...IONAL DEVELOPMENT

PN-AAX-955-A

INTERIM EVALUATION

OF

SOMALIA CENTRAL RANGELANDS DEVELOPMENT PROJECT

USAID Project 649-0108

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT
5151 E. Broadway, Suite 1300
Tucson, Arizona 85711-3766

Contract No. PDC-1406-I-7008-00

June, 1987

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

INTERIM EVALUATION

OF

SOMALIA CENTRAL RANGELANDS DEVELOPMENT PROJECT

USAID Project 649-0108

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT
5151 E. Broadway, Suite 1500
Tucson, Arizona 85711-3766

Contract No. PDC-1406-I-7008-00

June, 1987

INTERIM EVALUATION

of

SOMALIA CENTRAL RANGELANDS DEVELOPMENT PROJECT

USAID Project 649-0108

Prepared by

Dr. Steven H. Sharrow
Dr. David A. Bryant
Dr. Ray F. Brokken

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT
5151 E. Broadway, Suite 1500
Tucson, Arizona 85711-3766

Contract No. PDC-1406-I-00-7008-00

June, 1987

TABLE OF CONTENTS

	Page
PREFACE	ii
INTRODUCTION	1
SUMMARY	3
RECOMMENDATIONS	4
EVALUATION METHODOLOGY	6
EXTERNAL FACTORS	7
INPUTS	8
OUTPUTS	8
PURPOSE	12
GOAL	13
BENEFICIARIES	13
UNPLANNED EFFECTS	14
LESSONS LEARNED	14
SPECIAL COMMENTS OR REMARKS	15
RESPONSE TO SPECIFIC EVALUATION ITEMS	15
Relationship of USAID-Funded Components to Other CRDP Components	15
Range Resource Component	16
Water Development	17
Soil and Water Conservation	18
Range Management	19
Range Monitoring and Survey	20
Formal Training Component	21
Curriculum	21
Students	25
Faculty	26
Facilities	28
Research	28
Institutionalization of the Formal Training Component	30
Range and Livestock Associations	30
Functioning of RLAs	32
Institutionalization of Project Activities	34
APPENDIX A. PEOPLE INTERVIEWED	36
APPENDIX B. REFERENCES	37

PREFACE

The report which follows was prepared by representatives of the Consortium for International Development under Contract No. PDC-1406-I-7008-00. The report is an interim evaluation of progress and contractor performance for the Central Rangelands Development Project in Somalia being implemented by Louis Berger International. The findings and recommendations are based on field investigation conducted in Somalia during the period May 10-31, 1987. The authors of the report are:

Dr. Steven H. Sharrow
Associate Professor Range Resources
Oregon State University
Corvallis, Oregon 97331

Dr. David A. Bryant
Head, Department of Range Resources
University of Idaho
Moscow, Idaho 83843

Dr. Ray F. Brokken
Consultant Agricultural Economist
Corvallis, Oregon

The team members acknowledge the assistance of USAID/Somalia, Louis Berger International and the Government of Somalia in carrying out this evaluation.

INTRODUCTION

General Background
(excerpted from the 1979 PP, USAID/ Somalia)

Somalia is located between latitudes 11° 30' N and 1° 30' N and covers an area of over 637,000 square kilometers and a population of 3.5 million of which 80 percent are pastoralists. Its surface forms part of two plateaus sloping from the Ethiopian highlands, towards the Indian Ocean in the east, and the Gulf of Aden in the north. Climatically, the country divides into: (i) a northwest zone with a mediterranean climate and an annual precipitation of above 400 mm in certain areas; (ii) a northern and central zone with an arid and hot climate and annual precipitation between 50 and 200 mm; and (iii) a southern zone with a more humid climate and an annual precipitation of up to 600 mm. Two rainy seasons prevail over much of the country, the long or "Gu" rains (March-April to June) and the short or "Der" rains (September-October to December). Rains are highly variable in total amount, intensity and geographic distribution. Storms tend to be concentrated over small areas, consequently some areas may not receive any rain during some years. The rainy seasons are separated by the dry monsoons. The southwest monsoon occurs during July through August and the northeast monsoon occurs December through February. The temperature is fairly uniform throughout the year varying from 25° C to 30° C.

Nearly half of the total area of the country is made up of rangelands receiving 50-200 mm of erratic annual rainfall and is described as semi-desert and wooded or bush grassland.

Livestock production is the most important industry of Somalia. Over two-thirds of the population is engaged in transhumant grazing of livestock in the rangelands. Livestock production contributes about 75-80 percent of total foreign exchange earnings through export of live animals and animal products. Over the three-year period, 1974-76, an average of 1.5 million live animals were exported annually, of which 57 percent were sheep, 38 percent were goats, while cattle and camels accounted for 3 percent and 2 percent respectively.

The traditional livestock industry is based on natural rangelands which constitute 45 percent of the total land area (30 million ha.). This land is suitable only for extensive livestock production. The rainfall is erratic, both with respect to distribution and timing. Most of Somalia is consequently classified as arid to semi-arid. In central Somalia, the vegetation consists mainly of sandy bush grasslands. On the average, droughts occur once every five years. This severely limits the productivity of rangelands. These rangelands are already under pressure and are forcing pastoralists to fall back on the scarce stock water points. This results in overgrazing of vegetation in the surrounding area. However, range vegetation has a remarkable resilience. Normal rainfall and reduction in grazing pressure would enable the rangelands to substantially resume their vigor.

The sole productive use of the rangelands is to graze livestock under a husbandry system flexible enough to adapt to the sparse and erratic rainfall. The Somali pastoralists have developed a system of production which minimizes the effects of drought and disease. They achieve the best possible grazing by dispersing their herds wisely. The pastoralists constantly attempt to make maximum use of natural grazing and expand their flocks through uncontrolled breeding. The expansion of flocks is done in anticipation of the heavy losses which the next drought is bound to inflict. This traditional system has functioned as long as new grazing areas were available and feuds, drought and disease acted as a check on human and animal numbers. The enforcement of law and order and advances in human and veterinary medicine, together with first stages in the modernization of the economy, have, however, removed these constraints. The pastoralists are now compelled to compete with one another for the available forage and water. They have had wide experience in the utilization of grasslands but need additional technical knowledge to define the needs of the vegetation for recuperation and thereby to optimize the biomass supported by the soil and water resource available.

CRDP Project History

The CRDP is a large multidonor range and livestock development project designed to benefit nomadic pastoralists of Central Somalia. The overall project concept as developed by the World Bank was presented to prospective donors in April, 1979. Initial participants included IFAD, IDA, ODM, WFP, and GOS. The ODM withdrew from CRDP during its formulative stage and was replaced with GTZ. What emerged during the formation of CRDP was a set of individually funded and directed component projects each directed by a specific participating agency. Responsibilities were approximately assigned as follows: GTZ - veterinary services and forestry; IDA and IFAD - Infrastructure (buildings) and non-formal education; USAID - Range Management, Soil & Water Conservation, and formal education; WFP - food for work program in support of other project components; and GOS - Somali staffing of NRA, maintenance of infrastructure, and expendable NRA supplies. Plans for the USAID components were formally described in an August, 1979 PP. A contract was awarded to LBI in December, 1981 to begin implementation of the USAID portion of CRDP. Weaknesses were noted in the original project design by both USAID and LBI at the time of contract signature. Therefore, LBI agreed to prepare an inception report which would attempt to eliminate the design weaknesses present in the PP. This was to cause problems later as the inception report was never accepted by USAID as an alternative design document superseding the PP. Following completion of the inception report in April, 1982, LBI began implementing it. By 1986, it was evident that USAID was using the PP as the standard for implementation while LBI was working under the inception plan. A PP amendment was prepared by USAID/Somalia in consultation with the LBI/ Mogadishu chief of

party in order to incorporate experiences gained with the project since 1979, and to reconcile differences between the 1979 PP and LBI's 1982 inception plan. This effort was only partially successful as differences in basic project emphasis still exist with the amended PP emphasizing technological interventions, while LBI's inception plan emphasizes evaluation of prospective technology. These differences in perception of project purpose, together with a certain amount of ambiguity in the amended PP concerning project objectives and how project success is defined have greatly complicated the task of project evaluation.

SUMMARY

The Central Rangelands Development Project (CRDP) is a long-term rangeland development effort conceived by the World Bank in 1979. The goal of the CRDP is to increase range livestock production, thereby improving the income of pastoralists, while at the same time conserving or enhancing Somalia's rangeland resources. The project target area is a three-region, 150 thousand square kilometer area in Central Somalia containing approximately 30% of Somalia's rangelands. Approximately 4/5 of the half million people living in the project area participate directly in livestock production. Goats, sheep, cattle, and camels are all important livestock species in the project regions. Climate is tropical semi-arid with erratic rainfall generally ranging from 50 mm to 300 mm per year.

The CRDP is a multidonor effort involving agencies of the World Bank, the GTZ, and USAID along with the Government of Somalia. The initial phase of CRDP began in 1979 with a total funding of $45 million of which approximately $15 million was provided by USAID. Each donor accepted responsibility for specific components of the overall project. The purpose of the USAID component was to (1) improve rangeland and livestock productivity through the introduction of improved range management practices and livestock water supplies, and (2) improve the Somalia National Range Agency's ability to implement range development by training an NRA staff. The expected end of project status has been quantified in a table of target outputs which is included in the 1986 PP amendment.

In general, the project is well on its way to meeting EOP targets. Inputs are generally being provided by USAID, LBI (the contractor), and GOS in a timely fashion and are of high quality. A notable exception is failure of GOS to provide a sufficient and dependable supply of fuel to meet project needs.

Outputs are coming on-line as anticipated and are generally functioning as planned. The project has been very successful in educating NRA students of Somalia National University through development of a functioning Department of Botany and Range Management. Students are technically well educated and perform well on the job after graduation. Physical range improvements,

such as surface water impoundments, village shelterbelts, sand dune stabilization, etc. conducted by the project are generally functioning as planned and enjoy considerable support from the local population. Range management surveys have culminated in range management plans in the three project priority districts. It is too early in the implementation of these plans, which include grazing management strategies, to evaluate their merit.

Overall, the evaluation team feels that the USAID-CRDP project is making a valuable contribution to the educational, scientific, and technological bases for future implementation of improved rangeland management practices in Central Somalia. It is important, however, that monitoring to document the biological, sociological, and economic effects of technology introduced by the project be increased, so that their potential contribution to knowledge can be fully realized.

RECOMMENDATIONS

Based upon its evaluation of the CRDP, the evaluation team suggests that USAID consider taking the followig actions to improve project design and performance.

Formal Training Component

1. Seek to add coursework in speech and technical writing as well as sociology or anthropology to the curriculum at FOA SNU.

2. Incorporate practical experience or field training into the curriculum.

3. If agroforestry topics cannot be adequately covered in the Soil Conservation or Advanced Range Management courses at FOA, add a new course in agroforestry.

4. Pursue the addition of an expanded English language training component to the formal FOA course offerings as a priority item.

5. Continue the current policy of providing textbooks for range students.

6. Consult with GOS concerning the need to raise the pay of range graduates employed by NRA/CRDP to at least the 7,000-9,000 shilling rate paid to employees on other projects. Raise per diem rates accordingly.

7. Seek to have FOA SNU waive the teaching restrictions on returning participant lecturers to allow them to teach a full course load.

8. Extend the expatriate professors two years past the completion of the CRDP project to allow for needed overlap with the returning participant lecturers.

9. Equip the forage analysis laboratory as a top priority.

10. Evaluate research progress to date and prioritize future research needs for Somalia.

11. Explore a U.S. sister institution relationship for the formal training component and actively seek continuing external support for the Department of Botany and Range Management.

Range Resource Component

12. Emphasis on surface water development as opposed to boreholes for developing water in areas lacking a water source is proper and should be continued. Boreholes tend to be associated with land degradation near the well. No new boreholes should be drilled.

13. Limit water development, shelterbelts, sand dune stabilization or any other physical range improvement to areas where the improvement is part of an overall land management plan developed in consultation with local inhabitants.

14. Gather data to determine both the technical success and impacts on surrounding areas of all physical range improvement practices, including surface water development, shelterbelts, and sand dune stabilization techniques.

15. Continue project policy of only attempting to stabilize small dunes whose requirements are within project resources.

16. Gather data from controlled grazing areas to validate proposed grazing management practices. Data should include range plant production, number and type of livestock, season and duration of grazing use, degree of forage utilization, and some measure of livestock performance (preferably average daily liveweight change).

17. Revise work plans of expatriate range ecologists to include more monitoring of range vegetation reaction to physical range improvements and grazing management. Time could be made available for monitoring by abandoning the plan to survey an additional three districts outside of the three project priority districts.

18. Encourage project range ecologists to standardize their range survey and reporting procedures.

19. Seek to have GOS increase the priority level of CRDP for fuel allocation purposes. If a sufficiently reliable supply of petrol and diesel fuel cannot be obtained through GOS, fuel should be purchased directly by USAID to meet the needs of its project.

20. Employ a resource economist to analyze and estimate the economic benefits of project interventions including well rehabilitation, surface water developments, village shelterbelts, sand dune stabilization, and grazing management reserves.

EVALUATION METHODOLOGY

This evaluation is being conducted in year 6 of an 8-year project in order to measure progress, examine implementation strategies being employed, and make recommendations to improve project implementation. The evaluation team included Dr. Steven H. Sharrow, Range Ecologist and team leader (Professor of Range Science and Agroforestry, Oregon State University), Dr. David A. Bryant, Range Management Specialist (Professor and Head, Range Resource Dept., University of Idaho), and Dr. Ray Brokken, Agricultural Economist (private consultant).

In gathering information for the evaluation, the team reviewed project publications, progress reports, degaan management plans, consultants' reports, and project design/implementation documents from USAID, CRDP, and LBI files (see Appendix A). Interviews were held with project partitipants from the Faculty of Agriculture at SNU, CRDP, World Bank, USAID, and LBI (see Appendix B). A circular path from Mogadishu to Hobyo was flown in a light aircraft in order to observe general land characteristics and use patterns in Hiraan, Galgudud, and Mudug regions of Central Somalia. A 7-day field trip to Bulo Burte, Ceel Dhere, and Hobyo districts provided an opportunity to see project field activities first hand and to interview pastoralists, Range and Livestock Association Committees, district officials, former FOA-SNU students, and LBI field personnel and their Somali counterparts.

In preparing the evaluation, the team was requested to focus attention on five issues: (1) are the range management practices being recommended ecologically sound and consistent with Somalia development objectives, (2) are range livestock associations functioning as intended, (3) have project activities been institutionalized and will they likely continue after project termination, (4) are the subject matter being taught and research being conducted in the Department of Botany and Range Management at SNU consistent with the needs of Somalia, and (5) are Range Science students at SNU being taught in an effective manner.

Acronyms used in this report are defined as follows:

CRDP	Central Rangelands Development Project
EOP	End of Project
FOA	Faculty of Agriculture
GOS	Government of Somalia
GTZ	German Technical Mission
IDA	International Development Association
IFAD	International Fund for Agricultural Development
LBI	Louis Berger International, Inc.
MOV	Means of Verification
NFE	Non-Formal Education
NRA	National Range Agency
ODM	Overseas Development Ministry, U.K.
OVI	Objectively Verifiable Indicator
PP	Project Paper
SNU	Somalia National University
WFP	World Food Program

EXTERNAL FACTORS

A set of important external factors is provided in the assumption section of the original PP. Some of these assumptions are no longer relevant under the amended PP. These are excluded from consideration.

The two major external factors which have impacted project performance are the 1986-87 drought, and failure of GOS to supply fuel as agreed. As a result of below-average rainfall during 1986-87, many livestock in the Central Rangelands perished. Some grazing reserves were open earlier than planned to provide needed forage, thus disrupting planned grazing management. The current negative livestock range production situation caused by the drought may, conversely, have some positive effects upon production in the near future. The recent above-average rainfall together with low animal numbers will allow heavily grazed range areas to recover. Favorable balance of forage demand and forage supply may make pastoralists more willing to accept grazing reserves and other strategies which restrict livestock access to areas.

For the most part, GOS appears to be very supportive of CRDP. A major impediment to the progress of CRDP field programs has been the failure of GOS to provide petrol and diesel fuel as planned in the PP.

INPUTS

Since the last project review in 1983, personnel and commodities provided to the project by USAID and LBI have been timely and of high quality. An exception is the forage analysis lab which is now several years tardy in being equipped and made operational. Given the history of problems in getting the proper lab equipment purchased and delivered to FOA SNU and the short time remaining before EOP, it is questionable if the lab will become operational in time to make a meaningful contribution to project programs.

The GOS has responsibility for providing Somali counterparts and CRDP staff, maintaining CRDP buildings and other infrastructure, and providing expendables such as petrol and diesel fuel for project needs. Counterparts and CRDP staff, both in Mogadishu and in field offices, appear to be in place and to be generally competent and energetic. Transfer of counterparts into and out of the project without consulting their expatriate colleagues has been an occasional problem. Buildings administered by CRDP are relatively new. They are presently in good repair. Fuel shortages were mentioned by both expatriates and Somali CRDP employees as being a major impediment to project activities. Lack of fuel to run construction equipment often idles large field crews for days on end, greatly slowing project efforts and dramatically increasing the cost of range improvements. Project ecologists have sometimes not been able to get to the field because no fuel was available for their vehicles. Generators at CRDP compounds in the districts are often not run because no diesel fuel is available. Disputes over allocation of the fuel available contribute to friction within the project. When fuel is available, it may be of poor quality. Past reports suggest that fuel shortages have been a problem since project inception. The perception of expatriates which the team interviewed is that the fuel problem has gotten worse over time rather than better.

OUTPUTS

The intended project outputs in both the original PP and the 1986 PP amendment were ambiguous. The team assumed, therefore, that the table of target accomplishments contained in the amended PP was meant to serve as a list of project outputs (see Table 1).

Project outputs in general are being accomplished on schedule. Quality of outputs is high. Physical outputs completed such as wells, dugouts, shelterbelts, etc. are technically sound and are functioning as intended. Project emphasis in water development has changed from subsurface to surface water sources. It appears unlikely that more than one to three new boreholes will be successfully developed prior to EOP. Developments requiring heavy construction equipment or trucks such as dugouts, well rehabilitation, berkeds, access tracks, etc. are behind schedule largely due to lack of fuel. Unless a dependable supply of fuel is obtained, output targets will not be met by EOP.

Table 1. Amended project paper targets and accomplishments.

Components	Unit	Amended pp Targets	Completed as of 1986	To Do Before End of Project
A. Range of Development				
1. Resource Inventory	aerial survey	2	1	1 (additional requested)
2. Ground Survey	districts	6	3	3
3. Establish Range Condition Guides & Standards	--	--	In process	Update
4. Identify Areas for High Erodability, Grazing Reserves, Stock Water Devel.	--	--	In process	Continue
5. Range Monitoring Sites				
a. Fenced	sites	10	4	6
b. Not Fenced	sites	20	10	10
6. Access Tracks	km	250	50	200
7. Demarcation Lines of RLAS	km	1,000	500	500
8. Forage Identification	--	Proposed	In process	Continue
9. Forage Analysis	--	--	None to Date	--
10. Grazing Reserves	% of CRDP	23	3	20
a. Range Reserve	No.	18	6	12
b. Famine Reserves	No.	0	0	0
c. Village Reserves	No.	0	0	0
11. Grazing Assoc. (RLA)	No.	18	6	12
a. Mgmt. Plans	No.	20	8	12
B. Water Development				
1. Boreholes	No.	13 good	7 good	6 good
2. Dugouts	No.	77	17	60
3. Wells--New or Rehab.	No.	61	11	50

Table 1, continued

Components	Unit	Amended pp Targets	Completed as of 1986	To Do Before End of Project
C. Soil & Water Conservation				
1. Demonstrations				
a. Water Spreading	Site	3	2	1
b. Grazing Cooperatives	Site	0	0	0
2. Village Shelterbelts	No.	29	0	20
3. Berkhods	No.	28	8	20
4. Nurseries	No.	7	4	3
5. Dune Stabilization	Site	15	3	12
D. Animal Husbandry				
1. Livestock Survey	Survey	6	1	5
2. Herd Monitoring	Herds	6	0	6
E. Formal Training				
1. FOA Range Serv. Bldg.	% completed	100	100	0
2. Long-term Training				
a. Range Component				
(1) USA	Std. Years	20	20	9
(2) Third Country	Std. Years	8	0	8
b. FOA Component				
(1) USA	Std. Years	23	7	16
(2) FOA B.S. degrees	No.	53	13	40
3. Short-term Training				
a. In Country	No.	100	25	75
b. USA	No.	7	1	6
c. Third Country	No.	13	3	10
F. On-the-Job Training	No.	60	40	20
G. Publications	No.	63	37	26

Range inventories for the three priority districts are being completed on schedule and are scientifically sound. Coordination to standardize inventory methods among districts needs attention, however. Range monitoring work is scheduled to begin this year as is ecological survey of three additional districts. The evaluation team is concerned that this increased workload may be beyond the capability of the three range ecologists to perform. We suggest that the ecologists concentrate their efforts in monitoring the three priority districts rather than attempting to survey three new districts.

Training of Somali students both at FOA SNU and at U.S. schools has been excellent. Students are satisfied with the training which they received. Their job performance following graduation has been good. Numbers of graduated students plus those currently pursuing education in project programs are consistent with training goals being accomplished by EOP.

PURPOSE

The project purpose as stated in the Amended PP is to: (1) assist the Government of Somalia to improve rangeland and animal productivity through introduction of improved range management practices, livestock water supplies and improved veterinary services, (2) gain the confidence and cooperation of the pastoralists by establishing a dialog with them through non-formal training and (3) improving NRA's ability to implement range development by training staff at all levels and by providing technical assistance. This goal includes components (i.e. veterinary services, non-formal education) which are not provided by USAID. Presumably, it is a statement of goal for the CRDP in general. Extracting the USAID portion yields a project goal to assist the GOS to (1) improve rangeland and animal productivity through introduction of improved range management practices and livestock water supplies, and (2) improve NRA's ability to implement range development by formal training of staff. Critical yet questionable assumptions implicit in achieving linkage between project outputs and purpose are: (1) that appropriate range management practices are known which will improve both range and livestock production in Central Somalia, (2) that potentially useful technologies will be socially acceptable to Somali pastoralists, (3) that water development will necessarily improve range and livestock productivity, and (4) that people trained by the project will be available to the NRA. The evaluation team is not aware of any range grazing management practices which can be reliably applied to increase range plant or animal production without control of number of livestock using the range. Since grazing systems requiring control of livestock numbers are assumed to be socially unacceptable to Somali pastoralists, all proposed grazing management interventions should be viewed as experimental in nature until validated by successful implementation in the field. The current grazing interventions have not been in place long enough for evaluation and validation to occur.

Water development is not likely to increase range plant production. It may increase animal production to the extent which it relieves water stress in livestock and opens up underutilized range areas for grazing. However, water development which does not consider sociological, ecological and economic factors may promote destruction of rangelands through overgrazing, human conflict over grazing and water rights, and a decrease in their economic well being.

To date, most of the Somali students trained by the project have been employed by NRA. Given the relatively low pay provided by NRA to its employees together with a general lack of any adequate reward system to recognize employee excellence, it is questionable that well trained, motivated people will remain at NRA once USAID support ends. Since practically all requisition funds within NRA flow from outside donors, trained staff would have little utility without continued donor support for expendables.

It is the evaluation team's opinion that purpose 2 will be achieved at project termination, but that abilities of NRA will then deteriorate over time if employee pay and/or benefits are not increased by GOS.

There is little reason to believe that purpose 1 will be achieved by project end. In addition, the project monitoring system lacks adequate base data about pre-project range or animal production to quantify increases if they occur. This is not to say that the project has not made valuable contributions towards establishing a foundation of knowledge upon which later range/livestock management strategies may be based. Technological interventions undertaken by the project may ultimately achieve project goals, but this aspect is difficult to project from the status quo. In light of the long-term nature of rangeland-livestock project issues, it is unrealistic to assume that measurable production increases will occur during the life of a short project.

It is much more realistic to view an initial project as a mechanism to establish what is possible (as is done in LBI's inception plan). Actual infrastructure development and field implementation of technology would then occur in a phase II project. By this more realistic definition, the project would be considered to be well on its way to success.

GOAL

The statement of goal contained in the original PP appears to be a restatement of the project purpose. The amended PP does not contain a goal statement. Therefore, the evaluation team is unable to offer useful observations concerning the probability of project purpose leading to goal.

BENEFICIARIES

The country of Somalia is benefiting from investment in development of human capital, appropriate agricultural technology, and infrastructure. The formal training component of FOA SNU as well as on-the-job training of CRDP counterparts gives direct benefits to the individuals trained as well as indirect benefits to the country as a whole. Benefits from training are realized over the lifetime of the people trained.

No firm data are available to assess the impact of physical range improvements (water development, village shelterbelts, sand dune stabilization, etc.) on the welfare of local people. However, field observations by the evaluation team and interviews with pastoralists suggest that several thousand people of all ages have directly benefited from access to water, fuelwood, and fodder provided by project interventions. It would be worthwhile to commission a resource economist to accurately estimate the

number of people impacted, the level of impact achieved, expected lifetime of the improvements, maintenance costs of improvements, and the overall economic effect of improvements in each of the project districts.

UNPLANNED EFFECTS

The only major unplanned effect encountered to date was associated with development of permanent water sources. Provision of permanent water by drilling boreholes to tap groundwater resulted in much more human and livestock use of adjacent areas than was originally envisioned. Overuse of rangelands and cutting shrubs for fuel have contributed to desertification of large areas near boreholes. For this reason, the project has essentially discontinued its drilling of new boreholes.

LESSONS LEARNED

The CRDP since its inception in 1979 has been plagued by problems of coordination between the six participating donors (USAID, GTZ, WFP, GOS, IFAD, and GSDR). This problem is exemplified by the fact that although the individual project components are recognized to be interdependent, activities of some components began almost two years after others. The USAID-funded components of CRDP have also suffered from poor internal coordination, unclear chain of command, lack of a common vision of project purpose, and unrealistic project objectives, together with problems in securing expendables (particularly fuel) from GOS. All of these problems are related to a weak initial project design. The 1986 project amendment has helped solve these problems to some extent but is incomplete (lacking a revised logical frame work, statement of goal, MOV, LVI, etc.). Its relation to the original PP is ambiguous. Coordination of diverse project activities, clarification of chain of command between participants (GOS, USAID, USAID direct-hire expatriates, FAC, NRA, CRDP) and securing adequate reliable expendables are commonly encountered issues in working overseas. A strong project design would have taken these aspects into account. The lesson to be learned from this experience is that the USAID project design procedures can provide a valuable tool to check the logical foundation of a project and to coordinate project efforts by clearly defining what is to be accomplished, how it is to be accomplished, who is responsible for each activity, and how project performance will be evaluated. Project design and internal evaluation needs to be an on-going process so that new knowledge/ experiences may be incorporated into the project design as conditions warrant.

SPECIAL COMMENTS OR REMARKS

An analysis of expected economic benefits from the various interventions would be useful to help prioritize project activities and to indicate priority under a possible project extension.

A resource economist, experienced in project analysis could provide useful analyses of the possible economic value of the various interventions. For example, what are the expected and maximum possible benefits from dune stabilization? What are the benefits from some of the more successful water projects of various types (wells, well rehabilitation, dugouts, berkeds, etc.)? What are the possible net benefits from deferred rotational grazing?

One striking facet of pastoralist life is the lack of community organization to undertake community projects. For example, in some cases private entrepreneurs build berkeds or dugouts and sell water. It was reported that the investment in these private projects was very quickly paid off. It would appear that community water districts could provide services that individuals could not, and distribute the benefits under more competitive (or zero monopoly profit) pricing. Lack of community organization or ability to organize may thus be a major factor inhibiting community action. The RLAs are perhaps the first community development organization to be formed in many of the Central Rangeland communities. Some sociological studies to determine how these community development organizations could function more effectively and what other community development roles they might play could be very useful for long run development efforts.

In the time remaining, economic and sociological analyses would have to focus on only a few specific cases. The evaluation team recommends that both economic and sociological studies be undertaken in the last two years and that both sociological and economic components be added to any phase II effort of the CRDP. It is the team's understanding that an expatriate sociologist may be hired by USAID to undertake such studies sometime within the next two years.

RESPONSE TO SPECIFIC EVALUATION ITEMS

Relationship of USAID-Funded Components to other CRDP Components

As explained earlier, the CRDP is a multi-donor project with each donor sponsoring a set of specific CRDP activities. In general, CRDP components are run quite independently of each other, each with its own particular objectives and methods. The USAID-sponsored Range Management component is highly dependent upon the World Bank-sponsored NFE component to provide a link between Somali pastoralists and project technical experts during the design and application of physical range improvements and alternative range management practices. Relations between the

Range Management and NFE components have been cordial. The NFE component has been very effective in providing the services required to support the work of the Range Management staff. The evaluation team is concerned, however, that the proposed reorientation of the NFE component towards emphasis on agropastoralism which is being considered under Phase II of the World Bank project will result in reduced extension services available to support future range management work.

Relations between the GTZ veterinary component and the Range Management component have consistently been cordial. With addition of a livestock production specialist to the LBI Range Management staff, joint livestock production survey and research projects have begun to develop with GTZ veterinary staff.

Coordination of all components within CRDP is, in theory, accomplished through the activities of a full-time CRDP project Director and a project Donor Advisory Board which meets twice a year. In practice, this mechanism has been ineffective. Individual donors largely run their components as distinct enterprises divorced from the activities of other components. The advisory board appears to serve more as a mechanism to receive reports than as a decision-making body. The administrative chain of command within CRDP has occasionally posed problems for contractors who find themselves torn between conflicting requests from the CRDP director and the representatives of their donor agency.

Range Resource Component

The USAID-funded Range Resource component contains the following main activities: water development, soil and water conservation, and rangeland vegetation monitoring. In addition, formulation and implementation of rangeland management plans is a joint program of the range resource and NFE components.

As pointed out earlier in this report, both the philosophy and activities of the CRDP in general and the USAID components in particular have changed over time from those originally described in the 1979 PP. The Range Resource component appears to originally have been envisioned as a careful step-wise application of existing proven technologies to a large three-region area. In concept, the process involved four sequential steps: (1) quick surveys of rangeland areas to describe range resources (i.e. 1979 aerial survey, ecological vegetation mapping and range condition classification), (2) formulation of area management plans, (3) application of proposed technology, and (4) monitoring of vegetation and livestock to assess management effects. Project emphasis was placed upon technological interventions such as well drilling, construction of dugouts, and grazing reserves. The 1982 LBI inception plan contained increased emphasis on validation of proposed technology and scaled the scope of intervention down to focus efforts on 3 districts within the original 3 regions. This plan was never

fully implemented. Project progress was evaluated in March 1983. The evaluation team at that time suggested that proven transferable technology appropriate to conditions in Somalia was not known with certainty. Their recommendations, if implemented, would substantially shift project emphasis from implementation to development and assessment of potentially useful technology. Such a change would require much more monitoring of management effects upon people, livestock, and vegetation than was occurring at that time. The PP was amended in 1986 to reflect experiences gained since 1979 and to resolve discrepancies between the original PP, the LBI inception plan, and what was actually being carried out in the field. Recommendations made by the 1983 evaluation team are reflected to some extent in the Amended PP which appears to contain increased emphasis on range monitoring.

Water Development

Of all the technological interventions undertaken by the CRDP, development of water sources is the most popular one with pastoralists. People which the team interviewed in the project districts consistently mentioned water development as a major benefit which the CRDP had provided to them. The original PP called for drilling 32 boreholes. However, a relatively low success rate (7 useable wells out of 19 drilled) together with range overuse observed to be associated with permanent, water sources resulted in boreholes being deemphasized in favor of limited duration surface water sources such as dugouts and berkeds. The evaluation team is in complete agreement with the concept of limiting the number of boreholes to the absolute minimum possible. Deep boreholes are expensive to drill and their water lifting pumps require maintenance which is often not available in remote areas. Permanent water attracts people and their livestock which may devastate rangeland within several kilometers of the water source. Small dugouts, in contrast, only provide water for several months after rainstorms. They are an intermittent seasonal water source which can provide water to pastoralists so that areas may be grazed for limited periods. The size of the dugout may be designed to provide only enough water to support the level of grazing desired under the range management plan for that area. Properly constructed dugouts require relatively little maintenance. The team observed several successful dugouts in the project districts. The technology to site and construct dugouts seems to be well known. Since both the location and size of dugouts affect the seasonal distribution of people and their livestock, political as well as range management aspects of surface water development must be considered. In theory, the NFE unit provides a link between local pastoralists and water development staff. The team believes that coordination between the NFE and water development staff is adequate to ensure that the desires of potential water users and local political considerations are represented in water development decisions. Range management/ecological concerns are currently given inadequate attention when siting and constructing water developments in areas which lack an area management plan.

Range ecologists are rarely consulted to help determine the appropriate size of dugouts, even in areas having a management plan in effect. Since water development is a fundamental tool in managing semi-arid rangelands, it should only be undertaken as a portion of a formal overall management plan for the area concerned. In addition, monitoring of the actual amount of water impounded from various precipitation events, duration of water availability and associated range use is required to properly evaluate the technological success of catchments and their impacts on land use by pastoralists.

Soil and Water Conservation

Wind rather than water erosion is perceived to be the dominant mechanism for soil movement in Somalia. Therefore, soil and water conservation activities have emphasized sand dune stabilization and establishment of wind breaks (shelterbelts). Commiphora and Prosopis species have proven to be very effective for this purpose in all three project districts. Sesbania grandiflora, Leucaena leucocephala, Parkinsonia aculeata, and Terminalia spinosa are currently being evaluated as potential soil stabilization plants in adaptive trials. The sand dune stabilization/shelterbelt program is technically excellent. It contains a reasonable balance of proven existing technology together with field trials which should yield additional useful technology for the future. Care should be exercised in the selection of plant material to ensure that stabilization plants do not move off site to become weeds. Prosopis species in particular are known to be invasive. They produce sweet seed pods which are readily consumed by livestock. The seeds are indigestible and are deposited on new sites in animal dung. Once established, Prosopis may be difficult to control. One of the stabilized sand dunes visited by the team had several volunteer Prosopis chilensis plants which had established off site. The size and number of shrubs present on planted and adjacent areas should be measured at least once a year to monitor woody plant growth and reproduction so that need for management to manipulate size or number of shrubs may be assessed.

Pastoralists expressed an interest in having CRDP stabilize several large sand dune fields in Bulo Burte and Hobyo districts. Current project policy is to restrict sandg dune stabilization efforts to small dunes where adequate resources may be applied to ensure successful stabilization. The evaluation team supports this policy. Stabilization of large sand dune fields is well beyond the economic and human resources available to CRDP and chances of success are low due to lack of detailed information of the dynamics of sand movement within these fields.

Range Management

Range management activities of the range component are currently confined largely to design and implementation of large-scale rotational grazing systems. No attempt is being made to control livestock numbers on the range (stocking rate) as it is assumed that nomadic pastoralists will not accept such control of their activities. Since stocking rate is believed to be beyond project control, project range management efforts have been concentrated on manipulation of livestock distribution through a rotational grazing system. This program approach has been criticized by both the 1983 midterm review team and the 1986 Mascott team. We believe that most of these criticisms are well founded. The implementation approach taken implies two critical assumptions: (1) that deferred or rest rotation grazing are proven technologies applicable to conditions in Central Somalia, and (2) that a grazing management program can succeed where stocking rate is not controlled. Both of these assumptions can be challenged. After 40+ years of development and use in the United States, rest rotation and deferred rotation grazing are still not widely accepted as a proven technology except for very specific situations. Unless documented, successful application under conditions similar to those in the management area can be found, it is unwise to assume that rotational grazing will improve range condition. Moreover, it should be pointed out that grazing systems in general have been much more successful in improving range condition than they have been in increasing animal offtake from rangelands. The importance of interactions between grazing systems and stocking rate have been well documented. Grazing systems only provide benefits within a range of stocking rates which is particular to each vegetation type and grazing system. Long-term improvement of range condition and animal offtake through application of rotational grazing is unlikely unless optimum stocking rate is known and animal numbers are controlled.

The review team suggests that project emphasis be shifted from implementation of additional rest rotational or deferred rotational grazing systems to evaluation of those degaans on which introduced grazing systems now exist. Evaluation should include records of actual range use by livestock (number and type of livestock, season of use, amount of forage removed), plant response to management (plant growth and reproduction), and livestock performance (animal fecundity, weight gain, parasite and disease problems). These data would provide information to validate the rest rotation approach and to suggest how improvements may be made to it.

Range Monitoring and Survey

Detailed knowledge of the resources under management and reaction of vegetation, animals, people, soil, and water to past management decisions is fundamental to successful long-term rangeland management. The system to gather these data described in the Amended PP includes region level vegetation monitoring, district level vegetation monitoring, range surveys, livestock production surveys, collection of climatic data, and development of predictive models. Project monitoring and survey activities to date have emphasized range plant community description, range condition surveys, and to a lesser extent, livestock production surveys. With the exception of the 1979 regional scale aerial survey of Central Somalia, little monitoring work has been undertaken. Monitoring work is scheduled to occur primarily during the last two years of the project. This is unfortunate as the range-livestock system in semi-arid climates is very dynamic displaying distinct changes both seasonally and between years. Management decisions often interact strongly with yearly fluctuations in precipitation. In order to draw useful conclusions about the properties of range areas and their response to management, data covering a period of many years is required. It is the evaluation team's understanding that a system of field data collection to support monitoring efforts has not yet been formalized. The project has only two years remaining to collect monitoring data. It is unlikely that meaningful field information can be collected in so short a period. Considering the general lack of basic biological and climatic information for Central Somalia, it is unlikely that meaningful predictive models of either climate or livestock/forage production will be developed during the life of the current USAID project.

Range plant community description work by LBI ecologists is proceeding on schedule. The work appears to be of high quality. The 1983 midterm evaluation team noted lack of coordination between the 3 range ecologists to be a problem at that time. The survey results as reported by the ecologists in their degaan management plans suggest that coordination continues to be a problem. The ecologists appear to be using different classification systems. This may result in similar plant communities having different names in each district. Moreover, the criteria for delineating individual plant communities seems to vary between districts. If this is the case, transference of survey information between regions may be dificult if not impossible. Reports of the ecologists vary in format with some containing detailed methods sections and some lacking mention of methods altogether. All reports containing field data should include a detailed methods section so that readers understand what the data represent and so that Somali counterparts may use them as references for future work.

Formal Training Component

The CRDP was initiated in August, 1979 as the first phase of a long-term rangeland development activity in Somalia. A formal training component was included in the CRDP and eventually evolved into the Department of Botany and Range Management at Somali National University (SNU). An approximate chronology of the development of the formal training component is presented in Table 2. The objectives of the formal training program were: (1) to establish a range curriculum leading to a B.S. degree in Range Management at SNU in order to alleviate the acute shortage of range-trained personnel in Somalia; and (2) to establish a national range research program that would provide information for sound management decisions concerning Somalia's rangelands. The purpose of the formal training component evaluation was to determine if the subject matter being taught and research being conducted were consistent with the needs of Somalia. An additional part of the evaluation assignment was to determine if the range science students were being taught in an effective manner.

Curriculum

The range management curriculum leading to a B.S. degree at SNU was approved in 1984 (Table 4). In February, 1985, the first class of ten students graduated. A total of 26 students have graduated to date and 25 new students are scheduled to enter the program in July, 1987 (Table 3).

The 4.5 year (9 semester) curriculum includes 2 years (4 semesters) of range courses (Table 4). The first 5 semesters are the same for all students at SNU, and students declare either the range management or the agriculture option during their fifth semester. The range courses are taught in English, but all other courses at SNU are taught in Italian or Somali. An attempt is made to identify potential range students before they declare the range management option so that they may start English language training (2 courses) in preparation for the range courses.

The range curriculum covers the basic areas of range management education recommended by the Range Science Education Council and meets training needs of range graduates charged with managing Somalia's range resources.

The range courses are preceded by a rigorous 5 semesters of largely science courses. Some concern has been expressed by the faculty over the lack of social science/humanity courses in the curriculum. Coursework in speech and technical writing as well as sociology or anthropology would complement the heavy science orientation, and it is recommended that they be added to the curriculum. Communication skills should continue to be emphasized as appropriate in the existing range courses.

Table 2. Approximate Chronology of Formal Training Program Development[1]

Date/Phase	Item	Comments
Nov., 1976	--Northern Rangelands Dev. Project range program at FOA.	--functional for 2 semesters.
1982--CRDP formal training component initiated	--2 to 4 lecturers for training center. --1 professor for FOA.	--1 lecturer position filled for 2 years. --1 professor hired from USU.
March, 1982	--5 NRA staff sent to USA for B.S. degree.	--all post-graduate training funds used.
1983	--10-course range curriculum proposed. --Dept. of Botany and Range established.	--1 professor taught 5 courses/semester. --2 lecturers assigned to faculty to help with teaching.
Late 1983	--B.S. degree program proposed along with supporting research component.	--4 professors to be added for a total of 5.
June, 1984	--original professor plus 2 lecturers left program.	
March-Sept., 1984	--3 replacement professors arrived.	
Late 1984	--B.S. degree program plus research component approved.	
June 1985	--4th professor arrived.	--5th professor position not filled.
Jan., 1986	--additional semester added to curriculum	--9 semesters required to graduate instead of previous 8.
1987	--3 professors available.	
1988	--CRDP project phaseout.	--Somali staff to replace expatriate professors.

[1]"Professors" refers to the expatriate professors and "lecturers" refers to Somali participants.

Table 3. Students graduated from the range management program at SNU.

Date	Item	Comments
Feb., 1985	--1st class of 10 students graduated.	--4 hired by FOA and counterparts. --5 hired by NRA. --1 hired by Afgoi as a lecturer.
1986	--2nd class of 3 students graduated.	--1 hired as lecturer. --2 hired by Ministry of Agric.
July 1986	--24 new students due to enter program.	
Nov., 1986	--3rd class of 13 students graduated.	
July 1987	--25 new students will enter program.	
Summary	--26 students graduated with B.S. degrees to date. --2 CRDP staff received diplomas in Australia.	

Table 4. Range Management Curriculum[1]

Year	Semester	Class	Hours	Semester	Class	Hours
1	I	Italian	240	II	General Biology	120
		Mathematics I	120		Chemistry Gen. & Inorg.	120
		Biological Ecology			Mathematics II	120
					Italian	120
					Scientific Socialism	60
2	III	Systematic Bot.	120	IV	Anatomy & Physiology	120
		Organic Chemistry	120		Elements of Water & Irrig.	60
		Physics	120		Principles of Economics	60
		Zoology	120		Agric. Microbiology	120
		Philosophy	60		Plant Biochemistry	60
					Political Economics	60
3	V	Agric. Chemistry	120	VI	General Agronomy	120
		General Zool.(Intro. to Animal Science)	120		Exp. Meth. & Tech.	120
		Soil Science	120		*Range Ecology	120
		Topography & Cartography	120		*Range Plant Physiol.	60
					Special Zool. (Adv. Animal Science)	120
4	VII	Agric. Entomology	120	VIII	Pastures & Forests	120
		*Principles of Range Management	120		*Range Livestock Prod.	120
		*Range Plant I.D.	120		*Advanced Range Mgmt.	60
		*Sociology of Pastoralism	120		*Veg. Measure. Tech.	120
5	IX	Soil Conservation	60			
		*Range Econ. & Plan.	120			
		*Wildlife Management	60			

*Range Management courses.

[1]From Thetford, F., 1986. Formal range management education in Somalia. Handout. 10 pp.

The need for incorporation of practical experience or field training into the curriculum was expressed by several people interviewed during the evaluation. The first step in this direction is being taken for the range students this summer with a one-month tour of the Central Rangelands sponsored by the NRA. The evaluation team recommends extended field trips, more field-laboratory exercises and summer work experience as potential mechanisms for injecting field training into the curriculum -- assuming fuel, vehicles, per diem and personnel are available from CRDP.

Many of the B.S. range graduates interviewed indicated that they would like a course in forestry added to the curriculum. On-the-job needs for skills in sand dune stabilization, shelterbelt development and nursery management have likely stimulated the desire for a course in forestry or agroforestry. If these topics cannot be covered in depth in the Soil Conservation or Advanced Range Management courses, a new course in agroforestry may be justified.

Textbooks are provided free of charge to all students at SNU as part of the University policy. Most of the students, faculty and expatriates connected with CRDP felt that it was important that textbooks continue to be provided to the range students -- although this opinion was not unanimous. All of the B.S. graduates questioned about their textbooks indicated that the books were retained as valuable on-the-job reference material. This was corroborated by expatriate counterparts and co-workers. It is recommended that the current policy of providing textbooks for range students be continued.

Students

The B.S. graduates in range management from SNU are in the top percentages of their graduating classes according to one source. One recent range student graduated with the highest attained scores to date from the University. The students being produced are required to learn English as well as Somali and Italian; they are enrolled in a department where regular class attendance, test-taking and homework are required; and many are motivated by the hope of going on for M.S. studies in the U.S. after they graduate from SNU and obtain a job with the CRDP, NRA or Ministry of Agriculture. The philosophy of education in the Department of Botany and Range Management is characterized by the faculty as being patterned after the American ideal of teaching students to think using classroom discussions, problem-solving exercises and homework. This is a worthy goal which even if only partially achieved should enhance the quality of the graduates being produced.

The recent World Bank evaluation of the CRDP (Mascott 1986) projected that the number of range students being produced would eventually exceed the employment potential of the NRA for range-trained personnel. However, NRA projections of the need for range graduates as well as projections of the range faculty differ from this assessment. The consensus seems to be that the production of 8 to 10 range graduates per year is not excessive because GOS needs for range graduates are high and some of the graduates accept non-range jobs.

Most of the students interviewed indicated that they had grown up in a range environment and had some appreciation of the need for improved range management in Somalia. When questioned closely about their career goals, most students and graduates stated that they had majored in range with the hope of eventually going on for an M.S. degree in the U.S. Considering the low salary and per diem incentives inherent in GOS job positions, this appears to be a major motivation for students majoring in range management.

As chronicled in Table 2, the formal training component had a slow start within the CRDP framework. It did not produce B.S. graduates until 1985. For this reason, the graduates interviewed had been employed less than two years, and it may be too early to judge the influence of their university training on their job performance and advancement. However, the reports from expatriate counterparts, supervisors and the graduates themselves indicated that to date the range graduates are doing well on the job.

The low salary and per diem levels for range graduates working for the NRA/CRDP are a disincentive for employees to remain with the project. If this situation continues, the project will likely encounter problems in retaining qualified personnel. The evaluation team strongly believes that the current 2,300-2,500 shillings per month in salary should be increased to at least the 7,000-9,000 rate paid to employees on other projects. Per diem should be raised accordingly. A step-increase system for salaries that attempts to keep pace with inflation would address the basic salary problem that now reduces the NRA/CRDP range positions to essentially volunteer jobs.

Faculty

The plans for expatriate staffing in 1983-84 called for five professors. A total of four were hired by 1985. Three professors are currently in place. A teaching manpower shortage is anticipated for the fall, 1987 semester, and plans are being made to team-teach some courses in order to more evenly distribute the teaching load.

The course outlines and proposed goals of the faculty for calendar year 1987 reflect a desire to make the coursework relevant to Somalia. Sample exams provided to the evaluation

team varied in degree of objective and subjective questions depending on instructor's preference and type of subject being taught. In general, the opportunity for independent thought and reasoning is being provided to students.

The average number of contact hours per course appears heavy by American standards. However, it was mentioned that considerable repetition of lecture material is necessary to facilitate communication. The upgrading and formalization of the English language training program that has been recommended may help this situation.

The current expatriate professors are highly qualified for their positions and have been ranked by the range students as the best instructors at SNU.

One Ph.D. and seven M.S. candidates were sent to the U.S. from 1983 to 1986 under the formal training component. Three of the M.S. candidates recently dropped out and went to Canada. The remaining four M.S. students and one Ph.D. candidate are scheduled to complete their degree requirements and return to Somalia in 1988. All of the graduate research of the participants has been conducted in Somalia. The U.S. university major professors of the students have been encouraged to visit the Somalia research sites.

The participants will return to Somalia as range lecturers to take over the teaching responsibilities of two expatriate professors as the professors leave FOA in 1988. One expatriate professor may be extended an additional year which would provide some needed overlap with the returning participant lecturers. However, SNU policy calls for new faculty to teach no more than 0, 25, 50, 75 percent of a course's material during the first, second, third, and fourth times a lecturer teaches a course, respectively. This policy will create problems for the new participant staff in being able to continue the current level of range teaching activity as expatriate professors depart. A special waiver of the regulations is recommended to accommodate the unusual circumstances of this situation.

A reasonable solution to the problem of lack of overlap of the participant lecturers and the expatriate professors would be to extend the professors an additional two years. This would provide a critical phase-in period for the participants and a phase-out period for the expatriates that would serve to more securely institutionalize the formal training component. The participant staff received several months of on-the-job training before departing for their studies in the U.S. However, the expatriates and participants have not had a chance to fully interact as equivalent teaching/research counterparts and a phase-in/phase-out period would allow the transfer of responsibility to occur in an orderly fashion.

Facilities

The new building for the Department of Botany and Range Management was recently completed, and the staff has moved in. Furnishing of laboratories, classrooms, and the library is still underway. The new structure provides adequate office, laboratory, classroom and library space for the department. The current facilities are a vast improvement over the past housing situation for the department.

The forage nutrient analysis laboratory has been behind schedule for some time. The sample preparation lab and teaching herbarium are now being established in the new FOA range building. Once operational, these facilities will contribute significantly to the educational and research capabilities of the department. It is recommended that the forage analysis laboratory be equipped as a top-priority item.

A new FOA agronomy building is under construction next to the range building. The location of this new structure is thought to have been influenced by the recent construction of the range facility at the FOA site.

One perceived constraint of the Italian system of education at SNU is the attitude of the faculty that all equipment and resources belong to them in common and are thus available for everyone's use. This creates conflicts in the use of delicate instrumentation or expendable supplies that may be difficult to obtain.

Research

The responsibility for the development of a national range research program for Somalia was transferred from the CRDP to the Department of Botany and Range Management in 1984. The original CRDP plan called for dedicated grazing management research in support of project implementation. This concept was lost with the transfer of the research function to the formal training component. However, close cooperation still exists and is encouraged between the range scientists at SNU and those with the CRDP. A national range research plan was drafted in 1984 with input from both groups of scientists, but it has not been acted upon since that time and needs to be resurrected. Young (1986) produced a detailed paper on research needs for improvement of Somalia's Central Rangelands that may be used in setting research priorities.

The returning five Somali participant lecturers conducted the research for their graduate degrees in Somalia on research topics that were selected before they left for the U.S. According to Barker (1986), this approach had the following adantages: (1) the students become acquainted with Somalia's rangeland, (2) the students learned research methods directly applicable to Somalia's rangeland, (3) the student's chances of losing interest

and failing to return to Somalia were reduced, and (4) the research conducted was directly applicable to the development of Somalia's rangelands. This was a sound approach that was made even stronger by making arrangements for the participant's U.S. major professors to visit the research projects in Somalia and involving the expatriate professors on the students' graduate committees.

The expatriate professors are conducting research in their areas of interest on the Central Rangelands in cooperation with the CRDP range ecologists. Studies conducted to date or in progress include investigation of succession on cultivated areas, an ecological and behavioral study of Speke's gazelle, diet composition and movement pattern evaluations of major herbivores, soil-water-plant inter-relationship studies, yicib ecology studies, range condition analyses along grazing gradients, sand dune ecology and species selection trials. This is not an exhaustive list of the research projects to date but gives some idea of the diversity of investigation that has been undertaken.

The research effort is not fragmented, but the variety of studies undertaken by the available personnel raises questions about priorities. Given considerable constraints on conducting research in Somalia, is enough attention being given to establishing research priorities for solving the country's most urgent range management problems? Regardless of the answer to this question, the research that is being conducted appears to be good reasearch. This assessment is based on the apparent willingness of the researchers to design studies that will yield results acceptable for publication in refereed journals.

The current expatriate research projects were initiated in the 1983-85 period and are now yielding publishable results. The calendar year 1987 plans of work for the professors list such goals as "submit at least three research papers for publication in scientific journals". This is a positive indication of research progress.

A calendar year 1986 progress report for the formal training component listed 10 publications for 1986 ranging from papers at professional meetings and draft handbooks or textbooks to an article in press in the African Journal of Ecology. The amended PP target for publications lists 63 as the goal with 26 left to do by EOP.

The expatriate professors have started their own Somali Journal of Range Science with two issues published to date. This provides a ready mechanism for getting needed research information of all types in print for use in Somalia. The range staff are to be commended for their enterprise and foresight in undertaking this important project.

Bachelor degree theses are required of undergraduates at SNU. These are usually one-year projects that involve some type of original investigation by the student. Some of the range

research theses have been part of ongoing or long-term studies.

Some controversy exists concerning the merit of the B.S. degree theses. Certainly research conducted by undergraduates is not in the same league with graduate student research, although there are undoubtedly some good theses produced. The primary benefit of the thesis requirment is to the student. It is a learning process in which an individual develops a hypothesis, tests it with an experiment or data collection, interprets the data and draws conclusions based on the results of the study. The logic and thinking processes that are required to accomplish this task are valuable experiences for the students. The B.S. theses should be viewed in this light and not be interpreted as being equivalent to graduate student research.

Institutionalization of the Formal Training Component

The formal training component was a slow starter under the CRDP umbrella and is just now beginning to yield graduated students, trained participant lecturers and research results. It is unlikely to be firmly established enough or mature enough to survive past the phase-out of USAID/CRDP funding in 1988-89. A two-year extension of the expatriate professors would allow for additional institutionalization of the program to occur. However, once external support for the program is withdrawn, the team anticipates that it will collapse to some lesser level of productivity and effectiveness. The research function is particularly vulnerable since it is not fully supported or recognized within the SNU system.

The evaluation team strongly recommends that a U.S. sister university relationship for the formal training and research components be explored and that sources of continuing external support for the Department of Botany and Range Management be actively sought.

Range Livestock Associations (RLA's)

There is general agreement that if range management or technical interventions are to be widely adopted, there must be a way to establish and maintain effective communication with the pastoralists. The concept of Range and Livestock Associations was proposed as an organizational structure through which such communications could be accomplished in the CRDP and to serve as locally based managers of range management plans.

As originally conceived, the RLAs were to play a vital role in the CRDP as representative organizations to manage a plan to reserve from communal grazing, on a deferred, seasonal or (in the case of famine reserves) on a near permanent basis up to 30 percent of the project area. Successful implementation of USAID-funded interventions depends critically on the formation and functioning of the RLAs. However, at the outset of the CRDP

there were no working models of any such organizations. No guidelines had been established for forming the RLAs or for their proposed memberships, structure, size, function and responsibilities.

The task of forming the RLAs is the responsibility of the Non-Formal Education (NFE) component of CRDP which is funded by the World Bank. Range management plans developed by the USAID-funded Range Management component of CRDP must be implemented by the NFE component working through the RLAs. The NFE component also coordinates interventions of USAID-funded Soil and Water Conservation and Water Development components.

The process and procedures for successfully forming RLAs evolved through trial and error. These procedures are documented by Holt (1986). The process is rather time consuming and involves 7 distinct stages. It has been learnt that each stage must be successfully completed before the next can be undertaken and that if any step is left out, misunderstandings may occur, making future support and cooperation difficult to obtain.

Originally, it was conceived that the RLAs would have three main responsibilities:

(i) mediating between the authorities and graziers;
(ii) helping with demarcation of grazing reserves;
(iii) ensuring that grazing regulations, once accepted, are respected.

The CRDP has since adopted these and added three more:

(iv) assist the CRDP to develop and modify as necessary, a management plan for the grazing degaan;
(v) select suitable reserve guards from people living in the degaan, and supervise their work, with assistance and support from CRDP;
(vi) recommend and take an active role in the selection of CRDP interventions, then help with their implementation and management.

In practice, management plans worked out by the range ecologists are viewed as a set of guidelines by both the ecologists who provide them and by the NFE group through whom the plans are implemented.

Ten RLAs have been formed to date, six in the last year. An additional three RLAs are currently in the process of being organized. This constitutes about 12,000 square kilometers or about 40 percent of the three priority districts.

The 1986 PP amendment shows a target of 20 RLAs. Thus, half of the RLAs remain to be formed in the three priority districts before the project ends in June of 1989. However, the responsibility for forming RLAs falls under the NFE component which is not a USAID-funded component, rather a World Bank-funded

component. Phase I of the World Bank project may be terminated before June of 1989, but will be continued, with some redirection of its main thrust, under a Phase II project. Althugh, the second phase of the World Bank project may give more emphasis to agropastoral development, the RLAs or similar community structures are seen as vital to the successful implementation of any of the planned technical or management interventions.

Functioning of RLAs

Originally, the main thrust of the Range Management component of CRDP was to develop a rest rotation grazing system. This system involves reserving portions of the range from grazing for a period of a year or more on a continuous rotational basis to increase long-term forage production and utilization.

For reasons documented elsewhere, this thrust was modified and now management plans feature a shorter-term, deferred rotational grazing system. This system involves only seasonal reserves. Management plans also include recommendations for other interventions which are more enthusiastically embraced by the RLAs than the range reserve program.

These include (1) water developments (boreholes, dugouts, berkeds, hand-dug wells, well site improvement and river access priority), (2) village shelterbelts, (3) tree plantations, (4) sand dune stabilization, and (5) tree nurseries.

Although ten RLAs have been formed to date, six of these were formed in 1986. Two were formed in Hobyo District in 1983 and two in Ceel Dhere District in April of 1985. Four RLAs were also formed in the Bulo Burte District in 1983. However, the district ecologist left before management plans were completed and the RLAs lapsed until 1986, then reformed when ecological investigations were completed. Up until 1986 only the two RLAs in Hobyo District managed a deferred rotational grazing system. In 1986 the reserves were opened early for drought relief.

Holt (1976) reported that the two reserves in the Hobyo District have managed a deferred rotational grazing system each year since 1983, which in every wet season reserves approximately 15% of the degaan for use later when the dry season occurs. He reports that the results are encouraging. These reserves have been accepted by many of the RLA members because (a) the reserve provides a critical late-season reserve of livestock feed, and (b) they report a perceptible decline in the problem of livestock ticks. This latter benefit may be owing to the rest period of the reserve breaking the life cycle of ticks. This possible benefit should be verified. It is noteworthy that increased forage and livestock production were evidently not noticeable.

Guarding the reserves has posed difficulties. The guards are poorly paid and without transportation. The reserves are very large and must be guarded day and night. This cannot be fully accomplished with the resources committed to guarding the reserves. Guards are paid below subsistence level in WFP food and there are often long delays in provision of WFP food. The problem was partially solved by building shelters and providing water drums on the reservations for the guards. If the grazing reserve system is to succeed the problem of guarding the reserves must be solved.

RLA support for the grazing reserve plans seems unenthusiastic at best. Benefits from the grazing reserves in terms of increased forage and animal production are not obvious. Pastoralists cannot be expected to embrace the grazing reserve plans unless clear benefits can be demonstrated. Until then, implementation of the grazing reserve plans will remain an uphill battle.

Because of the severe drought during the past year, enforcement of the reserves was very difficult and perhaps unwise. Most if not all of the reserves were opened early for drought relief. However, the recent better than average rainfall coupled with the reduced herd size coming out of the drought, provides a new opportunity to enforce the grazing reserves during the coming year.

A special effort should be made to assess the economic benefits to the pastoralists from the deferred rotational grazing systems. If the net economic benefits cover the cost of guarding the reserves, this should be demonstrated to the RLAs and they should be encouraged to support the enforcement from their own resources. If the economic benefits do not cover enforcement costs, the program should be discontinued.

RLAs do enthusiastically support other interventions especially water development. There are clear benefits to water development. Pastoralists spend a great deal of their time and money for water. Strategically placed water developments can reduce the cost of livestock watering as well as increase range and livestock productivity. Benefits from sand dune stabilization are also quite clear and visible. However, there is a question of whether the value of these benefits will cover the costs.

The evaluation team recommends that the economic value of the benefits resulting from the various kinds of water developments, tree plantations, sand dune stabilization, etc. should be determined. Interventions with the greatest net social benefits should be emphasized.

Are the RLAs managing the range resources as management plans stipulate? The management plans are offered as a set of guidelines rather than a set of directives. The final plan is one with which the RLA committee concurs. Thus the RLA committee plays a key role in approving of the suggested range management

plan. With respect to the deferred grazing part of the plans, the RLAs as a whole are not managing the range resources according to the suggested management plans. Apparently only two RLAs, in the Hobyo District, have attempted to manage deferred grazing systems. Most others, faced with a severe drought in the first year of their existence, have not yet fully implemented a deferred grazing system.

With respect to other interventions the RLAs are more enthusiastic. They play an active role in approving the nature and location of interventions. However, their involvement in management or maintenance of these is minimal. On-site investigations indicated that dune stabilization projects seemed to be successful in spite of evidence of some lapse in guarding against tresspass by livestock. Perhaps the improved grazing resulting from recent rains will make the control of tresspass on reserves and dunes much easier.

The review team does not wish to fault the effort of the NFE component in organizing the RLAs and in developing the RLA committees' resource management capabilities. Rather, the review team is impressed with the competence and high level of motivation exhibited by NFE personnel. RLAs or a similar community organization are recognized as a vital part of any continuing community development effort. The problems of organizing the RLAs and working with them to develop their organizational and management capabilities is a much larger and much more difficult task than was originally imagined. Procedures for organizing RLAs had to be developed by trial and error. The necessary procedures proved quite involved. A great deal of skill and time is devoted to organizing an RLA and working with it until the group begins to function as required. The distances involved are very great and the roads poor. Transportation is not always available. Communication is only possible through personal, visual, and verbal contact. Once the organizational procedures got worked out, more rapid progress could only be attained with greater commitment of qualified expatriate and GOS personnel and greater logistical support.

Institutionalization of Project Activities

To what degree have the project activities been institutionalized and are they likely to continue following completion of the project in June of 1989?

Institutionalization of project activities seems tenuous at best and dependent on continued donor funding. Somalia counterparts seem highly capable and in many if not most cases, adequately trained. However, with the low pay and lack of any adequate reward system that recognizes excellence, it is not likely that well trained highly motivated people will remain at NRA if donor support ends. Even if adequate salaries and employee incentive programs are developed, there is still a need to provide

transportation and other inputs to carry out the NRA field operations. There is little indication that the GOS is committed to such support of the NRA on their own in the long run. Thus there is little likelihood of project activities being carried on without continued donor support. However, with the exception of formal training, indications are that a second phase of some if not most components of the current CRDP will be funded by World Bank and other donors even if USAID support ends.

APPENDIX A. PEOPLE INTERVIEWED

Government of Somalia

Prof. Mohamed F. Shirdon, Dean, FOA SNU
Kahlid Gelle, Deputy Field Manager, CRDP
A.A. Elmi, Head, Dept. Botany and Range, FOA SNU
Dahir Abby Farah, Director CRDP
Mohamed jame gahuyr, DRO CRDP, Harardere District
Abdulhakim Mohamed Ahmed, DRO CRDP, Hobyo District
Bashir Barre Buh, DRO CRDP, Ceel Dhere District
Axmed Mohamed Guleed, Regional Director CRDP, Ceel Dhere District
Mohamed Muze Samateh, [redacted] Party Representative, Ceel Dhere
Mohamed Farah Abdulle, District Commissioner, Ceel Dhere
Ahmed Awad, DRO CRSP, Jalalaksi District
Abdulkadir Warsame, DRO CRDP, Bulo Burte District
Burhau Cilm Hersi, Forester, Jalalaksi
Ali Ibrahim, District Party Secretary, Bulo Burte
Sheck Abdullahi, District Commissioner, Bulo Burte
Mohamed Abdul Ayan
Omar Alas, Soil & Water Conservation CRDP

Range Livestock Association Members Visited

Bulo Burte
Ceel Dhere

USAID/Mogadishu

Ray Carpenter, Agricultural Development Officer
Phillip Warren, Project Officer
Louis A. Cohen, Mission Director
Emilie Macthie, Evaluation Officer
Frank Thetford, Formal Education FAC SNU

Other Donor Agencies

Yusuf Farah Nur, Project Manager, Africare
Richard Holt, Range Extension Officer CRDP, World Bank

LBI Contract Personnel

Bill Hargus, Chief of Party, Livestock Production Specialist
Dennis Herlocker, Ecologist
Peter Kuchar, Ecologist
Ron Wieland, Ecologist
Bob Kornegay, Engineer, Soil-Water Conservationist

APPENDIX B. REFERENCES

Ali, A.M. and W.A. Hargus. 1986. Livestock management techniques in the Bulo Burte District. CRDP Tech. Rep. No. 18. 30p.

Anon. 1979. Somalia Central Rangelands Development Project Paper 649-0108. USAID. Washington, D.C. 120p.

Anon. 1979. Central Rangelands Development Project (649-0108). Core Review. 115p.

Anon. 1979. Somalia Central Rangelands Development Project. Staff Appraisal Rep. No. 2163-SO (Implementation Vol.). World Bank. E. Africa Reg. N. Agric. Div. 247p.

Anon. 1982. Inception report for Central Rangelands Development Project. Submitted by Louis Berger International, Inc. Mogadishu, Somalia. 106p.

Anon. 1983. Evaluation of the Somalia Central Rangeland Development Project No. 649-0108. Executive Summary. 31p.

Anon. 1985. Central Rangelands Development Project. Somali Democratic Republic. Long-Term Rep. of the Auditors. Financial Year 1985. Pannell Kerr Forster, Chartered Accountants. 22p.

Anon. 1985. Central Rangelands Development Project. Study on future development of central rangelands of Somalia. Draft Final Rep. Vol. Exec. Rep. Mascott, Ltd., Rural Dev. Africa.

Anon. 1985. Country development strategy statement. FY 1987. Somalia. USAID. Washington, D.C. 74p.

Anon. 1986. A study of the future development of the central rangelands of Somalia. Final Rep. Mascott, Ltd., Rural Dev. Africa. 424p.

Anon. 1986. Central Rangelands Development Project. 1987 Annual Work Plan and Budget. CRDP/NRA Rep. Mogadishu, Somalia. 88p.

Anon. 1986. Central Rangelands Development Project Progress Report (Jan. through June 1986). NRA. Mogadishu, Somalia. 34p.

Anon. 1986. Status of the Central Rangelands Development Project. Executive Paper. Prepared for seminar/workshop on future range/livestock development strategies for the central rangelands of Somalia. CRDP Tech. Rep. No. 19. 28p.

Anon. 1986. Annual report for CY 1986. Formal training component/CRDP. Faculty of Agric./SNU. Handout. 4p.

Anon. 1986. Workplan for CY 1987. Formal training component/CRPD. Faculty of Agric./SNU. Handout. 4p.

Anon. 1987. The present status and future of the Department of Botany and Range Management of the FOA. Somali National University. 18p.

Barker, J.R. 1986. Range management curriculum development and counterpart training at Somali National University. In: J.T. O'Rourke, ed., Developing successful international range management programs, Proc. Int. Range Dev. Symp., Orlando, Fla., p.31-35.

Barker, J.R. 1987. Proposed goals and workplan (1 Jan. through 31 Dec., 1987). Dept of Bot. and Range Manage. Somalia Nat. Univ. Handout.

Cope, T.A. 1985. Key to Somali grasses. National Herbarium. NRA. Mogadishu, Somalia. 77p.

Farah, D.A. 1986. Central Rangelands Development Project annual report. National Range Agency. Mogadishu, Somalia. 33p.

Fobair, I.W. 1986. End of tour report. CRDP Rep. No. 649-0108. 107p.

Herlocker, D. No date. CRDP range analysis: A background and justification. CRDP Tech. Rep. No. 20. 9p.

Herlocker, D. and A.M. Ahmed. No date. Interim report on range ecology and management of Ceel Dher District. CRDP Tech. Rep. No. 8. 38p.

Herlocker, D., D. Frye and H.M. Khalif. No date. Result of two years (4 growing seasons) protection of coastal plain grassland. CRDP Tech. Rep. No. 14. 11p.

Herlocker, D., A.M. Ahmed, B.B. Buh, M.O. Aden and A.M. Ibrihim. No date. Range management plans for the range and livestock associations of Ceel Dhere District, Galgaduud Region, Somalia. CRDP/NRA Rep. Mogadishu, Somalia. 125p.

Herlocker, D., F. Thetford, M.A. Ayan and O.S. Ahmed. 1985. Somali agricultural sector survey range management subsector. CRDP Tech. Rep. No. 13. 20p.

Herlocker, D. and P. Kuchar. 1986. Palatability ratings of range plants in Ceel Dhere and Bulo Burte Districts. CRDP Tech. Rep. No. 9. 18p.

Holt, R.M. 1985. Non formal education and training for a pastoral/agropastoral society: Preliminary experience with range development in central Somalia. CRDP Tech. Rep. No. 4. 25p.

Holt, R.M. 1986. Developing range and livestock associations in central Somalia. CRDP Tech. Rep. No. 5.

Kazmi, S.M.A. No date. Somali plant names. Somali National Herbarium. CRDP Tech. Rep. No. 11. 79p.

Kazmi, S.M.A. and A.A. Elmi. 1983. A glossary of botanical terms (explanations in English and Somali). National Herbarium. NRA. Mogadishu, Somalia. 47p.

Kuchar, P. and D. Herlocker. 1985. Somali plant names in Ceel Dhere and Bulo Burte Districts. CRDP Tech. Rep. No. 10. 28p.

Kuchar, P., A.E. Omar and A.S. Hassan. 1985. The rangelands and their condition in eastern Bulo Burte District. CRDP Tech. Rep. No. 12. 53p.

Kuchar, P. 1986. Plants of the central rangelands of Somalia. Vol. 1. CRDP Tech. Rep. No. 15. 190p.

Kuchar, P. 1986. Plants of the central rangelands of Somalia. Vol. 2. CRDP Tech. Rep. No. 15. p.191-392.

Kuchar, P. 1986. The plants of Somalia: An overview and checklist. CRDP Tech. Rep. No. 16. 291p.

Mire, Y.W. and H.G. Buchta. No date. Guidelines for livestock water dugout ponds. CRDP Tech. Rep. No. 7. 10p.

Naylor, J.N. and D. Herlocker. No date. Criteria for range condition classification. CRDP Tech. Rep. No. 6. 9p.

Naylor, J. and A.A. Adan. 1983. Ecological survey and initial management plans - Hobyo District, Somalia. CRDP Tech. Rep. No. 2. 61p.

Thetford, F. 19S6. Formal range management education in Somalia. Handout. 10p.

Thetford, F. 1987. Proposed workplan for CY 1987 (1 Jan. - 31 Dec. 1987). Dept. of Bot. and Range Manage. Somalia Nat. Univ. Handout.

Thurow, T.L. (Ed.) 1986. Somali Journal of Range Science. Vol. 1, No. 1. Dept. of Bot. and Range Science. FOA/ SNU. Mogadishu, Somalia. 30p.

Thurow, T.L. (Ed.) 1986. Somali Journal of Range Science. Vol. 1, No. 2. Dept of Bot. and Range Science. FOA/ SNU. Mogadishu, Somalia. 40p.

Thurow, T.L. 1987. Goals for CY-1987. Dept. of Bot. and Range Manage. Somalia Nat. Univ. Handout.

Warren, W.P. 1986. Central Rangelands Development Project amendment (649-0108). USAID Mission. Mogadishu, Somalia. 45p.

Wieland, R.G. No date. Range management planning for the central rangelands: By degaan for range livestock associations. CRDP/NRA report. Mogadishu, Somalia. 16p.

Wieland, R.G. No date. Range management plans Gawaan Degaan. CRDP/NRA Rep. Mogadishu, Somalia. 28p.

Wieland, R.G. (Ed.) 1986. Proc. of the seminar/workshop on future range/livestock development strategies for the central rangelands of Somalia. CRDP/NRA. Mogadishu, Somalia. 138p.

Wieland, R. 1987. Range management plans Wisil Degaan. CRDP/NRA Rep. Mogadishu, Somalia. 33p.

Young, S.A. 1986. Research for improvement of Somalia's central rangelands. In: J.T. O'Rourke, ed., Developing successful international range management programs, Proc. Int. Range Dev. Symp. Orlando, Fla. p.89-95.