management plans, consideration to be given to improving the quality of water for human consumption vis-a-vis increased costs required and preference for certain types of water development.

These guidelines should be drafted by the individual agencies involved and the Coordination Unit working together and made the basis for day-to-day operation of the planning teams. This would do much to ensure that all planning teams are operating similarly and moving toward the same goals. More importantly, frictions between team members as well as between planning teams and Kenyans would be reduced and the planning process expedited.

5. Make range planners responsible for developing means of monitoring range conditions and trends with the aid of local range officers and establishing adequate systems for documenting changes in range conditions and production.
6. We think that regularly scheduled meetings should be held with range management and ranch and range water personnel, PASA planning teams, and the project manager to discuss policies, problems, and progress and to devise ways to improve them.
7. Although we find no fault with the technical qualifications of PASA planning team members, we think more careful consideration should be given to their selection. The job requires persons who have shown themselves to be diplomatic and sensitive. AID could well expand their area of recruitment to include the Bureau of Land Management, the Soil Conservation Service and universities. Personnel from SCS and extension divisions of universities are particularly well suited by experience to deal with pastoralists.

Having no land base and, hence no authority over ranchers, they must depend for success upon their ability to sell the individual ranchers on the desirability of improved practices and their effectiveness is determined by the skill with which they are able to do this. The record made by some of the present range planners, despite some obstacles, supports us in our confidence that personnel with the temperament that would enable them to work effectively under Kenyan conditions can be found. Housley recognized the importance of the extension function to the success of planning teams.<sup>8</sup> Unless a larger and more important role can be worked out for the planning teams along the lines of our suggestions, we recommend that the planning effort be phased out and that USAID increase its extension and training efforts.

#### Intensity of Development in N.E.

It appears likely that unless the pace of development in the Northeast is quickened, the results will be progressive deterioration of the range resource. We recommend that development take place in stages of increased degree of intensity in order to reduce livestock migration and stabilize pastoralists within their traditional grazing areas. This course would in addition provide greater opportunities to trail cattle to permanent water sources or to market when drought occurred or the threat of it was imminent.

The details of development might vary considerably, but a two-stage development in which a network of water development spaced at intervals of about 24 km (15 miles) would constitute the first construction stage.

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<sup>8</sup>Housely, R. M., Kenya. PASA Range/Ranch Development Project, U. S. Forest Service Interdepartmental Memo. 19530, 7 May 1975.

These would be large pans or boreholes as conditions permit. At subsequent construction stages additional, more closely spaced developments would be made in sufficient numbers to provide the flexibility needed for the implementation of sophisticated grazing plans. During the first stage management plans should be simple and efforts should be centered on educating and motivating pastoralists and preparing them to accept the more complicated grazing systems to follow.

It might be argued that development in this fashion might lead to greater range deterioration. This is a distinct possibility and every effort must be made to obtain cooperation of pastoralists to prevent it. This will be no easy task and one that might well fail, but the chance of success appears infinitely better than under present plans. We do not believe it is practically possible to develop the N.E. area quickly enough to prevent ecological deterioration if the present plan of intensive development area by area is followed.

#### Divided Responsibility for Planning and Development

We think it a matter of high priority to develop a more unified system of administration and supervision of the planning and development effort. Although the need for this would be diminished should a strong Coordination Unit be established, we doubt that this will be done. We recommend that GOK officers and USAID officials commence a dialogue as to the possibilities of accomplishing this.

There are two ways in which unification of effort might be achieved. One would be for the responsibility of the planning-development effort to be assumed by one ministry for the duration of the project on an ad hoc basis. Planning personnel would be assigned to work within the agency designated. Because of the nature of the job and the fact improved

range conditions is the goal, not water development per se, we think the Range Management Division is the proper agency to direct the program should this course be taken.

The other alternative would be to create a special task force which would be mission oriented to operate semi-independently until such time as the project concluded. A director would be named to direct the work and supervise personnel assigned to the task force from the separate ministries. This would necessitate working out methods of procedures with Range Management and Range and Ranch Water Development Divisions, but once this was done, day to day direction would be the responsibility of the task force Director under the guidelines agreed upon.

#### Coordination

There are persuasive arguments to be made for strengthening the Project Coordination Unit. Unless this is done there is great danger that the programs of individual participants will work at cross purposes. For example, breakdown of the marketing programs, for whatever reason, would be felt in ranch and range areas. Livestock numbers would increase to the detriment of the range and ranches would be unable to meet loan payments. Meeting such situations could be facilitated if the Coordination Unit had sufficient powers to direct courses of action arrived at by the Coordination Committee. Short of this, coordination can be only partially effective.

A minimum useful role for the Coordination Unit would appear to be that of working out a system of reporting and maintaining complete up to date status records of all on-going activities of the program participants. These records would show the projections and accomplishments within separate activities and functions. This can only be accomplished if standard

forms are devised so that reports can readily be aggregated and summarized for the use and benefit of all donors and participants. Were the Coordination Unit charged with the responsibility of maintaining records of progress and accomplishments, it would facilitate the evaluation and review process and reduce the burden upon the individual participants to supply data when evaluations were made.

Report requirements as to form and content need be worked out with the respective participants, so that their needs are met. It is axiomatic that regular, uniform reporting in a manner least likely to be burdensome is the first requirement for the success of any coordinating and monitoring effort.

A system of reporting and record keeping such as we have outlined is a first step, but we believe it is essential that the Coordination Unit be responsible and held accountable for project success. There are two possible approaches which would require some sharing of power by program participants. One approach would be simply to appoint a very senior coordinator who could control coordination by force of his prestige and personality. We doubt that such a strong person is available, nor whether one would be acceptable. Another approach would be to give the Coordination Unit control over project funds, thus giving them the power that control of the purse strings provides. We found no indication that either of these alternatives would be acceptable to individual participants, although many agreed in principle to the need for more effective coordination.

The Planning Division of the Ministry of Agriculture could perform a much more useful supporting role to the Coordination Unit than is being accomplished at present. This could take the form of assistance in the documentation of the progress being made toward achieving project

goals, by projecting goals for the livestock production program and devising alternative strategies for achieving these goals. For example, one means of increasing livestock production is through expansion of feedlots using by-products of other agricultural crops. To the extent that this is possible, larger, better quality animals would reach the market and outlets for immature animals from range and ranch land would be increased.

#### Logistics and Maintenance

We believe that there is need to improve logistical support and maintenance in the N.E. Province. There are several ways in which this might be done. One is to contract the work. As it now stands, with workers being paid whether equipment is operative or not, there is actually a disincentive to keep equipment in operation. A suitable contract with a heavy equipment dealer with penalties for delays might solve this problem. The fact that present equipment is all made by a single manufacturer would facilitate the implementation of this alternative.

A second alternative would be to recruit, through AID participation, skilled equipment operators who understood first echelon maintenance, to work as crew foremen and supervisors. This should result in less down time and less need for heavy repairs at the maintenance shop being constructed at Wajir. There was some evidence that equipment was idled when simple repairs would have made it operable. This course might provide more chance for expertise to rub off on Kenyan workers also.

As for maintenance of boreholes and pans once they are completed, there are persuasive arguments for making the Division of Range Management responsible for all maintenance and repairs. Water facilities,

once constructed, are an inseparable part of range management. Water determines where and when grazing is possible; insofar as there is control over water, as at boreholes, water can be made available at the times when grazing plans require it or other needs arise. Moreover, it is the range officers who are constantly present and are in a position to know what the conditions and needs are. Pan maintenance and repair, largely desilting, is a non-technical job that requires at most experienced equipment operators of such equipment as bulldozer or draglines. Maintenance of borehole equipment is a more technical problem, but one that might be handled by contract if skilled personnel are otherwise unavailable.

### Training

Although Kenya is better off than many other countries with respect to the number of range-trained personnel, there are too few, both with respect to numbers and type of training, to continue with the range development program that is underway. There are a number of ways AID could assist in providing the manpower needed which need to be worked out to suit the desires of GOK. Although we can claim no universal agreement among those we interviewed, we found considerable support for the measures that we think are needed and desirable to fulfill Kenya's trained manpower requirements for developing and supporting sound range development. Possibly the greatest and most lasting contribution that AID can make is through training programs. We recommend:

1. Closer coordination between the courses at AHITI and Egerton designed to reduce duplication of effort and make it possible for AHITI certificate holders to continue work at Egerton, without repetition and lost time.

2. Development of a B.Sc. degree program in range management at the University of Nairobi, integrated with the range management program at Egerton.
3. Obtaining an expatriate to assist GOK in working out a rounded, integrated program among the university and other schools now providing work in range management and assisting with instruction at the university.
4. Develop programs of training in surface water hydrology, small watershed runoff, design and construction of small dams, soil and water conservation and other related surface water engineering, both at the sub-professional and university levels and increase efforts to obtain candidates for participant training in these fields.
5. Increased emphasis in participant training in public administration and extension methods, both through degree and nondegree programs.
6. Emphasize graduate training in range science at M.S. and Ph.D. levels to provide personnel needed for expanding the range research and range training programs that we have recommended.
7. Develop programs for training in ground water investigations and in well development and construction and increase efforts to obtain participant training in these fields.

#### Getting Acceptance by Pastoralists

We have little basis for judging the correctness of two basic assumptions made with respect to the NRRD Project:

1. That pastoralists will cooperate in applying grazing management schemes, and
2. That ranges will respond to rotation grazing systems.

We believe both these assumptions have validity, but measures should be taken to reinforce them and get the widest possible acceptance of improved grazing schemes.

Experience in the United States and elsewhere has shown that the most effective means of bringing about the adoption of improved practices is through demonstration areas wherein grazing is conducted according to a prescribed plan and the results documented. We think there is need for developing such areas in Kenya.

The training center at Giriftu could be made to serve this purpose. A well planned and managed rotation grazing plan could serve the dual purpose of training of technicians and as a demonstration area where pastoralists could observe the results. The Pilot Project Area might also serve this purpose, but there is less likelihood of being able to maintain the strict control there that would be required than there is at Giriftu.

The research stations at Kiboko and at Buchuma offer similar possibilities. Work is now underway at these stations on the effects of defoliation of plants and the results of different grazing schemes. Fortunately, Buchuma is located near company and cooperative ranches in Coast Province, and Kiboko is adjacent to group ranches in Kajiado District, so that they would lend themselves readily to the extension-demonstration functions.

The grazing programs at these stations should be structured with the objective of making them serve both research and demonstration purposes. Some of the ranches that were first established may also be useful as demonstration areas. A high priority should be given to establishing areas where the benefits from improved grazing systems can be demonstrated

as a means of motivating pastoralists toward their adoption.

In order that the socio-economic effects on pastoralists can be assessed, we recommend that a consultant in this field be engaged to set up a system for monitoring social changes.

The company and cooperative ranches should receive special attention. From the standpoint of contributing to meat production, company ranches are probably superior to group ranches and likely to be less effective than commercial ranches where owners provide management. The sociological impacts on company ranch shareholders are particularly unclear. Unlike the group ranches where there is a sense of ownership and close contact with the livestock, company ranch share holders are not involved with management tasks. They do not live on the ranch, but engage in other pursuits in villages removed from the ranch. Thus, they cannot identify their interests with particular animals and are remotely involved with management decisions which are made by the ranch manager and directors. It would be instructive to ascertain what the sociological impacts of this sort of venture is.

#### Special Personnel Needs

In order to implement our recommendations, certain specially qualified personnel are required. We emphasize the fact that we are here calling attention to the skills and expertise needed, and not the means by which these are obtained. We make no firm distinctions between direct hire and consultants, for example, for other than the short term position needs. Nor are we firm on time estimates. These matters will be at the discretion of AID Mission. We recommend persons with the following skills be obtained:

1. A training consultant for a period of one year to work with GOK officers, University of Nairobi officials, and the administration at Egerton College and AHITI to work out a unified program in range management among the institutions now giving range management training and to assist in developing a B.S. program in range management at the University. He would also develop a program of range extension education in Kenya and conduct in-service training in extension for range officers. It may not be possible to combine the expertise required in one person, in which case a short term consultant could be obtained to assist with the extension program.
2. One training consultant for a period of one year to work with GOK officers, University of Nairobi and Egerton College officials to improve training programs in surface water hydrology, small dam design and construction, and related aspects of surface water development.
3. A socio-economist to develop a program for monitoring social and economic impacts of the NRRD Program on pastoralists. This would probably require two to three months. Thereafter, annual reviews of the program would be necessary.
4. A person trained and experienced in wildlife and especially in range-wildlife interrelationships to work with the planning teams and with a station in Nairobi. Emphasis should be on management experience and expertise, rather than on biological training. He would be assigned to the Ministry of Tourism and Wildlife to bring that agency more actively into the project. In addition, he would assist the planning teams in establishing forage allocations for wildlife and maintain liaison with the

Canadian monitoring unit.

5. One person trained in satellite and aerial photography and utilization of these techniques for making resource inventories. He would be expected to work out with the Canadian monitoring unit, the capabilities of and possibilities for using these techniques in Kenya and to assist in devising methods and procedures for collection of data by field personnel to supplement and validate the images obtained. This probably would require one month.
6. A construction foreman experienced in heavy earth moving equipment operations and maintenance to supervise water development crews in the Northeast.
7. One person experienced in borehole construction, development and testing and knowledgeable about well equipment and installation.

We think it important that the job responsibilities of all personnel provided by AID should be kept under careful scrutiny. There is a real danger that GOK will be slow to assume responsibility for the functions AID personnel provide. Emphasis should be placed on the training and upgrading of the skills and expertise of Kenyans, so that they can assume the responsibilities as quickly as possible. This consideration is especially relevant with respect to range planners. It may be longer before expertise in water development is developed.

SUMMARYGoals

1. The overall goals to increase livestock production in Kenya and increase foreign exchange, given the proper time frame and sufficient inputs, are within realization. Experience the world over has shown that as the condition of the range improves the potential for livestock turnoff is increased. It is necessary to specify potential in this connection for cattle turnoff everywhere, and in East Africa particularly, is subject to a number of factors other than range conditions. Animal diseases, adverse weather and livestock prices are equally important in determining the supplies of livestock products available. These adverse factors are, however, made less severe if ranges are kept in good condition. The complexities of these interrelationships are such that quantifying the contribution of the range resource to the output attained is virtually impossible. There is, given the dearth of available base information, no way in which we can do so.
2. Given the magnitude of the problem, the size of the area to be developed and the complexity of overall livestock loan program of which the NRRD Project is but a part, no immediate confirmation of goal achievement can be expected. The progress thus far made toward development is yet so small that even if quantification were possible, the effects to now would not likely be reflected in any economic indicators that are available.

3. There are some indications that progress is being made.

Livestock marketing statistics prepared by LMD shows fluctuating but gradually increased numbers of animals coming to markets as indicated by three-year moving averages. The average selling price per head has similarly increased due to a general rise in livestock prices, but this statistic may also reflect larger animals as a result of disease control, range development and more efficient means of getting animals to market.

4. The progress made toward improved ranch management is varied. Examples can be found of ranches which show evidence of becoming successful. There is more progress being made with respect to controlling diseases, developing water and better cattle than toward improved grazing management practices. We have no basis for knowing what percentage these more successful ranches represent, but from our limited observation and our discussions with others, they are in the minority. The progress appears better with respect to the company than with the group ranches to this time.

#### Assumptions

5. It has not yet been demonstrated that range improvement has taken place as a result of project efforts. The basic concept of managing rangelands through rotation systems so that plants regain vigor and ranges improve is sound. We find no evidence either to support or discredit the particular rest-rotation system being advocated. Neither it nor other similar systems have been proven in tropical areas. We do not have reservations about transferring temperate-zone technology intact to tropical

conditions. We are also concerned that some of the schemes proposed are too elaborate for conditions in Kenya and could be counter productive. Whatever scheme is adopted, the project should be so monitored that the results obtained can be documented.

6. The assumption that pastoralists will become more sedentary and adopt sound grazing practices is likewise unproved. One of two conditions is necessary for successful implementation of sophisticated grazing systems - there must be control over livestock numbers, or herdsman must be highly motivated. The first of these does not exist, although some influence upon livestock numbers may be exerted through the ranch and livestock loan program. The second condition is only susceptible of evaluation by subjective means. We found some evidence in certain individuals that we encountered that pastoralists were responding to the development program; the expressed belief of others who have had better opportunities to observe and more contact with them provides further confirmation this is so. We think adoption of good grazing practices will come slowly; whether it will develop rapidly enough to avoid irreparable damage gives us grave concern.
7. We find no reason to question the basic project design. The slow progress made has not been due to faulty conceptualization but to poor execution. The causes lie in part to the complications that arise from a vast, multi-partied effort. The emphasis should not be on redesign but on more effective coordinated effort, although change in project input and emphasis could improve the chances of success. Even with the most skillful direction and management, success may be incomplete because of the immensity and complexity of the project.

8. The assumptions that GOK would meet the requirements for equipment, supplies and maintenance and provide adequate supervision to achieve a satisfactory rate of development have not materialized. Progress has been and is currently very slow. So far development is taking place only in N. E. Province. The need for additional equipment, supplies and personnel that will be required when the group ranches that are now being planned are developed will impose additional burdens. Experience to date does not indicate the additional demands will be met.

#### Progress

9. Progress has not equaled projections due both to factors which are internal to USAID and to factors external to it. Without respect to origin of and responsibility for the short falls we identify the following reasons for the deficiencies uncountered.
- (a) Failure to field full component of planning teams.
  - (b) Inadequate and underequipped counterpart personnel.
  - (c) Long distances between home stations in Nairobi and location of field work which was made more acute because of shortages of vehicles and supplies.
  - (d) Slowness in land adjudication in the company - cooperative ranch area in the Coast Province.
  - (e) Inadequate logistical support for planning and construction teams.
  - (f) Inadequate maintenance of construction equipment, borehole installations and pans which have hindered development and made those completed ineffective.
  - (g) Lack of clearly defined policies agreeable to Project Management and GOK as to effective utilization of planning teams.
  - (h) Personality differences.

- (i) Inadequate financial support to GOK agencies.
- (j) Divided responsibility for development between ministries in GOK.

10. In a venture of this kind, progress cannot be measured by units of work accomplished such as miles of track, number of management plans, etc., although they must be used as indicators of diligence and commitment to the job. In the final analysis, progress can really be determined only by changes in attitudes and practices among the pastoralists which the project serves and the increased expertise and devotion of Kenyan offices on whom the ultimate success of the project depends. There is no means of assessing these factors in the short run; time alone will reveal how successful the effort was.

#### Assessment of Project Inputs

11. The technical qualifications of U. S. personnel have been good, but their temperaments and approach to the job have in some instances left something to be desired. Their background experience may not have prepared some of them for the conditions encountered here where persuasion must be substituted for authority. We think more attention should be given to personality factors in future selections. Broader recruitment so that other agencies such as the Soil Conservation Service, the Bureau of Land Management and state universities have opportunity to supply personnel may improve the fitness of recruits to the planning teams.

12. There are valid reasons for some of the failures observed. Limiting PASA teams to planning alone and not providing them opportunity for seeing that the plans made were successfully implemented, the usual reward for effort, eliminated the major incentive that impels the professional. Policies governing the conditions under which they worked were poorly articulated and belatedly promulgated. There was no opportunity for them to consult with and make inputs into policies and programs commensurate with their qualifications and experience. To a considerable extent their contacts were limited to counterpart personnel who in many cases were not fully counterparts either with respect to training or experience. Finally, only one team was located outside Nairobi in the district where their work was and where they would be in close contact with provincial and district officers with whom they worked.
13. We found many Kenyan range personnel who are well trained and have the capacity for meeting the responsibilities placed upon them. We were impressed by the quality of both graduates and diplomats we encountered. However, there is a shortage of range personnel at all levels. This shortage is especially critical at the baccalaureate level. The diploma program at Egerton College has done a good job in turning out technicians, but these people cannot advance up the career ladder to become professionals. Another apparent deficiency is in on-the-job training at all levels. Young, enthusiastic range people come out of the training institutions, but they are forced into important decision-making positions before adequate practical experience is gained.

14. We believe that improvements can be made in the structure and quality of the training program. Egerton diplomats in range management have done very well in a number of overseas universities. Since many are not qualified to enter universities directly, the work in basic science at Egerton could be improved so that more of them could qualify for entrance into university programs. Although the University of Nairobi graduates about twenty civil engineers a year, we found few Kenyan engineers experienced in surface water hydrology, ground water hydrology, surface water development or ground water development. Both academic and in-service training in water development are currently at two low a level to provide for the development needs in Kenya. Additional emphasis should be given on water development and new courses added both at Egerton and at the University.
15. A high priority should be placed on the development of a BSc program in range management at the university level. It should be closely related to both the AHITI certificate and the Egerton diploma curricula. Although it appears there are obstacles to implementing a degree at the University of Nairobi, it is our opinion that an effort to do so should be made. Eventually, there may develop a need for programs at the master's level tied to the research effort at Kiboko and Buchuma. Considerable urging may be necessary from outside the university community to get such programs adopted. (Should these efforts fail we note in passing that the University of Khartoum is in the process of developing a program in range management.) In all these training programs, we stress the need for including

representatives from all pastoralist cultures; cultural gaps that exist within Kenya may be almost as great as between Kenyans and expatriates. Adoption of improved practices will be hindered by failing to take these cultural differences into account in recruiting and training personnel.

16. Shortages of equipment were observed at all levels. Deliveries were slow, mechanical deficiencies were found in some equipment received and maintenance and repair of that in use was below requirements. The most acute problem, and one that will become more so, was in vehicles for range officers and range assistants. In every district we visited, personnel were handicapped by vehicle and supply shortages. Additional emphasis should be placed on obtaining experienced equipment operators and construction supervisors.
17. There is evidence of a lack of close working relations administratively with "counterpart" officers in GOK and in USAID. Higher ranking ministry officers upon whom the success of the project depends seemed not to be brought into discussion of conditions which were hindering the project. In view of the general feeling encountered that sufficient funds were not being made available to government agencies to support the commitments made, it appears that much closer working relationships between USAID and GOK officers at all levels is needed.

#### Relationships Among NRRD, KLL and GOK

18. There was no evidence that the NRRD was being hindered by other elements within the Kenya Livestock Loan, at this stage of development. The potential exist for impediments in programs such as the AFC, LMD, DVS, Lands and Settlement

and from wildlife demands upon forage and water within developed areas. A technician familiar with wildlife techniques, preferably one with a range-wildlife combination and experience in harmonizing game and domestic livestock use, if included among PASA planning personnel to deal with the problems wildlife pose would be helpful.

19. A better basis for coordinated action between the various elements of AID mission and agencies within GOK needs to be developed. Mutual uncertainties now exist as to attitudes, policies, and procedures that affect the smooth working of the project. Unless these deficiencies can be removed or ameliorated, progress toward goal accomplishment will be slowed. We do not wish to suggest that an attitude of distrust or antagonism exists, but we believe that to some degree, mutual appreciation of each others positions prevents the free interchange between USAID and GOK that is necessary for success.
20. We found no way to measure or quantify the contribution of the NRRD Program to the larger programs, KLL and GOK's Livestock Development Program. Support of the training efforts has improved the prospects of GOK for mounting and administering an effective range management program; the contact with technical personnel at the field level incident to the planning process should have provided additional training through "ruboff." If no other contribution were forthcoming the contribution made in this way may be sufficient justification for the project.
21. Thus far there is little evidence which demonstrates that the ecological inputs of the NRRD Project will be beneficial. The project in the Northeast is in danger of becoming a disaster

area. The areas originally developed were too small to accommodate the great annual variation in and uneven distribution, both in time and space, of rainfall. Development of water in comparatively small areas combined with drought over the entire Northeast, has led to abnormal concentrations of livestock on the Pilot Project areas. The ranch projects in other areas have fared somewhat better, but with the exception of certain ranches in Kajiado District there is little reason for optimism to date.

22. There is some promise that with increased trained personnel being integrated into government positions, the technical capabilities for administering an ecologically sound range management program exist. Whether the administrative skills to do so and the will to make it a reality are forthcoming can only be a matter for speculation. In view of the deficiencies found in the Northeast with respect to the water development coupled with the inability so far to provide minimum logistical support for effective supervision of the development program, there is reason to doubt a successful program will eventuate.
23. If Kenya's rangelands are to be developed without adverse environmental degradation, the principles of ecology must take precedence over engineering and costs. This concept is well understood in the Range Management Division, but the emphasis on water development per se could lead to range degradation rather than range improvement unless careful coordination and control is practiced. We believe that the administrative artifact of having water developed and serviced by one group

- and range administered by another will continue to place restrictions on range productivity unless institutions are created or strengthened to bring a more coordinated approach.
24. There is a danger that too great dependence will develop upon expatriate personnel supplied under the technical assistance program and that Kenyans will not move to become proficient in the skills and know-how necessary for successfully carrying on the project. Maximum possible interaction between planning teams and GOK officers at all levels should be sought. At the field level this could be accomplished by considering the range planner the leader of a team to which local range officers belonged; the leader would plan the work needed and supervise the collection of data required; local officers would collect data and assist with layout and drafting of management plans. In this way there would be maximum opportunity for Kenyan personnel to acquire both the rationale and the knowledge of range planning. At higher levels within the bureaucracy, increased participation of PASA personnel in policy and procedural discussions would provide mutual benefits.

#### Effects on Pastoralist Societies

25. We can only conjecture as to the sociological effects of the project on the peoples whom it encompasses and think certain danger signals should be raised. We question that an effort should be made to alter greatly traditional pastoralist customs and procedures which have developed under the harsh and uncertain climatic conditions which prevail in Kenya. It is possible that complete immobilization of pastoral groups

and clans would make them more susceptible to vagaries of weather than they now are. Given the realities of weather and the force of custom, modification not elimination of nomadism may be all that is attainable and desirable. Changes should be approached cautiously.

26. There is greater chance that the Masai will become settled. Under a system by which the land becomes property of the group, the feeling of attachment to the land will be greater. Even so, drought will periodically necessitate one group moving into the lands of others in search of water and forage. This will occur by mutual consent and will not weaken the attachment they feel toward their own lands, which, hopefully, will lead to pride in and better husbandry of them.
27. From another standpoint, acquiring firm control over land can leave undesirable consequences in the long run. So long as there is enough land to provide for all, a strong system of land tenure is beneficial; when land is in short supply the consequence may be detrimental. Under fee-simple ownership, changes in land use and changes in land allocation become difficult. The strong and aggressive can acquire more land while the weak and ineffectual are displaced and must seek livelihood elsewhere. If there are inadequate means of integrating those displaced into other sectors of the economy, they become a burden to society and a drag on the economy. Should the group ranch program prove successful in increasing the economic status of the Masai and better health and medical care result, population pressures upon the land will be intensified

and the capacity of the land to support them diminished. The consequences could be tragic for many unless measures were taken to find a place for them in the economic structure elsewhere. They will not be prepared for assimilation unless adequate schooling is available to them. We have no means of knowing or even surmizing, what the ultimate consequences will be.

28. We think that Kenya's rangelands offer a good opportunity for development in such a way that they will strengthen the country's economy and that the NRRD Project together with other programs can assist in the accomplishment of that goal. Certainly, the conditions for mounting a program of this magnitude are better in Kenya than in most developing countries, since GOK has well developed institutions and many competent personnel. It must be recognized, however, that this is a high risk venture and that failure in one part of the program can jeopardize the entire effort. We believe that chances for success can be improved greatly with clear, firm policies on operations, establishments of mutual trust and a sense of community within the USAID Mission, strengthened coordination within the KLL project and systematic reporting and monitoring of progress.
29. Despite our concurrence in the importance of the Livestock Development Program in Kenya, and some restrained optimism regarding its success, we believe that the monetary outputs that were projected were overly optimistic. The increased offtake that was assumed is probably realistic with respect to commercial and company ranches. For some time to come, greatly improved production is not likely to occur in the

Northeast nor in the majority of the group ranches. This can come only as pastoralists develop management skills and as ranges improve. Both of these will come slowly, and any immediate increase in output will be due largely to greater market orientation - more animals sold but not necessarily more produced. Furthermore, the most significant contribution among the pastoralists will be the changes wrought in attitudes and manner of living, both unquantifiable. For these reasons, we question the validity of attempting internal rate of return calculations as a means of determining the viability of the project.

## APPENDIX A

List of Persons Contacted by Evaluation Team

Dr. P. M. Ahn	Soil Science Department, University of Nairobi
Lucas Ayuko	Head, Range Management Division
Phillip Berglund	Area Supervisor, AFC (AID)
Robert Casebeer	Wildlife Biologist, UNDP/FAO
George A. Classen	Assistant Director, Special Studies, MWD
D. Charena	Hydrologist, MWD
Robert Ellsworth	Agricultural Engineer, AID, Nakuru
Arthur Chege	Coordinator, KLP, Ministry of Agriculture
Susanne Drouilh	Deputy Representative, UNDP
Joe L. Frazier	Range Planner (PASA), AID
Robert E. Gray	Agricultural Economist, AID/Planning Division, Ministry of Agriculture
Jack C. Gunther, Jr.	Section Range Water Development, MWD, AID
Michael Gwynne	UNDP Temporary Head, Canadian Monitoring Unit
Billy H. Hardman	Range Planner, PASA
Leonard Hendzel	Range Planner, PASA
E. A. Idwasi	Group Ranch Representative, Ministry of Lands and Settlement
Ramsey Khouri	IBRD
Henry Kitete	District Range Officer, Narok
Sam Ole Koros	Administrative Officer, DRM
Conrad H. 'ter Kuile	FAO Representative, Nairobi
John T. Larsen	Assistant Coordinator, KLP (AID)
M. V. Lashey	Credit Supervisor (AFC), AID
Robert Langat	Principal Officer, Range Research Station, Kiboko

Mike Maluki	In charge Range/Ranch Planning, RMD
Neal McClymonds	Hydrogeologist, MWD (AID)
S. V. Meadows	Head, Livestock Marketing Division, Ministry of Agriculture
P. K. Metto	Lecturer, Egerton College
Dr. E. S. Mperre	Provincial Agricultural Officer, Garissa
Richard M. Muriuki	Provincial Range Officer, Garissa
George Murphy	Group Ranch Section, AFC
C. N. Mutitu	Head, Design and Construction Division, MWD
Joshua Mwaro	Manager, Sagala Ranch
Evans Mweya	Provincial Range Officer, Nakuru
Dr. W. M. Njoroge	Deputy Director, DVS
S. K. Nganga	Demonstrator, Egerton College
A. A. Omwenga	District Agricultural Engineer, MWD, Narok
David Ostensson	Principal, MWD training School
William Pierce	Resident Engineer, MWD, Wajir
D. R. L. Prabhaker	Assistant Director for Water Resources, MWD
E. M. K. Ruel	Senior Loan Officer, AFC
Charles Rono	Manager, Lualeini Ranch, Company
Peter Sadera	Provincial Range Officer, Mombasa
Ingvar Spanne	Head, Ranch Water Section, MWD
Ralph Von Toffnen	Head, Ranch Section, AFC
Lawrence Witucki	Deputy Coordinator, KLP (AID)

## APPENDIX B

Evaluation Team Field Inspections

18 March	Flight and ground trip to Pilot Project Team Leader Leroy Hoffarth Jack Gunther Neal McClymonds William Pierce
26 - 27 March	Trip to Magadi (group ranches) Hargreaves, Parker, Smith Leonard Hendzel, Range Planner, PASA Dayton Nelson, Engineer, PASA John Larsen, Deputy Coordinator
1 - 3 April	Trip to Nakuru and Narok District (group ranches and Egerton College) Hargreaves, Parker, Smith Michael Rugh Billy Hardman, Range Planner, PASA Robert Ellsworth Engineer, PASA
8 - 10 April	Trip to N.E. Province (Buna, Wajir, Giriftu, Garissa and Pilot Project) Hargreaves, Parker, Smith Leroy Hoffarth Jack Gunther Mike Maluki
12 - 15 April	Trip to Coast Province (company ranches and Kiboko Range Research Station) Hargreaves, Parker, Smith Michael Rugh

## APPENDIX C

Representation on the Livestock  
Coordinating Committee

CHAIRMAN: Project Coordinator, Ministry of Agriculture  
Head, Range Management Division, Ministry of Agriculture  
Head, Livestock Marketing Division, Ministry of Agriculture  
Director of Veterinary Services, Ministry of Agriculture  
Head, Economy Planning Division, Ministry of Agriculture  
Director, Ministry of Water Development  
Registrar of Group Representatives, Ministry of Lands  
and Settlement  
Minister of Finance and Planning  
Permanent Secretary, Ministry of Tourism and Wildlife  
General Manager, Agricultural Finance Corporation