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EVALUATION REPORT OF THE LIVESTOCK AND RANGE MANAGEMENT PORTION OF THE GUIDIMAKA I.R.D. PROJECT 682-0201-1 - SELIBABY 10TH REGION, MAURITANIA

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I. INTRODUCTION

I was invited well in advance of proposed arrival date of 24 April 80 which was confirmed in spite of delayed arrival of other evaluators. I arrived on schedule and started review of documents (PP, Pro Ag, Team Reports, Correspondence, Commodity order, etc.) provided by Barnett Chessin, Project Manager.

Monday 28 April I met with Barnett Chessin, Sally Sharp, Program Officer and Alan Reed, Program Officer to help formulate the "Terms of Reference for Livestock/Range Management Evaluation".

Other personnel consulted in Nouakchott were John Hoskins, Mission Director; Paul Guenette, Pacific Consultants' Administrative Officer; Derald Burris, AID/W Auditor of Pacific Consultants Contracts; Hap Wilder, Livestock Advisor-RAMS Project and one of original PP designers for Selibaby Project; Al Sollod, DVM Livestock Advisor RAMS Project; Jaime Concepcion, AID/N Purchasing Officer; John Grayzel, AID/N Anthropologist/Sociologist; Dr. Dillard, RAMS; Jim Hughes AID/N Agronomist; Mr. Lam Hamadi, Director of Agriculture of the Ministry of Rural Development; and Mr. Soumaré Abdoulaye, Project Chief/COP counterpart.

Due to delayed arrival (2 May 80) of other evaluator, Ernest L. Murphy, Development Economist, I departed for Selibaby by an indirect route to evaluate the livestock and range conditions from Nouakchott - Kiffa - Aioun - Timbedra - Touil - Oumaoudach - Kankossa to Selibaby.

The area to Kiffa had very few livestock remaining except a few lactating cows with calves, ~~and a few~~ pasture appears bare, but the livestock remaining were mostly in fair condition, some in poor condition and only a rare weak animal was observed. No more carcasses were observed than on a similar trip in early November 1979.

The pastures from Kiffa to Aioun had little more than roots remaining. More livestock were observed with higher percentage of cattle, but still the area had relatively few livestock. Condition of livestock was variable with some in good condition, but most in fair to poor condition.

The pasture from Aioun to Timberdra to Touil (Mali Border) to Oumaoudach usually had some stubble remaining on the roots, but only limited areas with much grass left on the ground. No area was unused. That is, livestock had been and was using, to some degree, all areas. More livestock and especially cattle were seen in these area, but the concentration was low. According to herders interviewed, most livestock had been moved south to Mali. Most herders expected to be able to maintain their animals until the rains if there is enough drinking water. Limited losses were observed or reported for cattle, but some reports indicated high loss of sheep. Livestock tended to be in fair condition given the hard dry season.

Condition varied widely within and between herds, with a few good, some fair to poor, but only a few were in weak enough condition to anticipate possible loss.

Very few burnt areas were observed. Only one burn of any size was seen. It happened to be in the 2nd Region where firelanes had been built (possible by FED). The burn extended 20 kilometers along the firelane on both sides except for the last 1.5 km which had burnt only on one side. That is to say the efficiency of the firelane for stopping the fire was very poor - less than 10% of the time.

The pastures had less grass and more rock between Oumaoudach and Kankossa, then almost no grass and more sand along mares and sand dunes until we got to Bouly. Livestock were still limited and tended to be in poorer condition but not weak. We still saw some livestock in fair to good condition for the season.

From Bouly to Selibaby slightly more roots and stubble grass was observed, but very limited. The few animals seen in this area also tended to be poorer. However, as all along the trip, the goats tended to be in better shape than other species. There was more bush and rocky pasture in this area.

I arrived in Selibaby 4 May 80 and started on site evaluation of Project the next day. I was joined by Murphy on 6 May 80 and continued inspection and interviews until 8 May 80.

All Agronomic and Range Demonstration Units, Office and shop constrution, project personnel housing and samples of Pilot Zone (20 km radius of Selibaby) were toured.

Individuals met and interviewed included: Max Goldensohn, COP; Lt. Col. Thiam, Governor; Boccar Ould Nah, Governor Adjoint for Economics; the Prefet; Jean Varenne, Administrative Assistant/Mechanic; Diop Mamadou Demba, GIRM Livestock Consultant; Ba Khalidou, GIRM Agronomist; Sidi Mohamed Ould Wagha, GIRM Agronomist; Director of the local Service d'élevage; and five other members of the Regional Coordinating Commitee.

Unfortunately, both the Livestock Advisor, El Kheir Khalafalla and the Agronomic Advisor, Jean-Willy Joachim were on vacation and their files were absent or limited. The livestock file had been misplaced.

The Range Management Position had not been filled, but they expect to fill it in June.

Project related observations are noted in the Outline Summary of Interventions.

Relative to pasture and livestock conditions in the Guidimaka, they were not much different from other areas. Very little grass or stubble remained except in two relatively small areas of less than 5 km diameter each. These two areas were being called reserves by Mr. Diop and other livestock people of the zone, but the forage was limited. It was all

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being grazed from watering points 5 to 10 km from center.

I observed fewer animals in the Guidimaka than noted on my trip last November. This was supported by comments from Mr. Diop, but he felt there were still too many animals in the Region due to more transhumance have moved out of the area to the south than those moving into the area.

The Guidimaka is obviously overgrazed this year which was a below average rainfall year. And, the range is suffering some damage. It appears that a reduction of livestock in the Region would be advantagous, therefore, the predicted high livestock death loss may serve some useful purpose. A more rational management of resources to avoid this type and promote through the IRD Project.

According to the 1979 Service d'Elevage report for the 10th Region, livestock numbers are higher now than in 1969 before the sever drought. This is reason enough for alarm. Let's hope that many of these animals taken south will be sold so the pastures will get a relief next year.

Livestock conditions observed during this trip in the Guidimaka and immediately west varied from good to poor. Most were in fair shape with more poor animals observed than in the eastern areas (1st, 2nd and 3rd Regions). Very few weak animals were observed, although many will be very weak by the time the rains come. And some death loss should be expected. However, I do not share the opinion expressed by some observers that "50% of the cattle will die". I would rather estimate that 10 and 15% might die between now and the rains. Herders interviewed expected less loss with a little luck.

It should be noted that normal annual death losses in the Sahel average 30% for calves, 10% for yearling cattle, 7% for adult cattle, 35% for young small ruminants, 17% for yearling small ruminants and 10% for adult small ruminants. These standard losses should be taken into consideration when evaluating statements of losses.

Murphy and I departed Selibaby 2 May 80 and drove to Maghama - Kaedi - Boghé - Aleg and Nouakchott. Fewer livestock were seen as we moved west. Forage also deminish to the west.

Friday 9 May 80 we met with Hoskins, Thessin, Sharp, Reed and Hughes for preliminary review of findings, search for missing information, and outline of schedule for writing and presenting report. We expected to complete report by Tuesday 13 May for afternoon departure, but news of 16 May arrival of AID/W IR revision personnel necessitated delay of departure until Sunday 18 May following briefing of IR rewriter on findings and recommendations.

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II. GENERAL OBSERVATIONS OF PROJECT AS SPECIFIED IN TERMS OF REFERENCE

This is primarily an evaluation of the project plans, feasibility of interventions and effectiveness of Project Management and Implementation Team at this early stage of implementation. The project has made very limit progress to date toward PP objectives due to a combination of factors:

1) The Project Paper and Pro Ag were very vague at best, while often providing less than technically sound recommendations;

2) The Project Management and the Implementation Staff has not had sufficient technical knowledge to supplement and correct the PP design;

3) The remote location of the project site has magnified all other problems, although this factor could not be avoided;

4) The poor preparation of housing for technical advisors has delayed arrival and possibly caused some prospective technicians not to accept the post;

5) Recruitment of qualified technicians has been slow with the except of the COP and Administrative Assistant who arrived in April 1979. (All positions except the Range Management Advisor are now filled, although two advisors are on leave);

6) Commodity orders are all behind schedule due to lack of specific list in PP and lack of expertise of Project Management and early implementation staff to specify needs.

Specific project accomplishments to date include:

1) All advisors except one in place or on leave;

2) All GIRM Counterparts in place;

3) National Interministerial Committee and Regional Coordinating Committee formed to advise on project activities;

4) Housing approximately 90% completed;

5) Office, shop and storage area 95% completed;

6) Three Agronomic Units have had fence post set and cultivation plots of 5 ha, 4 ha (of 20 ha Unit), and 2½ ha cleared;

7) One Range Demonstration Unit of 470 ha plus 25 ha of forest research have had fence post set in concrete;

8) Forestry and Garden Nursery of about ~~1.5 to 2.0~~ one ha has been fenced, cultivated and has plants growing;

9) Two water wells have been dug on the Nursery in the low land near Selibaby (both have hit enough water for limited irrigation of Nursery, but they plan to deepen);

10) Eight wells have been partially dug on the Agronomic and Range Demonstration Units on high land, but only three have hit a limited amount of water before digging had to be stopped due to hard rock;

11) The three wells on the Range Unit are dry and digging is presently stopped due to hard rock (Jack hammer and dinamite have been requested by the P.C. Team);

12) Vehicles for personnel and material transportation along with POL and maintenance are in place with the exception of resent additional orders;

13) Mineral Supplement (2800 kg) have been purchased and delivered;

14) Many other commodities have now been ordered from list prepared by the Livestock Advisor and Agronomic Advisor upon their arrival in mid to late 1979;

15) Two horses and four donkeys along with carts, local harness, etc have been obtained locally or in Senegal.

The Project Goal "To promote expansion in domestic food production, productivity and consumption as a result of the sub-goal: to increase agricultural and livestock production" is not considered attainable directly through the livestock interventions, but these interventions are necessary to help find the optional level of livestock production to complement increased agricultural production and protect the continuing optimun range productivity and environmental condition.

For the Project Purpose, "Develop technically and socially sound methods for increasing crop and animal yields among sedentary inhabitants of the 10th Region, and to generate the necessary data required to launch an expanded extension program", to lead to the Project Goal the true livestock status must be established and accepted by the donor, the GIRM officials and target group. By all counts, calculations and direct observations there are too many livestock for the Guidimaka Range capacity. All of Mauritania is stocked to the maximum or more.

The Project Outputs (relative to livestock/Range) need to be simplified, limited to a few interventions to increase economic efficiency (but not increase numbers) and collect range, animal and social data for analysis and design of the technological production package which is the Project Purpose. Specific weaknesses and recommended changes in outputs are outlined in sections III and IV.

Although several Project Inputs are not considered potentially effective in producing the Project Outputs, many of those inputs can be reorientated to produce the Revised Outputs which are considered applicable toward reaching the Project Purpose. Each Outputs is discussed in section III relative to applicability and relative to needed inputs.

Project Management and Administration on the part of AID/N and PC/N has apparently exerted special effort to support the project. However, as previously noted, the lack of technical expertise in livestock - Range - Agriculture has limited their ability to perform many backup services. This, combined with the lack of the same expertise on the part of the COP (Antropologist) has made it difficult to interpret and implement many of the activities which were vaguely treated in the PP. Administration from PC/W has apparently been less than desired and has caused many difficulties for the PC Team.

Pacific Consultants COP has done an excellent job of organizing the local people in support of the project, organizing a work force to initiate lay out and construction of infrustructure, organization and direction of the GIRM counterpart technicians, personnel management of the PC Technical Advisors and general public relations. The COP has had very little time to do sociological work, while his experience in this field has facilitated his ability to work well with the people. However, his lack of even General Livestock/Agricultural expertise has made it difficult for him to assess the validity of advise receive from other.

The present PC Administrative Assistant/Mechanic/Selibaby is apparently well adapted and qualified in his job which includes being a "jack of all trades". He has done a good job and many good reports were offered in support of his good performance.

The PC Extension Animal Husbandy Advisor, although not in country during the evaluation, was met and worked with for two days on a previous visit to the Project in November, 1979. He is well trained animal husbandman, has many good ideas and is dedicated to helping the people. However, his practical experience seems to limit has ability to judge potential interventions for applicability and economic effectiveness.

The PC Extension Agronomist was not in country, so no personnel contact was made. Comments from counterparts and limited information indicate that he has good theoritical training, but lacks experience in application and extension of ideas to others.

It is understood that a recent graduate Range Management Advisor with limited experience will be filling the last position in the next few months.

Given the relatively low level of technical experience of these technicians and the lack of technical backstop support from PC/COP, AID/N nor PC/Washington, project implementation difficulties are likely to continue. An experienced person with Livestock-Range-Agricultural background is needed to consult with the team members on a periodic or fulltime basis to help direct general work plan of technicians.

The GIRM counterpart technicians have limited professional training, while several are very well experienced. Willingness to work and desire for assistance to direct this work is apparently shared by most technicians. Given the establishment of well defined project activities they should perform well.

III. OUTLINE SUMMARY OF PROPOSED INTERVENTIONS AND RECOMMENDATIONS

Intervention	Present Status	Project Paper & Pro Ag Proposal	Implementation Team Work Plan-Revision Proposals	Evaluation Livestock Adviser Recommendations April - MAY 1980
A. Animal Traction and Animal Feeding				
1) Procurement and Use	They have purchase 2 horses and 4 donkey, and they are in process of buying 4 steers for training	Proposed demonstration of use of oxen horses and donkeys as draft animals	Proposed demonstration and comparison of use of oxen horses, donkeys, tractor and hand cultivation	1) Limit effort to demonstration of draft animal potential 2) Purchase four extra steers for feeding demonstration and eventual use as draft animals 3) Do not include tractor
2) Animal Training	One donkey trained	Training to be at Kaedi	Training proposed at Project site by Kaedi Trainer	Training at the site is recommended in accordance with Implementation Team
3) Animal Feeding	1) Some straw & grain stored 2) wells dug at site	1) Feed Crop residue + hay and supplement 2) Dig one well per site for stock water	1) Feed Crop Residue and hay and supplement 2) Dig two wells per site for stock water and garden irrigation	1) Feed Crop Residue as planned in dry season with supplement as needed 2) Graze animals in rainy season 3) one well per unit should be sufficient
4) Forage-Storage	Some straw and grain stored	conserve crop residue and cut native pasture grass for hay	(same)	Proceed as planned, but maintain record of labor, materials and other cost along with yield, consumption and animal performance (work and gain) data.
5) Forage Crop Production	No Action	1) Cowpeas and /or other legumes grown in rotation with grain 2) Test forage Crops	(same)	1) Rotation as planned 2) Do not test cultivated Forage Crops other than in rotation 3) Cut and store native grass hay

B. Range Management				
1) Range Demonstration Unit	1) 470 ha being fenced and cross fenced into 4 pastures	400 ha for the combined use of grazing and reseeding demonstration	470 ha for grazing and 25 ha for reseeding	1) Use the 470 ha for the grazing and deferment demonstration 2) Use the separate 25 ha for reseeding to avoid confounding effects of grazing pressure and reseeding efforts 3) remove the road that cuts through the middle of two of the four pastures. It should be outside the Demonstration Unit or on the division fence as originally planned (fence on both sides of road)
2) Demonstration Livestock	No Action	Borrow 200 animal Units (AU) 1/. 50% Bovin and 50% Ovin to be grazed separately and in combination 1/ One AU = 250 kl animal	Obtain 100 AU, of which 30 cattle would be purchased and other cattle and sheep would be either borrowed or purchased according to availability	1) Stocking rate proposed by PP and Implementation Team both exceed recommended stocking/rate for the area 2) Obtain 73 AU's of cattle by purchase or loan (fixed two year loan) after (only after) stock water is established and grass is growing

B. Continued Range Management				
3) Water point on Range Demonstration Units	Four wells started - but stopped due to hard rock <u>No Water</u>	1) One well and three catchment tanks 2) Hand Pump (catchment tanks usually only extends surface water availability a few months into the dry season. They should not be considered permanent water source as implied in the PP)	1) four wells on Range site including the one on Agronomic area, Only three of four, pastures watered. No provisions made for catchment tanks. 2) Solar pumps, immersed pump(?) windmill, animal traction and mechanical foot pump proposed. 3) Wells were located by local "well wisher" in absence of project hydrologist.	1) Complete one well with a minimum capacity of three cubic meters per day. 2) Pipe water to common concrete water through (2x2x0.5 meters) at intersection of crossfence 3) Use simple hand pump or hand drow bucket to draw well water 4) Consider digging small catchment tanks in the three pastures in stocking rate demonstration based on TDY consultation of SCS surface water specialist for temporary water only.

Intervention	Present Status	PP and Pro Ag	Imple Team	Eval. Recommendation
B. (Cont) 4. Catchment tanks in Pilot Zone	No Action	Not proposed in Phase I	Not Proposed	1. Based on GIRM Livestock Technician report of under-utilized pasture due to lack of water points, the TDY SCS surface water consultant should also study these areas and select location for one catchment tank in each of two areas, if feasible. 2. A wheeled bulldozer has been recommended basis on successful use in nearby Bakel Projet for building catchment tanks and firebreaks. 3. Communication-Firebreaks could be cut to catchment tanks for communication and data collection on effectiveness as firebreak.

Intervention	Present Status	Projet Proposal and Pro-Ag.	Imple Team	Evaluation Recommendation
B. (Cont) 5. Fencing	Palm post set in concrete at 4 mts space. Barbed wire has been ordered, but has not arrived	Suspension fence, 30 mts post spacing with five wires outside and four on crossfences	1. Regular fence with 4 mts spaced post and four wires 2. Set post in concrete	1. Neither of the fences proposed would control small ruminant movement, cattle will often go through a four wire fence as well. 2. It is recommended to put five wires on fences of Range Unit since only cattle are recommended for the unit. A herderguard for the unit will need to patrol the outside fence to help reduce trespassing of small ruminants. 3. The agronomic units should be fenced with woven sheep and goat wire to keep small ruminants out. 4. Do not set post in concrete because of post rot, cost and no more solid than tamped post.

Intervention	Present Status	Projet proposal and Pro AG	Imple Team	Evaluation Recommendation
B. (Cont) Rge mgt 6. Firebreaks	None	1. Construct 20 meter firebreaks on outside fence and 14 meter firebreaks on cross-fences of all demonstration Units. 2. Study brush fire control and design recommendation for possible implementation in phase II in the Region	1. Construct 16 kilometers of various size firebreaks around around demonstration units. 2. Construct 150 km of firebreaks in Pilot zone of 20 km radius around Selibaby.	1. Only construct firebreaks around perimeters of demonstration units to give some degree of protection (?) for demonstrations. 2. Cut firebreaks by hand initially since trees are small, vegetation limited and deliver time of possible wheeled bulldozer uncertain. Future maintenance could be by hand, animal traction or tractor according to availability and cost. 3. Firebreaks are not recommended for Pilot zone due to ineffectiveness and high cost for the potential return as found in other AID projects and by FED and WORLDBANK. 4. Only if the firebreaks were built for communication between villages and markets should they be included in this project.

Intervention	Present Status	Project Proposal and Pro Ag	Imple Team	Evaluation Recommendations
T B. Range mgt (Cont.) T.G.O. Reseeding	1. Some local grass seed collected 2. Tree nursery Planted	Reseeding of forage and vegetation plants on 100 ha of Range unit and other unused demonstration land	1. Collect and test forage, woody plants and fruit trees. 2. Establish tree nursery. 3. Reseed and reforestation of approximately 25 ha 4. "Reseed in pilot area even if costly".	1. Limit reseeding and tree planting to fenced area (25 ha) outside of Range grazing demonstration unit as planned by implementation Team 2. Monitor effect on natural reseeding resulting from deferred grazing of 100 ha during approximately eight months of year, including first three month of growing season.
8. Rotational grazing and testing carrying capacity	None	Deferred grazing on 100 ha with reseeding. Dry season grazing reserve for livestock on remaining 300 ha of Range Unit. Only one carrying capacity proposed therefore no test possible.	Rotational grazing was not well defined but assumed to be similar to P.P.	1. Compare stocking rates of 4 ha, 8 ha and 12 ha per all on three of the four pastures. 2. Demonstrate deferred grazing benefits to range and forage reserve by deforming grazing on 100 ha for 8mos 3. Compare with reseeded area.

Intervention	Present Status	Projet Proposal and Pro, Ag.	Implem. Team	Evaluation Recommendation
B. Cont.) 9. Hay cutting and storage	Approximately one ton of hay stacked for draft animals, etc.	Cut and store hay on Range and Agronomic units for dry season feed for Range and draft animals	Same	1. Cutting and storage of hay should be limited to the agronomic units for use in feeding draft animals and growing finishing. Labor, transportation and other cost should be closely monitored along with animal performance to properly evaluate this practice. 2. "Standing hay" on deferred grazing is proposed to provide dry season reserve for range cattle.
10. Land Use Survey	Minimal Baseline data on animal and forage conditions were collected by the mad lands. GIRM and PC team collected herd and vegetation data, but records not available.	1. Conduct land use survey 2. Establishment of baseline range data and continuous monitoring system.	Requested cancelation or deferment to other project making land use survey. However, the extension livestock advisor recommends studie of land, livestock and marketing.	1. Leave aerial study and indepth land use study to other project but get information. 2. However monitoring of livestock water and range quantity, quality, map, composition, health yield and condition need be done continually by the team in pilot zone and demonstration units (over).

B.

10. Cont.)

3. Monitoring the range conditions in the Pilot zone will provide information on effect of concentration of animals (near and far from water points), effect of fire by date of burn and effectiveness of natural or imposed fire barriers.

Intervention	Present Status	Project Proposal and Pro. Ag.	Imple Team	Evaluation Recommendation
B. Cont.) 11. Livestock Producers association	None	Organize herder association to provide shepherd and other labor for range management unit	1. Do not organize association for demonstration unit 2. Oragnize association in pilot area 3. Hire shepherds by project	1. Do not attempt either herder association organization at this time. 2. Obtain more sociological information along with livestock and range data which may be useful later in determining possible group actions to implement range management recommendations. 3. Hire shepherd guards as needed.

Intervention	Present Status	Project proposal and Pro. Ag.	Imple Team	Evaluation Recommendation
B. Cont.) R & mgt. 12. Baseline data	A parti & vegetation map has reportedly been prepared. It could not be located	Proposed detailed-on-going monitoring range conditions, forage production, firebreak status, water points, range transuts vegetation map, and crop production	Proposed leaving to other project.	1. This basic range monitoring is essential to evaluation of intervention on the demonstration units and for planning their subsequent application in the pilot zone or Region. 2. This monitoring should be compared and used with the livestock monitoring data to make management decicus decisions
13. Grazing control Law	A draft grazing law has been prepared by someone outside of the project for presentation to GIPH	The possibility of grazing lawe for grazing control was suggested but no positive action indicated	Suggested need, but no specific action.	1. Present knowledge of actual animal numbers and movement, average annual and seasonal range conditions, etc is not sufficient to apply law. 2. Monitoring in the project of range animal and social factor will give better basis for implementation of grazing law if approved.

Intervention	Present Status	Project proposal and Pro, Ag.	Implentation Team	Evaluation Recommendations
C. Animal Management 1. Animal Heath	Some medicines and supplies have been ordered for service d'Elevage.	Provide technical assistance and commodities to the animal health service to insure health protection for project animals while improving the regional service.	1. Provide technical assistance and commodities as per PP 2. Build animal health clinic on Range unit and equip with refrigeration, diagnostic equipment and other material for complete high technology animal treatment.	1. Provide technical assistance and commodities as proposed in PP. These specific needs should be jointly determined by the Project Livestock advisor and the service d'Elevage Technicians. 2. Do not build animal health clinic on Range Unit. 3. Direct such support of animal helth clinic to improve and properly equip present service d'Elevage facilities.
2. Canals Corral	Not Started	1. Vaccination corrals canals on range Unit 2. Maintenance canals For traction animals on Agronomic units	Same as PP.	1. Plans to build as outlined with local material are agreeable. 2. Animal scale is imperative, but sqeeze chute is not. Traditional chute is functional.

Interveiton	Present Status	PP. and Pro. Ag	Imple. Team	Evaluation Recommendation
C. (Cont.- 3. Animal Nutrition	1. Project has 200 Mineral blocks purchased for resale and use on rge unit and traction animals. 2. Placed order for 600 tons on concentrate feed for resale in pilot zone.	Improve animal nutrition by controlled and rotation grazing, free access to water, forage preservation (hay), and mineral salt supplementation on the demonstration units	1. Near same as PP with half the animals 2. Emergency concentrate feed sale program for pilot zone.	1. The original PP. and Implementation Team design to demonstration nutritional advantages of controlled and rotational grazing and forage preservation included too many factors and too heavy stocking rate to be practical, therefore should be redesigned. 2. See recommended redesign under B,2 B,7 and B,8. 3. Emergency feed program should be discontinued due to high cost, difficult distribution, questionable benefits and due to the negative effect of prolonging overgrazing of the area. 4. Given the high cost of the available mineral blocks and limited potential économic benefits, this intervention should be dropped. 5. Stop feed and mineral orders or give to service d'Elevage for distribution. 6. Investigate other source of minerals and salt such as steamed bone meal and local salt mixed 50 % - 50 %

Intervention	Present Status	Project Proposal and Pro. Ag.	Imple. Team	Evaluation Recommendation
C. (Cont.) An. mgt 4. Selection	No Action	Selection was recommended in the form of castration culling older non-productive cows and marketing 2 yr old males	The PP. selection proposal was amplified to included several more criteria for selection, artificial insemination crossbreeding and small breeding herds of cattle and sheep.	1. No direct interventions should be directed toward for animal selection due to low potential, longterm nature and questionable applicability. 2. Marketing of the "less productive" animals to reduce overgrazing should be promoted through extension information service.

Intervention	Present Status	Project proposal and Pro. Ag.	Imple. Team	Evaluation Recommendations
C. (Cont.)	NO Animals obtained	1. Reproducing cattle herd for beef production. NO milking, nor use of herders 2. Reproducing sheep flock with herder	1. Reproducing cattle herd for beef production. NO milking but herder to be used. 2. Reproducing dairy cattle herd. cows to be milked. 3. Reproducing sheep flock.	1. Specialization of beef or dairy production is not practical under these economic, social and nutritional conditions. The dual purpose system should be supported. 2. Sheep production is viable and very important in the area but should not be included on the demonstration unit due to the need to simplify management and due to the lack of proper fencing to manage sheep. 3. Two herders will be needed to keep check on Range unit cattle, move cattle for healt control and water cattle, but cattle should have free grazing within assign pasture.

Intervention	Present Status	Project proposal and Pro. Ag	Imple. Team	Evaluation Recommendations
C. (Cont.)				
6. Poultry Unit	Site located on Range Unit	Not included	Proposed Poultry Unit and promised detailed description and economic analysis.	Cancel Poultry Unit
7. Animals Survey (Baseline Data)	Survey of Livestock in Pilot Zone (20 ll radius of Selibaby) has been initiated"but results misplaced" Basic baseline data was also collected by the badland's study.	Not specified other than quoting data collected by badland study.	Extension livestock advisor suggest priority of project should be information gathering in field of animal production including "Land use survey, livestock marketing survey.	1. Monitoring of livestock in the demonstration Unit and Pilot zone is essential to complement the range survey for planning and evaluation of intervention and for controls, and to evaluate the project. 2. Data should be collected in cooperation with the animal health service as well as specific observations and surveys by the livestock advisor. Data should include herd number, composition by age species, sex, lactation status, health, location by season, movement, milk production, animal sales, death loss and sample weight if possible. Sample weight can be obtained with herd ruminants and weight tapes for cattle.

Intervention	Present Status	Project proposal and Pro. Ag.	Imple. Team	Evaluation Recommendations
D. Commodities in Question 1. Wheeled Bulldozer	N^{O} Action	Use proposed, but failed to include in commodity list	Requesting D 4 Bulldozer and Grader.	1. Only a wheeled bulldozer should be purchased if catchment tanks and demonstration unit fire-breaks are to be built and maintained. 2. Wheeled bulldozer would also serve to build two proposed pilot zone catchment tanks if judged feasible by TDY-SCS/USDA surface water consultant. 3. This wheeled bulldozer should be near same as the one on the Bakel Range Project to be able to take advantage of experience in use and maintenance.

Intervention	Present Status	Project proposal and Pro. Ag.	Imple. Item	Evaluation Recommendations
D. (Cont.)				
2. B. Farm tractor	Tractor and equipment ordered	Not Scheduled	Requested for Farming	Cancel order because : a) Not considered feasible intervention for farming in local system, b) Not useful to build range interventions of catchment tanks and firebreaks.
3. Grader	NO Action	Not Scheduled	Requested for firebreak construction and maintenance	Do not order because : a) Extension firebreak constructi not recommended, b) Wheeled bulldozer can do limited firebreak construction around demonstration units and communication to catchment tanks.
4. Forage Scales	NO Action indicated	Not specified, but use indicated	Not specified	Order four small land scale for weighing field samples of forage as cut.
5. Cattle and sheep woven wire	NO Action	Only barbed wire specified	Only barbed wire specified	Order enough woven wire to fence each agronomic unit.

Intervention	Present Status	Project proposal and Pro. Ag	Imple. Team	Evaluation Recommendations
E. Training	1. On the job training in progress. 2. Information gathering trip to Bambey Senegal	Short term training proposed for : 6 livestock agents, 8 extension agents and 2 environmental protection agents.	Proposed a maximum of 6 months training for each of the six counterparts of the project.	1. Project management should approve the short term training as proposed by implementation team. 2. This could be a combination of U.S. training at the USDA summer range management short course at new Mexico state University and/or agronomic orientation, and/ or 3rd country training
F. TDY's	Not being used	18 p m of TDY technical consultation	Not Specified	1. One month TDY of surface water specialist (SCS/USDA or other source with experienced personnel). (French not required) 2. Senior range management consultant to design range monitoring system, advise resident range advisor on collection and help interpret results. (French not necessa 3. Three month TDY in three tri of senior livestock management consultant to design animal monitoring system advise resident livestock advisor on collection and help interpret results. (French not necessary).

Intervention	Present Status	Project proposal and Pro. Ag.	Imple.' Team	Evaluation Recommendations
F. TDY (Cont.)				4. One month TDY hydrologist to study status of demonstration unit water wells and study available data and terrain of the zone to make evaluation of potential shallc well development or improvemer in the area.

IV. Recommendations for revised project

A. Animal traction and growing cattle on integ i Farm

1. Demonstrate, test the feasibility of oxen for pa paration and cultivation of agricultural demonstration plots and use of horses and donkeys for transport and other lighter work.

2. Maintain accurate records of work performed, time, labor, other cost and production to compare with traditional cultivation in the area.

3. Cut and store the crop residue and the legume rotation crop for dry season roughage. Graze fallow fields and the remains of the stubble fields. Keep records of harvest and storage cost.

4. Limited concentrate supplementation will be necessary during dry season for working and growing animals receiving only dry roughage. A mineral-salt supplement should be made available year around. Keep record of cost, consumption and production (gain or work).

5. Cut native grass on fallow and unused land for dry season forage. Keep labor, transportation, storage and other handling costs.

6. Graze the 16 ha. of non farm land on the 20 ha agronomic Unit west of two during rainy season.

7. Limit the number of animals to the four oxen, two horses and four donekys for draft and an additional four young steers for traction animals or marketing. After a year of experience this number may need to be adjusted to better fit the forage productivity of the approximately 30 ha in the agronomic Units.

8. The training and other management as outlined by the implementation team seem appropriate.

9. Initiate in early rainy season 1980 if possible and extend project through December 1982.

B. Range and Animal Management

1. Range demonstration Unit

a. Complete fence with five strands of barbed wire around the 470 ha. unit.

b. Complete one water well with a minimum of three cubic meters of production per day.

c. Build a two cubic meter water trough (2x2x0.5 mt) on the center crossfence intersection to water all four pastures.

d. Pipe water farm well to trough.

e. Build the three planned catchment tanks as to be located by TDY surface water consultant from SCS/USDA or other experienced source.

f. Stock the range unit with 73 AU

(1) The first year (Rainy season 1980 or 81 depending on stock water and fencing) approximately 91 heifers 18-24 months of age weighing average of 200 kg should be obtained (purchased and/or borrowed from herders for a fixed two years). The 91 heifers will be divided into three groups of 50, 25, and 16 head on a random basis. These groups will be assigned to three of the four pastures giving stocking rates of 4 ha/AU, 8 ha/AU and 12 ha/AU, counting semi-permanent and deferred pasture. Each group will graze its assigned pasture eight to nine months from about February through September while the fourth pasture is left ungrazed to reseed and to provide a reserve. All 91 head (three

groups together) will graze the fourth (deferred reserve pasture) three to four months from about October through January to rest the semi-permanent pastures.

(2) The second year these same heifers (then averaging about 240 kg) should be reduced to 73 head, keeping the remaining animals in the same stocking rate group. The new groups will then number 40, 20 and 13 head of heifers, plus 2 bulls with the 40 heifers. 1 bull with 20 heifers and 1 bull with the 13 heifers. The grazing system will be the same as the first year.

(3) Records to be maintained on individual numbered heifers will include original weight of heifers, baseline weight oneach heifer after one month of adjustment and then monthly weight throughout the demonstration. Following the second rainy season and exposure of the heifers to the bulls, they should all be examined for pregnancy in December.

These data will provide a comparison of the effects of stocking rate level on growth and reproduction, both of which are strongly influenced by nutrition.

(4) Range Records to be maintained should include plant composition and yield data on transects and sampling within each of the four pastures plus the reseeding--total reserve plot (part of 25 ha of forest reserve) and the traditional grazing area (control). This will provide data for evaluation effect of stocking rate level, deferred--rotational grazing, complete reserve--reseeding and traditional grazing (in pilot zone) on forage production and plant composition (range and ecological quality).

(5) Animal health control should be provided by the service d'Elevage as specified in the PP. The project will provide support to the service d'Elevage in the form of vaccines, medicines, equipment, refrigeration, transportation, technical consultation of extension animal husbandman to insure complete care of the project animals and improved service in the pilot zone.

2. Pilot Zone

a. Support service d'Elevage as outline above.

b. Build two catchment tanks of 8,000,000 liter capacity (as designed in the Bakel Range and Livestock project) in two undergrazed areas of the pilot zone as designated by the vegatation map being prepared by S. DIOP, the GIRM LIVESTOCK CONSULTANT, AND AS CONFIRMED BY A TDY surface water consultant feasibility evaluation of the terrain. Plan to dig tanks in dry season 1980-81 for use 1981-82.

c. Cut communication path of 10 mts to each of the catchment tanks going through the nearest village to facilitate movement to and from the consturction site, to leave an improved path to the village. Although no firebreaks are recommended, these paths will serve the same purpose and can be evaluated for effectiveness and cost to support or contradict previous unfavorable results.

d. Study potential for improving village livestock and potable water wells. Provide TDY hydrologist (possibly in cooperation with another project) to study area and recommend villages for a total of 2 to 4 renovated or new wells.

e. Monitoring- The range management advisor should establish several transects in the pilot zone traversing heavier use areas (water points) through the intermediate areas to the underutilized areas with little or no water. Specific transects should be established to evaluate the effect of the catchment tanks, that is, before (1980-81) and after (1981-82). These data shold provide a basis for developing a vegetation map in cooperation with the land use survey to be ocnducted by a cooperating project, compare effects of water point distribution in the pilot zone, evaluate the effectiveness of the "Path-firebreaks", evaluate the effect of the catchment tanks, compare traditional grazing with demonstration unit and provide basis on which to make future recommendations for interventions and/or controls.

C. Personnel

1. Senior Agricultural economist with experience in range and agricultural development projects:

   a. To live in Nouakchott and commute periodically to Selibaby.

   b. Provide technical backstopping for implemantation team administration and technicians.

   c. Help design (re-design) monitoring systems to assure collection of useful data on range livestock, economic and social aspects of the project.

   d. Help with analyses and interpretation of data.

   e. Provide mini feasibility studies of potential interventions and technical practices under consideration.

2. TDY Surface Water Consultant

3. TDY Hydrologist for village wells.

D. Time Frame - Extend project to December 1982 to accomplish the simplified objectives with a minimum additional imputs to those already obligated. Given the delays to date and likelihood of partially missing this rainy season, very little useful results could be produced by September or even December 1981.