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Report of GARD Consultancy

AN ASSESSMENT OF DEFERRED GRAZING SCHEMES IN THE GAMBIA

Steven M. Lawry

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REPORT OF AN ASSESSMENT OF DEFERRED GRAZING SCHEMES IN THE GAMBIA

by

Steven W. Lawry
Land Tenure Center
University of Wisconsin-Madison

Prepared for the
Gambia Agricultural Research and Diversification Project,
the Department of Animal Health and Production, and
the Department of Agriculture.

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Report of an Assessment of
Deferred Grazing Schemes in The Gambia

I. INTRODUCTION

This report presents the findings of an assessment of the Deferred Grazing Project and Crop Residue Feeding Program implemented in the course of the Mixed Farming Project (MFP) program of research on range and livestock management. The assessment was proposed in the course of the workshop on livestock production held by the Gambia Agricultural Research and Diversification Project (GARD) and the Department of Animal Health and Production (DAHP) in December, 1986. The workshop expressed the view that, though some evaluative work had been done on these activities (see especially Deffendol 1986; Eastmann et al. 1986; Russo et al. undated), an updated assessment of the programs in relation to current livestock and range research policies was in order.

A consultant from the Land Tenure Center at the University of Wisconsin-Madison with experience in grazing management issues was contracted to join a team made up of Department of Agriculture (DOA) and DAHP staff members representing relevant technical and social science disciplines. In addition to the consultant, team members included: Omar Njie, Range Management Specialist, DAHP; Aminatta Njie, Animal Scientist, DAHP; and Peace Corps Volunteer Bradford Mills, Agricultural Economist in the Resource Management Program at Sapu.

This report was authored by the consultant. The findings and recommendations of the report are based in large part upon observations made by the assessment team during visits to field sites and upon in-depth group discussions. The team's approach was to seek common perspectives on the issues and problems, mindful that consensus on all details and implications of findings to research and development strategies is not always possible. Therefore, this is not a group report and the author is solely responsible for its contents. Bradford Mills compiled Appendices 1 and 2.

The assessment was undertaken during the week of June 22-27, 1987. In the field the team was based at Sapu agricultural research station, and visited all villages where deferred grazing schemes had been established: Piniai (on 23 July); Makama Sireh (24 July); Sukuta (25 July); and Boiram (25 July). MFP had also concentrated extension activities to encourage harvesting, storage, and later use of grain stovers in villages which had received deferred grazing schemes. Information was also collected on the adoption of recommended crop residue management practices during the assessment of the deferred grazing schemes.

II. BACKGROUND TO THE DEFERRED GRAZING AND CROP RESIDUE PROGRAMS.

According to Deffendol "deferred rangelands are forage reserves, protected, often reseeded to improve productivity, and managed for optimum livestock grazing during a specific season of the year" (1986:25). Deferred pasture sites were selected at Pinial, Makama Sireh, Sukuta, and Boiram and fenced to protect them from grazing during the rainy season and the early dry season. This allowed growth and protection of forage for use by selected classes of cattle during the late dry season, when open range forage traditionally is in short supply. On average, deferred pastures were between 10 and 15 hectares in area. In each case they represented additions to already established one hectare sites developed as crop residue storage and feeding points, or as range demonstration sites.

MFP had already established one hectare range demonstration sites in 18 villages, which were used to test the establishment of native and exotic perennial grasses and legumes. Species tested included Andropogon gayanus, Cenchrus ciliaris, Stylosanthes hanata, and root transplantings of Panicum maximum.

Villages were selected to receive deferred grazing schemes where local Livestock Owner Associations (LOAs) had demonstrated high levels of interest and cooperation in past range management activities, including development of the range demonstration sites.

All fencing materials for the deferred grazing sites were provided by MFP, and labor for fence construction was provided by LOA members. Site locations within villages were determined by a combination of criteria, most notably soil suitability, absence of conflict with other land uses, and ability to secure the land for project purposes. In most cases, land tenure was not an issue, as permanent transfer of land rights to DAHP or the LOA was not contemplated. Generally, land under the control of village alkalos was made available for specific project purposes, and insofar as the schemes were devised as demonstration projects of limited duration, the issue of long-term use rights probably did not arise. Land tenure did become an issue at Kumbul, a Fulla village where villagers were concerned that stockholders from neighboring Sarahuli villages might take advantage of rights to graze the deferred site to gain full control of what had traditionally been Fulla land. As a result a deferred grazing site was not established at Kumbul.

LOA members were asked to express their preferences for classes of cattle that should be allowed to graze the deferred sites. Heifers were selected by every village. A research program was designed to compare rates of weight loss/gain between heifers allowed to graze the deferred pastures, and heifers in control groups that grazed open pastures. Girth measurements and weights were taken of both groups at various times in the dry season. It was also hypothesized that an improved dry season feeding regime would reduce the age of first calving by at least one year. However no data were collected to evaluate this question.

Grazing of deferred pastures was to be used in rotation during the late dry season with feeding of crop residues. With the exception of groundnut hay, farmers traditionally had not collected and stored crop residues for feeding in the late dry season. Groundnut hay and other stovers when collected were normally fed too soon, in December and January, while animals did not come under severe nutritional stress until April (Deffendol 1986:30).

An extension program was developed to encourage farmers to collect maize and sorghum stovers, groundnut hay, and rice straw at central storage points, fenced by MFP. Various feeding trails were carried out, evaluating animal weight loss/gain in relation to combinations of stover fed, timing of feeding in the dry season, and feeding of stovers in rotation with grazing of deferred sites.

Logistical and other problems severely hampered data collection. (See Russo et al. for a discussion of data collection problems.) Data collection problems, and especially problems with the control group, made quantitative evaluation of the feeding trials difficult. At Boriam, where problems were least severe, 90 heifers receiving the combined deferred grazing/crop residue feeding package gained an average of five kilograms per day during a 90-day period in the 1984 dry season. This compared with an average loss of three kilograms per day by seven control group animals during the same period.

Deffendol notes that while the original extension approach was to encourage storage of stovers at central collection and feeding points, actual practice evolved toward individuals storing their own stover at their compounds.

With the cessation of MFP field activities in 1986, MFP monitoring and supervision of deferred grazing/crop residue activities at the four villages ended. MFP's own evaluations of these programs tended to conclude that the deferred grazing schemes did not provide promising models for improving range management. The deferred schemes suffered severe management problems. Sites were plagued by uncontrolled bush fires, in the case of Piniai resulting in the complete loss of grazing for the 1984 dry season. Water was not provided at deferred sites, introducing new herding and other labor costs in getting cattle to and from watering points. Questions were raised (but never thoroughly evaluated) about the ability of stockholders to self-finance high fencing costs.

Conclusions concerning feeding of crop residues were more positive. One economic analysis of crop residue feeding estimated an extremely high return to labor of D2.86 per hour (Patrick and Eastmann 1986:6). Although no definitive survey data were available, it was generally perceived that recommended practices for collecting and feeding crop residues in addition to groundnut hay had been widely adopted by farmers in target villages.

III. FINDINGS OF THE ASSESSMENT

The team visited each target village. Normally, the deferred grazing site was inspected on arrival at the village. The Pasture Assistant responsible for the area was asked to relate experiences in developing the site (such as organizing labor contributions for site development), to describe what he knew of the management and research programs implemented at the site, and to describe any problems encountered in implementing the range management program in the particular target village.

Next the team would contact persons in the village who had knowledge of the deferred grazing scheme. This usually included the alkalo and leaders of the Livestock Owners Association. These informants were asked to provide a history of the deferred grazing/ crop residue programs in their village, and to comment on a variety of implementation and management issues. From the first interviews in Piniai a more or less standard set of questions considered relevant to the assessment were asked by the team members. Questioning solicited information on the following subjects.

i) Villagers' perceptions of the effectiveness of the deferred grazing scheme in improving range management and animal condition.

ii) The use and management of the deferred grazing site, including numbers and classes of animals grazed on the site, the duration of grazing, and how use of the deferred scheme was supervised before and after the cessation of research activities. Membership and participation by stockholders in the LOA and the deferred scheme. Involvement of neighboring villages in the scheme.

iii) Technical problems in site development and management, including fire control and water provision.

iv) Adoption of the crop residue feeding practices recommended by MFP.

v) Villagers were asked to describe traditional herding and grazing control practices, and to assess the ability of the village to more intensively control seasonal grazing patterns without fencing.

Summaries of responses to these questions and other observations made in the course of the assessment are presented below. In addition to the above subjects, a brief discussion considers costs and benefits of the deferred grazing sites. The reader is referred to reports by Deffendol (1986, especially pages 25-30) and Russo et al. (undated) for detailed technical descriptions of deferred sites and research activities undertaken by MFP.

1. Villager perceptions of deferred grazing schemes

Virtually everyone spoken to felt that deferred grazing was a beneficial concept. Many participating stockholders had seen tangible benefits in terms of reduced animal weight loss during the late dry season. Agreement that deferred grazing was a good concept even extended to Boriam, where the high costs of watering cattle kept at the deferred site led owners to withdraw their animal after the first season of use.

If evaluated simply in terms of a limited demonstration objective--pasture land rested during the rainy season and protected from grazing during the early dry season will provide a stand of reserve forage for use in the late dry season--the deferred grazing program as implemented might be considered successful. Whether fenced, deferred grazing schemes provide a workable model for grazing management is another question; a question requiring consideration of a number of management, technical, and cost issues not explicitly included in the MFP experimental design. It is the consultant's view that the limited purposes of the program often cited in defending failure to evaluate other relevant issues would not in themselves have justified the levels of expense and effort involved in implementing the deferred grazing program.

2. Use and management of deferred grazing sites

During the research phase of the program use of the deferred sites, including determination of numbers of animals to be grazed, and timing and duration of grazing was supervised by MFP and DAHP staff. DAHP Pasture Assistants were often in day to day contact with villagers and exercised fairly close supervision over how the deferred sites were used. Where clear lines of communication functioned between Headquarters and research staff, pasture assistants, and LOA members, recommended grazing practices were generally adhered to.

Where supervision became lax, usually following cessation of data collection activities, villagers were uncertain as to how sites should be utilized and usually improvised in the absence of clear direction. At Makama Sireh virtually all village cattle of all classes, over 200 head, were grazed on the site for a period during the 1987 dry season. Although this led to the site becoming overgrazed, villagers felt that the reserved grazing provided by the site helped reduce dry season death losses. In contrast, the site at Sukuta was not grazed at all during the 1987 dry season, because the Pasture Assistant had not shown up to tell people when to start grazing. (It also appeared that dry season grazing was not a severe constraint at Sukuta in 1987.)

Where labor cost and technical constraints were not issues (discussed below), stockholders appeared willing to follow the lead of MFP and DAHP staff. It was clear however that successful site development and site management were dependent upon the very active leadership provided by staff.

In each village the assessment team was told that virtually all stockholders were members of the local LOA. Membership fees of about D5 per year were typical. LOAs functioned principally as extension contact organizations,

and had not taken on any independent livestock or range management functions. In villages where MFP/DAHP extension activities ceased, LOAs tended to become dormant. None the less, high levels of stockholder participation and cooperation in development activities forebode well for future collaborative efforts in range management.

The deferred grazing sites were usually intended to serve a number of neighboring villages in addition to the villages where the sites were actually located. The assessment team visited two neighboring villages, Catamina near Piniai and Willingara near Makama Sireh, and queried villagers for their use of the deferred grazing sites. The team had been told at Piniai that Catamina stockholders had not participated in the deferred program. Catamina is a Mandinka village in a predominantly Fula area, and stockholders typically make arrangements with Fula to manage their stock, especially during the dry season. When questioned, Catamina villagers felt that their lack of direct participation in the Piniai scheme was not the result of feeling excluded by Fula domination of the LOA, but because they were satisfied their stock were being properly looked after in traditional stock sharing arrangements. At Willingara distance between the site and village water supplies clearly militated against Willingara's participation.

Deffendol notes problems in securing labor contributions from villages distant from the sites. Since rights to graze stock in the sites were in part related to labor contributions in building fences, stockholders from neighboring villages tended to receive smaller grazing allocations. Arrangements for watering cattle from neighboring villages were not satisfactorily worked out, providing a further disincentive to participation.

At Piniai a short section of fence between two fence posts was down, but generally fences appeared to be intact and in good condition.

3. Technical problems in site development and management

Much has been made in previous reports (Deffendol 1986; Russo et al. undated) about technical problems, often beyond the control of project staff, which hindered implementation of the deferred grazing program. Grazing at Piniai was completely destroyed by a bush fire one week after it was opened for grazing in 1982. The site has burned every year since then, but usually sometime later in the grazing season. While fire break construction would appear an obvious solution to fire control problems, many field staff and villagers were doubtful that sufficient labor could be organized to clear and maintain sufficiently wide fire breaks.

At Makama Sireh, villagers explained they overstocked the deferred grazing site because extensive areas of open range land had been burned and lost to grazing. It would appear that the prevalence of uncontrolled bush fires is a factor in dry season forage availability generally. Fixed deferred sites will always be vulnerable to serious fire loss, and given the high levels of investment involved, better means of fire protection are essential.

A major technical problem at Boiram and Makama Sireh was lack of water on site. During the dry season availability of water and the costs of watering livestock become major livestock production constraints. Under traditional management strategies, many cattle are kept near the river during the dry season to take advantage of easier access to water and to graze swampy areas normally flooded during the wet season.

At Makama Sireh water was collected from village wells into 55 gallon drums and carried by donkey cart to troughs at the deferred site. A similar practice was employed at Boriam, where livestock watering became such an onerous and time consuming task that use of the deferred scheme was abandoned after cessation of research activities. Failure to adequately account for watering requirements was a major weakness in project design.

4. Adoption of crop residue feeding practices

Villager comments on the crop residue program were generally very favorable. The assessment team gained the impression that stover utilization had significantly improved as a result of MFP activity. Villagers observed that many stockholders were collecting, storing, and feeding maize and other grain stovers later in the dry season, as had been recommended by MFP. The assessment team was not in a position to collect any empirical data on adoption rates and actual use practices.

5. The ability of stockholders to intensify range management without fencing, within the traditional grazing system.

As has been noted, informants viewed the availability of a late dry season grazing reserve as clearly desirable. Mindful of this, and in light of the obvious costs of fencing and the various technical problems encountered in the fenced schemes, villagers were asked if it would be possible to intensify village grazing management without fencing. Essentially, this would require that certain sections of open pasture be designated as reserve areas, not to be grazed until needed. Such a system would require thorough village-level discussion and broad agreement on grazing rules and some form of local enforcement mechanism. It would require that animals be closely herded at all times, to ensure they do not wander into reserve areas.

Villagers were doubtful that this kind of grazing control would work. They cited several problems. First, herds were customarily grazed wherever suitable grazing was available, without constraints. Grazing strategies are opportunistic in character. Herders appear not to regulate their grazing patterns to achieve optimum long-term vegetation productivity per se, but to provide the best possible feed for their livestock's current needs. This of course involves moving from place to place, but as a grazing strategy it does not emulate pasture rotation for purposes of managing the vegetation system. This represents a major difference in perspective between how herders and range scientists respectively view livestock and range management problems.

Second, it does not appear that animals are closely herded. Closer herding would have to substitute for fencing in implementing a coordinated grazing pattern. The herdsman hired by LOA members at Piniai to look after

heifers in the deferred grazing site was asked if he could effectively control herd access to an unfenced area set aside as a reserve if hired to do so by the LOA. He was insistent that he could not, because at least some stockholders would object to such restrictions, and since they were also his neighbors he would not want to face the social conflict that would result from such a role.

Third, villagers observed that their village grazing was often utilized by livestock originating for a number of villages, clearly complicating coordination and control of livestock movements. Villages adjacent to swampy areas near the river were often inundated during the dry season with cattle originating from distant villages.

Development of effective regulatory mechanisms in light of current range management practices would be an extremely complicated undertaking, and the social and organizational problems involved should not be underestimated.

6. Costs and benefits of deferred grazing

Questions of benefits in relation to costs were raised in some of MFP's own evaluations of deferred grazing (see especially Eastmann et al. 1986) but cost and benefit data were not evaluated in any systematic fashion. The agricultural economist on the assessment team has calculated cost estimates for development of a 10 hectare deferred grazing site, considering fencing costs only, and assuming labor for fence construction is provided as a contribution by stockholders. (See Appendix 2 for a detailed breakdown of costs). Assuming use of steel fence posts, estimated total costs are D15850. By using untreated wood fence posts (subject to fire damage) total fencing costs would drop to D11508.

Benefits, in terms of such things as reduced weight loss, lower mortality rates, increased calving rates, and increased milk productivity, could conceivably justify these levels of expenditure. Unfortunately productivity data collected by MFP were too limited in scope and of too short duration to calculate credible estimates of benefits.

Any benefit/cost analysis also leaves aside questions of the availability of capital for this kind of undertaking, the ability and willingness of stockholders to meet the costs, and the management of collective loan arrangements.

IV. CONCLUSIONS AND RECOMMENDATIONS

Deferred grazing

The deferred grazing program was conceived as a project to demonstrate that rangelands protected from grazing during the rainy season and early dry season will produce a stand of forage that can be grazed by livestock during the late dry season. In implementing the deferred grazing program, relevant questions about the ability of stockholders to manage the schemes, the

integration of the schemes with other aspects of the livestock, range, and water use system, and the cost effectiveness of this particular approach to range management were not considered. As such, the program contributed little useful information toward the development of workable range management strategies for The Gambia. In considering relevant management, technical, and cost issues ex post, the assessment team identified many potential problems with deferred grazing schemes as replicable models for improving range management.

The deferred grazing program raised more questions than it answered, and several of these questions merit further study. Success in improving range management will hinge upon intensifying range use, principally through better coordination and management of animal grazing patterns. This is essentially a problem of control, and developing the institutional mechanisms for making and enforcing rules governing range use. Available evidence suggests this will be a difficult task to accomplish in The Gambia, principally because little precedence exists for the kind of intensive regulation of resource use needed. But little thought has been given to the issues involved in intensifying management of communal grazing lands, and some modest research would help identify likely constraints and opportunities, and provide some tests of the ability of communities to improve grazing management. It is therefore proposed that GARD and DAHP undertake a joint research project to examine opportunities for improving community management of communal rangelands. The research program would have the following components.

1. A review of existing literature on community management of rangelands in Sub-saharan Africa and The Gambia. Considerable research has been done on communal grazing management in Africa. Much of this research has been collected and summarized by the Land Tenure Center at the University of Wisconsin.

2. Small-scale studies of range and water management in the four villages where deferred grazing schemes have already been established. These studies would have two principal components.

   a. Using rapid rural assessment techniques, research will describe current range and water use and management practices. Most data would be collected through interviews with key informants and would be used to develop a picture of the range use system as a basis for suggesting ways to intensify overall management and control.

Possible strategies for improving control (for instance, by investing LOAs with certain management prerogatives) would be thoroughly discussed with village leaders. This aspect of the research program would involve collection of quantitative survey data. Available studies of livestock ownership, herding practices, and livestock economics undertaken by MFP would in most cases provide sufficient quantitative background data.

Researchers would interact with communities in generating ideas for addressing specific management problems, such as fire control and access to water. Where appropriate, small-scale collaborative projects would be designed to test community management models.

b. A second aspect of this research activity would be identification of existing technical constraints to the ongoing functioning of existing deferred sites, such as water availability and fire control. Research will assess the feasibility of solving these problems through technical assistance and management changes. Any new interventions would be designed with a view to testing the ability of communities to manage deferred sites with a minimum of outside assistance and to bear the costs of site operation and management.

A major benefit of the research activities described above will be a better understanding of the social, economic and organizational constraints to improving the management of communal rangelands. An enhanced understanding of the management environment will contribute to the formulation of more realistic policies and programs in the future.

Crop residue feeding

It appears that the principals of crop residue collection and feeding have been widely adopted by stockholders in the MFP target villages. This suggests that progress in this area should be consolidated by more widely promoting the new practices through extension.

A sample survey of crop residue collection and feeding practices as actually employed by stockholders should be carried out as a second research activity. Data collected will provide a basis for understanding elements of the MFP package found more or less adaptable by farmers. It will also identify farmer innovations in collection, storage, and use of stovers that may be evaluated and usefully promulgated in an extension package.

A sample survey will be carried out in deferred grazing target villages at the same time as the rapid rural assessment described above. These villages were also extension targets for promotion of crop residue feeding and as such will provide a useful benchmark for package adoption. The survey should collect the following information: Types and classes of livestock fed stovers; types, quantities, and combinations of stovers utilized; frequencies and sequences of feeding stover; collection and storage practices; the presence of markets in stovers; an estimated adoption rate of recommended feeding practices.

A final research activity is a study of native legumes and grasses. An objective of the deferred grazing program which has not received sufficient follow-up is evaluation of the performance of native grasses and legumes established at the deferred grazing sites. Trials will be reestablished to yield more definitive data on the performance of selected native grasses and legumes.

The attached Project Data Sheet (Appendix 1) provides detailed descriptions of the research objectives, staff and other resources and activities necessary to implement the research activities recommended by this report. In addition to the inputs summarized on the Project Data Sheet, additional short-term consultant input from the Land Tenure Center could be made available to assist it the survey design and testing phases of the research program.

REFERENCES

Deffendol, Scotty, 1986. Final Report Range Ecology Component. Technical Report No. 14. Mixed Farming Project.

Eastmann, Clyde, J. B. Eckert, P. M. Jakus, M. O. S. Jammeh, W. S. Spencer, 1986. The Gambian Livestock System: A Socio- Economic Perspective. Technical Report No. 16. Mixed Farming Project.

Russo, S. L., N. A. Patrick, S. Deffendol, undated. Conducting Village-level Feeding Trials in The Gambia. Mixed Farming Project.

Vesseur, P, E. J. Hurkens, J. Eckert, J. C. Crouch, L. Mol, 1986. The Gambia Cattle Herd: A Survey Report. Technical Report No. 13. Mixed Farming Project.

APPENDIX I

PROJECT DATA SHEET

TITLE: Livestock Feed Management Study

PROJECT LEADER: Omar Njie

PROJECT SCIENTISTS:
Omar Njie
Musa Bojang
Bradford Mills
Omar K. Touray

CALENDAR START: March 1988 END: December 1988

DESCRIPTION

DEVELOPMENT OBJECTIVES:
-Sustained livestock production
-More efficient use of rangeland resources
-Improved utilization of crop residue as livestock feed
-Production of livestock feed management packages for extension

TARGET GROUPS:
-550 Livestock Owners Association members in the Boiram/Njoben, Pinial/Choya, Sukuta/Tuba Kuta, and Makama Sireh areas
-Extendable to other LOA's in the MID and URD regions.

MAJOR LINKAGES:
EXTERNAL: I.T.C., I.L.C.A.
INTERNAL: D.A.H.P. and D.O.A.

RESEARCH OBJECTIVES:
-Assessment of deferred grazing sites
-Survey of livestock systems and crop residue feeding practices in deferred grazing site villages
-Native Legume and Grasses trials

IMPACTS ON DEVELOPMENT: Development of integrated cattle and small ruminants feeding system in The Gambia

ACTIVITY DATA SHEET

IDENTIFICATION

PROJECT TITLE: Livestock Feed Management Study

ACTIVITY TITLE: Assessment of Livestock Production Systems

ACTIVITY SCIENTISTS:
Omar Njie
Omar K. Touray
Bradford Mills

CALENDAR START: April 1988 END: December 1988

LOCATIONS:
Boiram/Njoben
Piniai/Choya
Sukuta/Tuba
Makama Sireh

DESCRIPTION

OBJECTIVES:
- Provide a descriptive analysis of livestock systems in four locations
- Identify livestock system constraints preventing effective implementation of deferred grazing and crop residue feeding programs
- Provide recommendations for more effective local livestock management practices and grazing controls

ROLE OF SCIENTISTS:

Omar Njie--Assessment team coordinator. Will provide technical expertise in range management and M.F.P. activities.

Omar K. Touray--Animal Health specialist. Will provide expertise on constraints to animal well being and benefits associated with deferred grazing and crop residue programs.

Bradford Mills--Socio-economist. Will provide assistance in analyzing social and economic constraints in deferred grazing and crop residue programs.

OUTPUTS: This activity will evaluate the constraints to livestock control and management and attempt to present alternative Deferred Grazing and Crop Residue programs. Proposals for possible further implementations of deferred grazing schemes and crop residue programs will be drawn up and presented to appropriate donor agencies.

SPECIFIC COMMENTS: The livestock system assessment and the survey will take place at the same time in both village, thereby making using of economies of scale. The results of all activities will be fully integrated in the presentation of a final report.

ACTIVITY DATA SHEET

IDENTIFICATION

PROJECT TITLE: Livestock Feed Management Study

ACTIVITY TITLE: Livestock Feed Management Survey

ACTIVITY SCIENTISTS:
Bradford Mills
Omar Njie
Omar K. Touray

ACTIVITY TECHNICIANS: D.A.H.P. Pasture Assistant will be used as enumerators in the implementation of the survey.

CALENDAR START: March 1988 END: December 1988

LOCATIONS:
Boiram/Njoben
Piniai/Choya
Sukuta/Tuba
Makama Sireh

DESCRIPTION

OBJECTIVES:
-Literature review of Sub-Sahelian livestock feed management systems and analysis of past Gambian livestock system data
-Quantitatively identify feeding strategies undertaken by compounds before and after MFP intervention
-Identify and quantify inputs and outputs of different livestock types

ROLE OF SCIENTISTS:
Bradford Mills - Survey team coordinator. In charge of survey design and overseeing implementation of the survey.

Omar Njie - Range management specialist. Will participate in the survey design, as well as analysis and interpretation of results.

Omar K. Touray - Animal Health specialist. Will aid in survey design and interpretation of the results.

OUTPUTS: In addition to yielding factual information for the Livestock Feed Management Report, this activity will attempt to derive the costs and benefits associated with different livestock types. Such information should prove valuable in judging the cost effectiveness of further implementation of livestock projects. Finally, an evaluation of the success of implementing the crop residue program will be made with the intent of presenting an improved crop residue extension package.

SPECIFIC COMMENTS: The livestock system assess and the survey will take place at the same time in both villages, thereby making use of economies of scale. The results of all activities will be fully integrated in the presentation of a final report.

ACTIVITY DATA SHEET

IDENTIFICATION

PROJECT TITLE: Livestock Feed Management Study

ACTIVITY TITLE: Study of Native Legumes and Grasses

ACTIVITY SCIENTISTS:
Musa Bojang
Omar Njie
Omar K. Touray

CALENDAR START: March 1988 END: December 1988

LOCATIONS:
Boiram/Njoben

DESCRIPTION

OBJECTIVES:
-Establish native legumes and grasses in trial plots
-Determine performance of species in natural conditions
-Determine palatability of species by different livestock types
-Determine regrowth characteristics of species in response to grazing

ROLE OF SCIENTISTS:
Musa Bojang--Forage Agronomist. Establishment and overseeing of trails. Analysis of experimental data.

Omar Njie--Range management specialist. Will assist in design and monitoring of trials

OUTPUTS: The trials will yield an assessment of various native legumes and grasses utility in intensified grazing schemes.

SPECIFIC COMMENTS: The results of all activities will be fully integrated in the presentation of a final report.

APPENDIX II

An Estimation of Deferred Grazing Site Fencing Costs

MATERIALS NEEDED	UNIT COST	COST
WITH METAL POSTS		
1465 meters of pig wire	D. 6/meter	D. 9,522
1465 meters of barbed wire	D. 1.10/meter	D. 1,611
220 steel fence posts*	d. 21	D. 4,620
misc. (U nails, clips)		D. 100
	TOTAL	D. 15,853
WITH WOODEN POSTS		
1465 meters of pig wire	D. 6/meter	D. 9,522
1465 meters of barbed wire	D. 1.10/meter	D. 1,611
220 wooden fence posts*	d. 1.25/meter	D. 275
misc. (U nails, clips)		D. 100
	TOTAL	D. 11,508

* These are untreated wooden fence posts which are assumed to represent a significant savings over the 7 ft. steel fence posts used by M.F.P. They are, however, subject to destruction by fire.