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IMPROVED AFRICAN LIVESTOCK PRODUCTION

Robert E. Bement
August 1990

Agreement No. 90-134-8400
Task Assignment # 3-----

Task Order No. 78, Amendment No. 2

LABAT-ANDERSON, INCORPORATED

IMPROVED AFRICAN LIVESTOCK PRODUCTION

TASK NO. 78. AMMENDMENT NO. 2

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Introduction: In January and February 1990 I worked in Kenya and Botswana where contact was made with commercial livestock and wildlife operators. Some of those operators were interested in developing production optimization graphs in order to manage their rangelands more effectively. See Bement, Improved African Livestock Production-report March 1990.

On Task Assignment No. 3, I returned to Kenya and Botswana to work with previously contacted operators. In Zimbabwe I made initial contact with commercial livestock and game ranchers and worked with the District Council and farmers on the Gazaland Tribal District.

KENYA: June 2 to June 22, 1990

On Monday June 4, I contacted Jim Dunn, acting Agricultural Development Officer, USAID/Nairobi and explained to him what I hoped to do on this assignment. In order to initiate the development of a production and management plan to be used as an example, I contacted the manager of the Athi River Game Ranch. I had visited the ranch in January and the game and livestock managers were anxious to conduct a vegetation survey to define the range types on the ranch.

In January I conducted a seminar on development of the production graphs for members of the Kenya Department of Resource Surveys and Remote Sensing. At that time the acting Director, Dr. Ebson Mwendwa, said he would like to have some of his people work with me to learn the techniques for developing the graphs. On this assignment three men from the Department worked with me doing the Athi River Ranch survey. They were Patrick Gang, Obed Karime and Clement Omari. These men knew the plants and did an outstanding job. It was a pleasure to work with such an expert team.

Plant community and biomass measurements were taken along a transect that started in a heavily grazed area on an upland site and continued down the slope to a bottomland area then up the next slope to another upland site.

Table 1 shows the vegetation on the heavily grazed upland. Cynodon and Eragrostis are the dominant grasses. Cynodon provides grazing but this species of Eragrostis is of no value for grazing.

Table 1. PLANT FREQUENCY AND BIOMASS DATA

Athi River Ranch June 6 thru 11, 1990
Outline Transect

Transect Section:	A	B
	PERCENT FREQUENCY	
Without Plants:	38	34
<u>Plant Species</u>		
Eragrostis tenuifolia	14	22
Cynodon dactylon	42	12
Pennisetum mezianum	2	6
Cassia mimosoides		2
Digitaria milaniana		2
Microchloa kunthii		6
Digitaria scalarum		2
Dicathium inselptum		2
Sida ovalis		4
Sporobolus festivus		
Themeda triandra		
Harpachne schimperi		
Aristida kenyensis		
Lintonia nutans		
Brachiaria eruciformis		
Pennisetum stramineum		
Andropogon abyssinicus		
Ischaemum afrum		
Alysicarpus glumaceus		
Indigosea brevicalyx		
Setaria sphacelata		
Leptothrium senegalense		
Rhynchosia minima		
Cyperus votacudus		
Green Biomass kg/ha	5076	3376
Oven Dry Biomass kg/ha	2553	2123

Table 2 shows plant composition and biomass on the easterly facing slope where grazing pressure was lighter. Themeda and the Digitarias are grasses valuable for grazing.

Table 3 shows data from the bottomland where Section F is in a moist area and Section G is in an area that is seasonally water logged. The Pennisetum and Lintonia are of low grazing value but the Themeda and Andropogon are valuable grazing plants.

Table 4 shows the vegetation on the westerly facing slope where Digitaria, Themeda, Andropogon and Setaria are all valuable for grazing.

Table 5 shows the vegetation on the next upland where the Digitaria, Themeda and Andropogon are present but the Setaria has become the dominate plant.

These data show that there are five different vegetation types in this area of the ranch. The vegetation in Table 1 is what can be expected to result from heavy grazing. It is likely that the vegetation in Table 2 on the slope may also be influenced by heavier grazing. The presence of the Cynodon here is an indicator of the heavier grazing. The other sites I think are more nearly properly grazed. Development of the graphs will tell us about how they should be grazed.

The next step on this ranch is to map it by vegetation types and determine which ones are most important area wise.

The cattle are controlled by herding. It is planned to keep records on when and how many animal days of grazing take place in each area. Animal weights will be recorded when cattle go in and leave an area. This will be done by weighing tester animals from each herd as they are brought in for dipping.

Wildlife animal data is taken as carcass weight each week as animals are harvested for the restaurant trade. Peridic game counts give an indication of when and where the game graze.

It is my opinion that this ranch is presently being operated on the right side of the production optimization graphs. For the cattle I base this opinion on the use of cattle purchase and sale weights to estimate individual animal production and total herd production per hectare along with the productive condition of the vegetation.

I think the wildlife operation is also presently on the right side of the graphs considering the excellent condition of the animals and the vegetation. The bottom line is how the vegetation and the animals look at the end of the dry

Table 2. PLANT FREQUENCY AND BIOMASS DATA

Athi River Ranch June 6 thru 11, 1990
Cutline Transect

Transect Section:	C	D	E
	PERCENT	FREQUENCY	
Without Plants:	32	38	28
<u>Plant Species</u>			
<i>Eragrostis tenuifolia</i>			
<i>Cynodon dactylon</i>	8	2	10
<i>Pennisetum mezianum</i>	6	8	20
<i>Cassia mimosoides</i>		2	
<i>Digitaria milanjiana</i>	2	6	12
<i>Microchloa kunthii</i>	4		
<i>Digitaria scalarum</i>	8		
<i>Dicathium inselptum</i>		6	10
<i>Sida ovalis</i>			
<i>Sporobolus festivus</i>	10	4	
<i>Themeda triandra</i>	10	16	12
<i>Harpachne schimperi</i>	8		
<i>Aristida kenyanensis</i>	4	2	
<i>Lintonia nutans</i>		6	6
<i>Brachiaria eruciformis</i>		4	
<i>Pennisetum stramineum</i>		2	
<i>Andropogon abyssinicus</i>			
<i>Ischaemum afrum</i>			
<i>Alysicarpus glumaceus</i>			
<i>Indigosera brevicalyx</i>			
<i>Setaria sphacelata</i>			
<i>Leptothrium senegalense</i>			
<i>Rhynchosia minima</i>			
<i>Cyperus votacudus</i>			
Green Biomass kg/ha	4528	5464	6288
Oven Dry Biomass kg/ha	2422	2737	3343

Table 3. PLANT FREQUENCY AND BIOMASS DATA

Athi River Ranch June 6 thru 11, 1990
Cutline Transect

Transect Section:	F	G
	PERCENT FREQUENCY	
Without Plants:	20	40
<u>Plant Species</u>		
Eragrostis tenuifolia		
Cynodon dactylon		
Pennisetum mezianum	36	14
Cassia mimosoides		
Digitaria milanjiana	2	
Microchloa kunthii		
Digitaria scalarum		4
Dicathium inselptum		
Sida ovalis		
Sporobolus festivus		
Themeda triandra	14	4
Harpachne schimperi		
Aristida kenyensis		
Lintonia nutans	26	18
Brachiaria eruciformis	2	
Pennisetum straminium		
Andropogon abyssinicus		18
Ischaemum afrum		2
Alysicarpus glumaceus		
Indigosera brevicalyx		
Setaria sphacelata		
Leptothrium senegalense		
Rhynchosia minima		
Cyperus votacodus		
Green Biomass kg/ha	7100	5904
Oven Dry Biomass kg/ha	3962	3297

Table 4. PLANT FREQUENCY AND BIOMASS DATA

Athi River Ranch June 6 thru 11, 1990
Cutline Transect

Transect Section:	H	I	J	K	L
	PERCENT FREQUENCY				
Without Plants:	26	34	28	40	34
<u>Plant Species</u>					
Eragrostis tenuifolia					
Cynodon dactylon	4		4		
Pennisetum mezianum	6	8	4	16	4
Cassia mimosoides					
Digitaria milaniana	6	6			
Microchloa kunthii					
Digitaria scalarum		4	6	14	4
Dicathium inselptum					
Sida ovalis			4		
Sporobolus festivus					
Themeda triandra	20	16	16	22	16
Harpachne schimperii					
Aristida kenyensis					
Lintonia nutans	10	6	14	2	2
Brachiaria eruciformis				2	2
Pennisetum stramineum					
Andropogon abyssinicus	6	20	8		14
Ischaemum afrum					4
Alysicarpus glumaceus	4			2	
Indigofera brevicalyx	4	2	4	2	
Setaria sphacelata	10	4			16
Leptothrium senegalense			4		4
Rhynchosia minima			2		
Cyperus votacudus			6		
Green Biomass kg/ha	6408	5700	5540	5024	5088
Oven Dry Biomass kg/ha	3546	28592	30467	3051	2578

Table 5. PLANT FREQUENCY AND BIOMASS DATA

Athi River Ranch June 6 thru 11, 1990
Cutline Transect

Transect Section:	M	N
	PERCENT FREQUENCY	

Without Plants:	24	20
<u>Plant Species</u>		
Eragrostis tenuifolia		
Cynodon dactylon		
Pennisetum mezianum	4	2
Cassia mimosoides		
Digitaria milaniana		
Microchloa kunthii		
Digitaria scalarum	4	
Dicathium inselptum	2	
Sida ovalis		
Sporobolus festivus		
Themeda triandra	16	6
Harpachne schimperi		
Aristida kenyensis		
Lintonia nutans		2
Brachiaria eruciformis	2	
Pennisetum straminium		
Andropogon abyssinicus	10	14
Ischaemum afrum	4	2
Alysicarpus glumaceus		
Indigosera brevicalyx		
Setaria sphacelata	36	54
Leptothrium senegalense		
Rhynchosia minima		
Cyperus votacudus		
Green Biomass kg/ha	4988	4508
Oven Dry Biomass kg/ha	2477	2074

season. We need to have the entire graphs developed to make timely management decisions. Activities are in progress to develop the graphs for the Athi River Ranch.

I asked the Department of Resource Surveys and Remote Sensing to give me an estimate of what it would cost to field a team to do the vegetation measurements needed to develop the production optimization graphs. A copy of this estimate is attached as Appendix 1.

If the \$40,000 cost of Group Personal Accident Insurance were prorated on a daily basis instead of for a full year, the estimated cost for a 100 working day period for the team would be approximately \$111,200 with daily costs as follows:

Per diem	\$280
Professional fee	300
Transport	
Daily rate	80
Insurance	20
Km @ 100 Km/day	100
Camping gear	200
Personal Accident Insurance 40000/365	115
Protective clothing 435/100	4.35
Field equipment	7.30
Stationery	0.20
Other	5
Daily Total	\$1112

I met on June 13 with David Smith and Simon Wells of Claymore International, Turichia Mugambi of R.H.L. and Carlos Zurberti of Egerton University to discuss the Kenya meat packing and livestock/meat export industry study and proposal. I was very favorably impressed with the livestock -meat packing-marketing knowledge displayed by Mugambi and Zurberti. I think they and the Claymore staff will make an outstanding team for this proposal

On June 19th I talked with Holly Wells, USAID Private Sector Officer on the phone about what we had done on this assignment and then at lunch I briefed Charlie Norris of the AID Agricultural Office on assignment accomplishments.

ZIMBABWE: June 23 to July 23, 1990

My first contact in Zimbabwe was John White Executive Officer of the Zimbabwe Commercial Wildlife Producers Association. He arranged for me to meet with Jerry Grant Deputy Director of the Commercial Farmers Union and Clive Stockil Chairman of the Safari Operators Association and the Zimbabwe Professional Hunters and Guides Association. At the meeting with these gentlemen I was able to explain the development and use of the production optimization graphs to effectively manage rangelands for livestock and wildlife production.

While in the Harrare area I visited the Bally Vaughan Game Park which was a combination cattle ranch, crop farm and game viewing enterprise. I left the Harrare area on June 29 to go to the Chiredzi area with Clive Stockil.

In the Chiredzi area I spent the first day on a very heavily grazed game preserve and the second day on a privately owned game ranch across the river from the preserve. The bare, crusted soils and the gullies on the game preserve were the result of the area being severely overstocked with Impala. The vegetation cover left on the privately owned area was enough to prevent the packing and sealing of the soils and cutting of the gullies. The Impala harvest carried out on the private land prevented the overgrazing and left enough vegetation to protect the land. It is extremely important in this area to leave enough vegetation to prevent the intense rains from sealing the soil and causing runoff.

On the third day Clive Stockil arranged a meeting of the local ranchers at the Hippo Valley Hotel for me to explain the use of the graphs to develop production and management plans and make timely management decisions. Twenty three ranchers attended the meeting and resulted in my visiting twelve of the ranches in the Chiredzi area.

I spent one day on the Sinuka Ranches teaching a young couple, Bob and Heidi Duncan, how to use the frequency quadrats to define plant communities and how to make the kilogram per hectare vegetation biomass measurements. They will take vegetation, wildlife and cattle data to initiate the development the graphs for the Sinuka Ranches.

Clive Stockil has successfully worked with the people of the Gazaland District in the development of a wildlife safari enterprise on their communal lands. With the income from this operation they have built schools and set up workshops to make furniture including desks and benches for the schools. They have also established grain grinding mills in the area. It is wonderful to see what these people are developing with their own money.

I made three trips to the communal lands with Mr. Stockil.

During the first trip we discussed with a local group from the District Council, the possibility of some cooperative communal grazing trials to develop the production optimization graphs and provide grazing demonstrations in the area. On the second trip we visited a grain grinding mill and saw more of the area. On the third trip we met with Mr Mlambo, Mr. Makuve, and Mr. Kurehwa of the Gazaland District Council and Mr. Moro of the Agricultural Extension Office. The Council would like to set up grazing trials in the Mutandawe ward. Several potential sites were visited by the group and it was suggested that one trial might be done on the black soils and another on the red ones. The group said they would send Mr. Stockil a copy of the council minutes requesting technical advice to start these trials and demonstrations. On the way back we met Mr. Chauke, Vice Chairman of the Gaza Khomanani District Council and he will propose to his council that a grazing trial and demonstration be started in the Chitsa ward.

This development has the potential for being the most promising grazing project to be done in Africa. These people in working with Mr. Stockil have learned how to make money from managing their wildlife well. They have learned how to use that money to expand the education of their people and they have learned how to develop more businesses to keep the money in the area and increase their income. Now they are interested in managing their grazing lands well and I know we can help them do it.

From Chiredzi in the low veld I returned to Harrare in time to attend the 22nd Annual All Breed Bull sale on July 18, 1990. The top three sellers were Brahman and sold for Z\$28000 Z\$33,000 and Z\$39,000. Herefords with the same Line 1 Domino breeding as our bulls at home sold for between Z\$5,000 and Z\$6500. It was a good day to sell Brahman and buy Hereford.

I met many ranchers at this sale including Graham Franceys Chairman of the Cattle Producers Association. As a result of these contacts the rest of my time in Zimbabwe was spent on six combination game and cattle ranches in the mid veld and one afternoon on the Grasslands Research Station at Marondera.

A relatively new and thriving business in Zimbabwe is the capture and sale of live game animals to ranchers interested in developing wildlife numbers for viewing and hunting on their properties. I saw several very attractive accomodations that were being built to house tourists on game viewing safaris.

I was taken directly from Marondera to the airport on July 24. I had contacted Doug Pickett, USAAID/HARRARE, Agricultural Development Officer by telephone upon my arrival and several times later, the last being July 19 the

day I left for the mid veld. we discussed the potential for the grazing trials and demonstrations in Gazaland. I tried to contact him again from the pay phones at the airport on my way out but was unsuccessful.

BOTSWANA: July 24 to August 7, 1990

I was met at the Gaborone airport by a driver from USAID and taken to USAID housing as all hotels were full. I had an evening meeting with Robert McCulaugh, USAID Agricultural Development Officer concerning the development of a wildlife habitat monitoring and management system. USAID provided me with office and transportation support which I very much appreciated.

The next day I made telephone contacts with those ranchers and government range and wildlife people with whom I had worked on previous visits. That afternoon I was asked to look at grazing conditions on the Brinks Tule Block resulting from an excessive number of Wildebeest.

A game capture company had been hired to reduce the size of the herd. Permission had been obtained to take 600 animals. We arrived at the site about 9PM and the next morning I was taken by helicopter to look at the range and animals. I had seen this range in February and it was beautiful then. Now large areas were devastated. It looked as if the Wildebeest grazed in one locality until all the grass was gone and then moved to another place. Many animal species travel around grazing a little here and a little there gradually taking the vegetation down.

If it had been possible to do so I think about 1000 Wildebeest could have been taken to balance animal numbers with the available vegetation. There is no chance for rain till October and no assurance that it will come then. The animals are in good shape now and ready for the market.

The capture unit was very efficeint. They herded the Wildebeest by helicopter into a funnel shaped trap of plastic curtains suspended on cables so they could be closed like a shower curtain. At the narrow end the animals were shot by two expert riflemen. The curtain there was then lifted and the animals were taken outside to be bled and hung on flatbed trucks that carried 28 animals.

They were taken several kilometers from the trap where they were gutted and the head and feet removed. They were then taken to a skinning area where water was available. The skins were salted and folded and the clean carcasses were loaded in refrigerated trucks and hauled to Gaborone where they were deboned and the meat packaged for sale.

The animals were inspected by a veteinarian at the kill site and during the processing. I inspected rumen contents expecting to find quite a bit of brush being eaten but to my surprise I found no brush at all. Those Wildebeest were eating grass.

It is my opinion based on the number I saw from the

helicopter, and the grazing use of the brush that this area is also heavily overstocked with Impala. They are the brush eaters. It is difficult to herd the Impala and they cannot be taken as readily as the Wildebeest. Night shooting with spotlight-rifle teams is the most effective way to harvest Impala.

I was pleased to see this Wildebeest operation and the effort being made to balance animal numbers with the available vegetation. It is far better to put this meat on the market while the animals are in good shape than to have them starve on the range. This was a timely management decision. For Sunday morning breakfast we had Wildebeest fillets and I have never eaten more delicious meat.

Upon my return from the Wildebeest operation I contacted Raymond Kwerepe of the Range Ecology Unit of the Ministry of Agriculture, Dr. Louise Setshwaelo of the Animal Production Research Unit and Nigel Hunter of the Wildlife and National Parks. With these people we discussed the possibility of a proposal to jointly develop the production optimization graphs for those vegetation types where animal data is already being taken. As the animal data continues to be taken, vegetation data needs to be taken periodically through the year and particularly when animals are removed from the area.

Once graphs have been developed we need to show those who manage the different vegetation types how the graphs are used to make management decisions that will optimize animal production and sustain the vegetation.

The cost of using fecal analysis laboratories to determine what plants are eaten when by which animals will be checked out. This technique makes it possible to tell what species of animals are using which species of plants at any given time on a given area.

The proposal would be to finance transportation and incountry expenses for me along with some funds for laboratory fecal testing over a three year period. This portion of the costs would come from USAID/Botswana and Government of Botswana cost sharing funds with USAID AFR/MDI funding my fee. Raymond Kwerepe of the Ministry of Agriculture will take the lead in preparation of the proposal.

Training sessions were held for seven people in taking the vegetation data needed to produce the production optimization graphs. Three officers from the staff of the Range Ecology unit and four from the staff of the Animal Production Research Unit attended. Wildlife and Parks didn't have anyone in the area at the time we held the sessions but when their people return those that attended will show what was learned. It was a pleasure to work with

the Botswana range people.

I left Botswana August 7 and arrived home August 9. I feel I got more done on this African trip than any since I started in 1977.