PD-AAA6-414

649-0108-01-[redacted]

SOMALIA

CENTRAL RANGELANDS DEVELOPMENT

Project Paper
649-0108

August 1979

Agency for International Development
Washington, D.C. 20523

AUG 6 1979

ACTION MEMORANDUM FOR THE DEPUTY ADMINISTRATOR

THRU : ES

THRU : AA/PPC, Alexander Shakow

FROM : AA/AFR, Goler T. Butcher

SUBJECT: Central Rangelands Development Project (649-0108) - Somalia

I. Problem: Your approval is required to execute a grant of $1,000,000 of FAA Section 103 funds (Agriculture, Rural Development and Nutrition) to the Government of Somalia (GSDR) for the Central Rangelands Project and to authorize a life-of-project funding of $14,944,000.

II. Discussion:

A. Project Description: The goal of the project is to implement a system of range management in Somalia which optimizes livestock production, therefore increasing the income of the herders, while preserving the range resources. This will be accomplished by developing a range management program in the central region of Somalia under the auspices of the National Range Agency (NRA). The project will assist in reducing the devastating effects of periodic drought through the reservation of "grazing blocks" to be used only in excessively dry years. The project area will encompass 149,000 sq. km which represents 25% of the total range land area of the country. Droughts in this region in 1974 resulted in the loss of from 45 to 50% of all livestock.

The Government of Somalia (GSDR) has expressed its commitment to the project by establishing the National Range Agency (NRA) and vesting it with authority to allocate land and to supervise grazing reserves.

This is a multi-donor project, the GSDR, the World Bank, International Fund for Agricultural Development, International Development Association Overseas Development Ministry*, World Food Programme** and AID have collaborated closely in the design of the project. As the major donor, AID will provide technical assistance, training and commodities.

The strategy of the project is three fold:

-Technical assistance and training for the NRA.
On-the-job training programs for the NRA will begin in September 1979. Follow up workshops and seminars will upgrade the skills of the NRA implementation team. The IBRD will provide management

*(ODM)
**(WFP)

assistance through the services of a project coordinator, a technical director for administration and a financial controller.

- A Rangeland Survey.
The initial activity of the project will be a base-line survey to determine the socio-economic, environmental, and technical data necessary to supplement preliminary studies. Range trials will be conducted under the direction of the Range Monitoring Unit. This unit will be staffed by both AID funded technical experts in range ecology and conservation and by 3 professional Somali counterparts.

- Establishment of grazing associations and cooperatives.
Grazing associations, formed by the pastoralists under the direction of the NRA, will be established to assume the management of the grazing reserves.

Grazing associations are loosely structured organizations whose main function is a cooperative dynamic exchange between members to formulate mutually beneficial policy for the area reserves. The authority and by-laws of the associations are clearly spelled out in the NRA publications. In order to provide incentives and to reduce the possibility of competition for water and grazing rights, no wells will be dug until a grazing association is in operation and the Water Development Agency (WDA) has assessed the feasibility of drilling in that area.

The structure of the associations will provide a framework for the establishment of marketing and purchasing cooperatives. Twelve cooperatives of this type have already been established in the Northern Rangelands area and are providing herders with price reductions in basic commodities and with assistance in marketing livestock.

Financial Summary: Project grant funding requirements are summarized in the following table:

(in thousands of dollars)

	1st project year	Life of Project
Capital	-	923
Technical Assistance	250	5,025
Training	100	354
Commodities	500	2,644
Other	150	5,998
Total	1,000	14,944

The total cost of the project is $46.3 million. AIDs share of the cost at $14.9 million amounts to 32% of the total cost. The IDA will contribute a credit of $8 million, and IFAD a loan of $9 million. ODM will provide $4.0 million in assistance and the WFP $4.3 million. The total GSDR contribution of $6 million will be utilized for local salaries and allowances and for the maintenance of a National Range Agency account. Under prior GC opinions, the 25% Host Country contribution requirement of FAA Section 110(a) does not apply to this project because it involves multiple donors and is therefore not considered a bilateral project.

B. Socio-economic, Technical and Environmental Description: Social Soundness: The Project has been judged to be socially sound and by its design to have a positive impact on the estimated 400,000 pastoralists of the Central Rangelands area, who are among Somalia's lowest income group. Women, who already play a dominant organizational role in the associations of the north will be encouraged to belong to the grazing associations under this project. They can participate in decisions affecting the livestock they manage, and attendant policies of the associations.

The primary benefit to be derived by the participants will be an insurance against repetition of the devastating droughts of the past.

Economic Feasibility: The economic rate of return for the project has been estimated at 15% by IBRD appraisal. In addition the project will result in social and environmental benefits which are not quantifiable.

Technical Analysis: The bulk of the construction under this project will be financed by the World Bank. However, AID has a small construction component for stockwater yards and well drilling equipment. The REDSO engineer has been asked to confirm that the requirements of Sec. 611(a) of the FAA have been met. Funds will not be obligated until this determination has been made.

Environmental Analysis: The Project Review met on June 26, 1979 and agreed that the water development components of this project are an integral part of the Comprehensive Groundwater Project (scheduled for early FY 80 authorization) and should, therefore, be considered within the environmental assessment of that project. The environmental recommendation for this project states that, "the project in itself is not likely to have a significant environmental impact, though it has the potential for providing environmental and monetary benefits." The Project Review agreed, based on this assessment, to recommend a negative determination.* The Initial Environmental Examination is included in this package.

The Christopher Committee for Human Rights has met and raised no objection to the project.

C. Implementation: The Project Paper proposes to use host country contracting procedures as the appropriate mode for contracting U.S. technical assistance. The NRA has both the authority (Law No. 23, 1976 and Law No. 68, 1970) and the experience to contract for services. In addition, the project provides for close coordination, training and supervisory assistance from World Bank and AID technical staff. (See contracting capability of the NRA, Annex C).

D. Committee Action and Congressional Apprisement: The Project Review Meeting held June 26, 1979 agreed that the project should move forward for authorization. In addition, an Executive Committee for Project Review, (ECPR) chaired by the Assistant Administrator for Africa, was held July 19, 1979 for the purpose of informing the Executive Committee current project plans. The following concerns were discussed and resolved at the ECPR.

1. The Project Review recommended a negative IEE determination for this project since the water components will be developed under the auspices of the Comprehensive Groundwater Project, (649-0104) for which an environmental assessment has been recommended. The ECPR concurred with this decision.

2. The capability of the NRA to handle procurement and contracting was discussed. It was agreed that the previous experience of the NRA, together with management assistance from the World Bank will ensure satisfactory implementation of the project. (See Annex C)

The advice to Congress was submitted on July 11, 1979 and the fifteen day waiting period expired July 26, 1979. The following major covenant is included in the project:

No stockwater supplies will be developed unless they are incorporated into a range grazing reserve and supervised by an already existing grazing association.

III. Recommendation: That you sign the attached PAF II and thereby authorize the proposed project.

Attachments: A. - PAF II
B. - Initial Environmental Examination (IEE)
C. - Statement of the NRA's Contracting Capabilities
Project Paper

Clearances:
AFR/DR, JWKoehring
AFR/DR, NCohen
GC/AFR, ESpriggs
GC/AFR, MBall

Clearances:
AFR/EA, CCarr
AFR/DR/ENG, MJMorgan
AFR/DR/ARD, WJohnson
AFR/DR/ARD, DGates
AFR/DR/SDP, BBoyd
PPC/PDPR, MZak
PPC/PDPR, DSidman
DAA/AFR, WENorth
AFR/DR/EAP, MMcDaniel

AFR/DR/EAP:SFee/MFoster:hrp:7/26/79:x28286

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

COUNTRY: Somalia

NAME OF PROJECT: Central Rangeland Development Project

NUMBER OF PROJECT: 649-0108

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to the Somali Republic (the "Cooperating Country") of not to exceed One Million United States Dollars ($1,000,000)(the "Authorized Amount") to assist in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of a multi-donor effort to assist the Cooperating Country in: (1) improving range-management, livestock water supplies and veterinary services; (2) establishing non-formal training of pastoralists; and (3) improving the Cooperating Country's ability to implement range development by training of staff at all levels and by providing internationally recruited senior technical staff. A.I.D. will provide technical assistance, training and commodities for the range development components and a water development component to be implemented subsequently under the auspices of the Comprehensive Groundwater Development Project (649-0104) scheduled for authorization in early FY 1980.

I approve the total level of A.I.D. appropriated funding planned for the project of not to exceed Fourteen Million Nine Hundred Forty Four Thousand United States Dollars ($14,944,000), Grant, including the funding authorized above, during the period FY 1979 through FY 1984, subject to the availability of funds and in accordance with A.I.D. allotment procedures. Funds for construction shall not be obligated until preliminary plans and cost estimates for such activities are reviewed and approved by A.I.D.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority, subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate:

a. Source and Origin of Goods and Services

Except for Ocean Shipping, goods and services financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in the United States or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean Shipping financed under the Grant shall be procured in the United States or the Cooperating Country, except as A.I.D. may otherwise agree in writing.

b. Condition Precedent

The Project Agreement shall contain a condition precedent to the effect that prior to the first disbursement of funds under the Project Agreement, or to the issuance of any commitment documents with respect thereto, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D. evidence that all requirements for the participation of other donors have been satisfied.

c. Covenants

The Project Agreement shall contain covenants providing in substance as follows:

1. The Cooperating Country agrees that no stockwater supplies will be developed unless (i) they are incorporated in a range grazing reserve, (ii) a grazing association has been formed for supervision of the reserves, and (iii) the grazing association has agreed to abide by any restrictions on grazing and water imposed by the Cooperating Country.

2. The Cooperating Country agrees to meet with A.I.D. and other donors to review socioeconomic, environmental and technical data (collected under the Project) prior to the development of grazing reserves and to incorporate the relevant recommendations into development of the reserves.

3. The Cooperating Country agrees to submit to A.I.D., by December 31, 1983, proposals for increasing cost recovery.

Date: _____

_____
Douglas J. Bennet, Jr.
Administrator

INITIAL ENVIRONMENTAL EXAMINATION

Project Location:	Somalia
Project Title:	Central Rangelands Livestock Development
Funding:	14,944,000 of 36,715,000 Total (FY 1979-1985)
Life of Project	six Years
IEE Prepared	Mission/McGowan Date: Dec. 9, 1978

Environmental Recommendation: A negative determination is recommended

Concurrence Charles P. Campbell Date: 12/16/78

Approved: [illegible]

Disapproved: _____

Date: 8/27/79

Project Description

AID is to be the major donor in a cofinanced project which seeks to improve livestock production and range resource management. The project area under discussion encompasses the drought prone arid central portion of Somalia. The project has several phases. An initial phase will consist of extensive resource surveys and monitorings. Its intermediate phase will be that of providing training, services, construction, infrastructure building, and water under the auspices of the Comprehensive Groundwater Development project. The final phase will be a gradual concentration of pastoral communities and increased livestock offtake. The combined effect will enable Somalia to reverse the current degradation of its principal resource base - the range.

The Problem

Both human and animal populations are increasing and range utilization is becoming execessive. Pastoralists are compelled to compete with one another for available forage. There is little regard under these conditions for the needs of pasture or range, their survival or indeed their maintenance. Thus, this competition ensures that ALL available forage is consumed.

Overall Statement

The project is ambitious and has merit. It is not, however, free of risk. Much depends upon the ability of the host government to provide inputs and ultimately assume management. Equally important is an understanding and acceptance of the project's goals by the nomadic population - the recipients. The implementation schedule as provided may be somewhat rapid for existing circumstances. Until AID is assured that 1) the recipient population accepts

the tenets of the project and 2) the host government has the capacity to extend and maintain such tenets, no water development should take place. It should be noted that an Environmental Assessment will be undertaken with respect to the closely related Ground Water Development Project (649-0104) which is scheduled for authorization and implementation in early FY 1980.

LAND USE

Range Development:

There are virtually no current economically viable alternatives for the project area other than livestock raising. From this aspect, the project does not alter the existing land use. It will, however, alter the utilization of lands within the framework of "use." How such utilization is determined and controlled is of paramount importance. Proposals must be developed in concert with the target populations. Thus the inter-relationship of the government within itself and with the nomadic populations, especially as perceived by the nomads will influence project success. To address this concern, social science expertise is incorporated in the large informal education component.

The sociologist will have input into such components as training, community surveys, and extension. As an example of the need for a sound social analysis prior to implementation is the question of whether youthful extension agents would be more or less successful in the initial delivery of information to nomads and later development than more mature individuals. A knowledgeable Somali source feels that nomadic leaders may not listen, except to those of similar age and stature. The sociologist could provide insight to these issues, especially if the social data gathered on nomads through this Project and the Health Project could be coordinated. The sociologist should also investigate the attitudes of pastoralists with respect to the provisions of the new Range Law. This is especially important when

considering the formation of grazing associations and cooperatives. The IBRD document (Annex.9, p.8) raises the question of deeper seated problems relating to these forms of land use.

Increasing Population:

The Project, per its design, will increase the overall carrying capacity of the range - hence, ultimately its population. Population increases may be seen from two distinct sources; increased natural productivity from improved conditions, a long term increase, and the immigration of nomads who formerly utilized grazing areas in Ethiopia. The project is also designed to concentrate nomadic communities which will aid in delivery of services. The lack of services to nomads is currently reflected in a disproportionately high neonatal death rate. Provision of services would tend to reverse this. The resultant conditions, over time, will produce a need for infrastructural changes to accomodate both increased animal and human populations. The benefits are increased economic return per unit and reduction in the cost of services delivery. Although the project will tend to increase and concentrate populations, it will also eventually reduce risk. Once risk is reduced - and along with it short term survival decision making - the nomad who is traditionally a consumate ecologist, will be able to take a long term view of range utilization.

Because of these reasons and the vagaries of climate and economy, as well as the certainty for population increases, the project will need to evaluate

the absorptive capacity of the Somali Government. This analysis must critically evaluate the capacity or educational institutions to provide sufficient and qualified personnel. The Bank document (Annex 5, p. 10, P 36) indicates that the area is currently fully stocked. It further indicates that it is unlikely that any reduction in grazing pressure would be possible for some years after the initiation of the project - and then only if the benefits of altered management can be seen and accepted by the population. Additionally, the project may, from an overall cost/benefit basis , be one of long-term loss reduction - at least for the foreseeable future. That the project may, over the intermediate period, be one of loss reduction, should not interfere with its implementation - nonetheless this needs to be determined in concert with current marketing mechanisms and constraints.

Land Clearing:

The project, in establishing various range reserves, is expected to produce approximately 10,200 km of demarcation lines. Approximately one half of this distance is assumed to be in the form of lines cleared by earth moving equipme Additionally some of these demarcation lines will serve as access tracks and fire breaks. It is expected that cleared demarcation lines will be two dozer widths wide. Assuming a dozer blade width of 3 meters, the total area cleared by an estimated six meter wide demarcation is 3000 km^2. This represents about 7 percent of the combined reserve area but only an insignific percent of the entire project area.

These areas, to the extent that they don't reseed and support grass or other vegetation, are susceptible to both water and wind erosion. Use of these demarcation lines as access tracks will only exacerbate this tendency. For these reasons they will act as foci to erosion and the project must consider placement of demarcation lines with respect to soil type and ground slope. Unless the threat of fire is extreme or the demarcation is to be used for access the project should consider using a dashed line approach, especially on fragile areas or slopes. This will not only reduce the tendency for erosion, it should substantially decrease operation time. During final project design it became evident that "bare earth" demarcations are not foreseen but rather grassed clearings and more rudimentary markings will be constructed.

Improper siting of wells may cause de facto land clearing from excessive animal grazing pressures. Many areas of Somalia are already susceptible to sand dune formation. In other areas, key habitats exist - eg. the Clark's gazelle ranges between Afbarwaaq and Hobyo. Natural preserves and key habitats must be considered during the planning phase. Some are listed in the new Range Law. The major thrust of the project, however, is to reduce de facto land clearing which accompanies overgrazing. By using inputs to influence animal movement and concentrations, as well as change range resource carrying capacity, the project over time will improve the area. Thus, taken in its entirety over the long run, the project through constant monitoring and management will reduce tendencies for land clearing.

Changing the soil character and altering natural defences:
Overgrazing around waterholes as discussed above, will also ultimately affect soil infiltration capacities and consequently overall soil structures.

This may result over the medium term, in an essentially irreversible change in the soil.

Additional factors such as rain drops impact are discussed under atmosphere below: Currently the soils in many areas have been deprived of their natural defences - vegetative cover. Through the project's early analysis of the area, and later placement of reserves and watering points, as well as provisions for increased off-take, the natural vegetation is expected to recover. The technical provisions for increasing carrying-capacity, hence production are fairly straight forward. Mechanisms for assuring an increased off-take are less clear. The proposed Range Law has provisions for an increased off-take but the Project needs to analyze the various other Laws and their interrelationship to each other and the overall goals of the project.

Foreclosing Important Uses:

The project with proper design and management will not foreclose any important use-the project area's best use is that which is within the design of the project. Nonetheless Ground water development and heavy well draw may adversely affect shallow wells in this the same field. This may create a need for further capital investment to deepen the affected wells. In some

cases this may not be possible thus adversely affecting the dependent population. The project will evaluate such problems.

WATER

Ground water extraction will be the principal source of additional water in the project area. The Bank document, in various sections but principally in Annex 6, discusses the issues involved in both development and quality.

Water Quality

Physical state:

Bringing water from an aquifer to the surface and subjecting it to intense isolation and wind shear is expected to cause evaporation.

To the extent that this can be controlled, better utilization of ground water resources will be possible.

Chemical and Biological State:

Two principal issues are involved: Contamination and mineralization. The former may accrue to improper casing and introduction of biological sources, or from one aquifer of lesser quality contaminating one of higher quality. Mineralization changes may occur from an excessive rate change in the circulation of waters within the aquifer. Additional sources of mineralization needing consideration are salt or brackish water intrusion. Observation wells should be considered if salt water intrusion may develop.

The Bank document mentions various salts and attendant problems - (Annex 6 p. 5 Pragraph 17 - 19.) these should be considered for their long term affects on both animal production and human health. To reiterate the main problems seem to be clorides, sulphates, and flourides; the latter being of grater concern. An analysis of waters should be conducted to determine the levels of these and other salts.

To avoid the possibility for exceeding the recharge rates of aquifers or mining fossil water unintentionally, the early stages of development should consider the merits of tritium and carbon 14 analyses. These are common tests which can be easily run. These tests will also aid in determining the depletion dates if a decision is made to mine water. This is mentioned in passing as it is assumed that the hydrologist would consider such during project design in the Comprehensive Ground Water Project.

Control of Drilling:

Two schools of thought occur. One favors providing NRA with the capacity to drill; the other favors mechanisms whereby WDA would control drilling and equipment. Both have merit. The problems need to be considered at an early stage. Statutory relations between the two organizations also need review. These issues were reviewed during design of the project and determination was made to concentrate water development in the WDA.

Atmosphere

Air and noise pollution arising from drilling operations are expected to be localized and of short duration. Therefore these activities will have negligible influences on the overall environment. Cutting of demarcation

lines for the various resources is expected to produce some dust pollution during the construction phase. Siting and alignment of these lines must consider future wind erosion.

Over-use in arid areas on light soils by excessive grazing may cause sufficient deterioration of soil aggregates to render the soil susceptible to rain compaction or to wind erosion. These issues are discussed in greater detail in the IEE for the Comprehensive Ground Water Project and will be investigated in the EA for Groundwater. Siting of wells will take these issues into consideration.

The project should also study the entire hydrologic cycle to obtain maximum usage of the water resource as well as safeguarding against misuse. This was discussed within the IEE for Comprehensive Ground Water Development.

Natural Resources

The use and availability of water, Somalia's principal renewable natural resource, can either cause further deterioration of other natural resources, or it can improve existing systems. The project is designed to assure proper range management and should be designed in concert with other systems.

SOCIOECONOMIC

Personnel Requirements:

As stated above, in the PID, and throughout the Bank's document - the limiting factors lie within the absorptive capacity of the interacting government institutions and the acceptance by the target population. The

ability of the host government's institutions to supply the requisite numbers of staff has been previously mentioned. It would be prudent for AID to accurately assess both the quality and quantity of manpower upon which many of the projects components are dependent. In pursuit of this, a brief manpower study was undertaken as part of project design. The study assessed the sheer numbers necessary, and the capacity for, and constraints upon, quality control. Portions of the project will also be dependent upon World Food Program (WFP) assistance. AID verified the manpower capacity and availability of those WFP programs upon which the project is critically dependent.

Target population:

It is generally agreed that the project areas' carrying capacity has long been reached or exceeded. Under these constraints, the socioeconomic condition of the areas' population can only continue to decrease. Within the caveats relating to acceptance and management, the project will have a beneficial influence upon the people. Their deteriorating socioeconomic condition should stabilize, and ultimately improve. This improvement will be derived through two basic modes: the increased ability of the government to supply needed services to a more concentrated populace, and the internal development of awareness.

CULTURAL

The project is designed to shift current cultural practices and realign them with better overall management. This will enable government, through

foreign exchange. Much of the success will depend on sustaining meaningful dialogue between the nomadic peoples and the government. As previously mentioned this will be facilitated by social evaluation early on in the program.

HEALTH

As previously mentioned, many aquifers are highly mineralized. How such mineral/salt content affects both human and animal health must be reviewed early in program design.

All wells must be adequately protected from contamination. High moisture around water points may invite soil borne diseases and parasites. The design of water systems must consider such issues. Additionally designs must consider the high incidence of malaria and the capacity of water systems to harbor mosquito larvae. Corrective measures need to be considered.

One method meeting with success is the introduction of larvivorous fish.

Systems for pumping in villages should be uncomplicated thereby allowing local repair. Training programs within the project should include village members. In designing wells for villages the project should study the merits of dual construction wells - ie. pumped systems which can be opened to bucket operation in the event of prolonged repair problems.

GENERAL

International Impacts.

The development of a sound system should substantially lessen the dependency

on foreign exchange. The project may wish to evaluate future programs such as shifting livestock and meat sales from a per head basis to one based on animal quality.

Larger Program Inputs:

Coordination between this project and other projects of water development, land use planning, health, and other sector development is a must. Phase I of the project will need to consider such coordination.

Environment Recommendation

The project in itself is not likely to have a significant environmental impact, though it has the potential for providing environmental and monetary benefits. The project design incorporates numerous ecological, vegetation grazing, etc., studies to define the preferred management approach. It also contains both ecological and socio-economic monitoring to identify the impact and evaluate benefits and disbenefits under the project. The only potential for significant adverse impacts is if the water program is undertaken without management. To address this concern covenants are to be included in the project agreement requiring the establishment of a grazing association and agreement from the association to abide by proper management principles prior to installation of wells. Moreover Water Development activities for this project will be instituted under the auspices of the FY 1980 Comprehensive Groundwater Development and an EA will be undertaken for the water project prior to its authorization which will address issues in Water Resource development.

Therefore a negative determination is recommended for the Central Rangeland Project.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-areas 1/	Impact Identification and Evaluation 2/
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	M
b. Extracting natural resources	M
c. Land clearing	M
d. Changing soil character	M
2. Altering natural defenses	M
3. Foreclosing important uses	L
4. Jeopardizing man or his works	L-M
5. Other factors	
B. WATER QUALITY	
1. Physical state of water	M
2. Chemical and biological states	M
3. Ecological balance	L
4. Other factors	

1/ See Explanatory Notes for this form.

2/ Use the following symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

IMPACT IDENTIFICATION AND EVALUATION FORM

G. HEALTH

1. Changing a natural environment ———— M

2. Eliminating an ecosystem element ———— 1

3. Other factors

———— ————

———— ————

H. GENERAL

1. International impacts ———— M

2. Controversial impacts ———— L-M

3. Larger program impacts ———— M

4. Other factors

———— ————

———— ————

I. OTHER POSSIBLE IMPACTS (not listed above)

———— ————

———— ————

———— ————

See attached Discussion of Impacts

Annex C

Contracting Capabilities of the NRA

The NRA was established by Law No. 23, 1976 of October 26, 1969 and Law No. 68 of October 20, 1970. These laws give the NRA the authority to negotiate and undertake contracts and procurement actions.

The NRA has, in the past, done both contracting for technical services and procurement of goods and training services under international tenders with the Northern Rangelands project under Kuwait financing. Their experience indicates success in procuring the services of firms.

Under the Central Rangelands project, the IBRD will be providing expatriate technical assistance in management to assist the NRA in contracting and procurement. This assistance consists of a Project Coordinator, the Technical Director for Administration and a financial Controller. The IBRD is also assisting the State Planning Commission in the establishment of a Project Implementation Unit at the Planning Commission to serve as advisors to all projects in the field of contracting and procurement.

The USAID Mission and REDSO plan to hold their first procurement seminar for GSDR staff involved in AID projects during August or September 1979. It is planned that this introductory seminar will be followed by other workshops and on the job training for Somali staff in Nairobi and the U.S.

In view of the legal authorities of the NRA, their past contracting and procurement experience, the project specific assistance being provided by the IBRD and the non project specific assistance being provided by the IBRD and AID, we feel that the NRA will be capable of undertaking host country procurement of goods and services following the guidelines of AID handbook 11.

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: Somalia

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 649-0108

6. BUREAU/OFFICE: A. SYMBOL: AFR; B. CODE: 06

7. PROJECT TITLE (Maximum 40 characters): Central Rangeland Development Project

8. ESTIMATED FY OF PROJECT COMPLETION: FY 86

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 79; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 84

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 -)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL	900	100	1,000	13,400	1,544	14,944
(GRANT)	900	100	1,000	13,400	1,544	14,944
(LOAN)	-	-	-	-	-	-
OTHER U.S. 1.	-					
OTHER U.S. 2.	-					
HOST COUNTRY	--			140	5,860	6,000
OTHER DONOR(S)	1,140	570	1,710	19,200	6,100	25,300
TOTALS	2,040	670	2,710	32,740	13,504	46,244

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 79 F. GRANT	E. 1ST FY 79 G. LOAN	H. 2ND FY 80 I. GRANT	H. 2ND FY 80 J. LOAN	K. 3RD FY 81 L. GRANT	K. 3RD FY 81 M. LOAN
(1) FN	110	210	-	1,000		2,400		2,600	
(2)									
(3)									
(4)									
TOTALS									

A. APPROPRIATION	N. 4TH FY 82 O. GRANT	N. 4TH FY 82 P. LOAN	Q. 5TH FY 83 R. GRANT	Q. 5TH FY 83 S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1) FN	3,000		4,000		14,944	
(2)						
(3)						
(4)						
TOTALS						

12. IN-DEPTH EVALUATION SCHEDULED: MM 07 YY 82

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14 OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Charles P. Kimpell

TITLE: Mission Director

DATE SIGNED: MM 05 DD 25 YY 79

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PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN
DJIBOUTI
DJIBOUTI
WEST GALBEED
SOMALIA
CENTRAL RANGELANDS DEVELOPMENT PROJECT
ETHIOPIA
GEDO
BAKOOL
HIRAN
MIDDLE SHEBELLE
MOGADISHU
MIDDLE JUBA
KENYA
KILOMETERS
SAUDI ARABIA
SUDAN
ETHIOPIA
SOMALIA
KENYA

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CENTRAL RANGELANDS PROJECT DEVELOPMENT TEAM

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May 28, 1979

Background and Project Description General

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 plateaux 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 200mm; 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 south-west 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 Sector

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 vigour.

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. Without the introduction of management of the rangelands and livestock, the forage resource wouldderiorate and livestock numbers would decrease. This would result in a lower output of meat and milk which would have to be shared by an increasing population.

The cyclical pattern of production and the impact of drought is becoming more pronounced. The severe drought period, 1973-75, caused the loss of up to 30-40 percent of the animal population and forced 200,000 pastoralists into government relief camps. This was a clear indication of the breakdown of the traditional system of production and the increasing vulnerability of the pastoralist. The government is determined to bring education, health and extension services to the pastoralists who represent 80 percent of the Somali population. However, it is a difficult task to achieve because of the fragmentation and high mobility of pastoral communities. Under present circumstances, the fragmentation and mobility of pastoralists is essential to the continuation of livestock production in the rangelands. A sedentarization of pastoralists which was not proceded by the introduction of range management would however, be detrimental to the livestock industry and might entail the loss of livelihood for possibly as much as half of the population.

The government's development strategy is: (i) to improve the resource base of the livestock industry through range management; (ii) alleviate the constraints on livestock productivity by providing better veterinary services; and (iii) to achieve a gradual concentration of pastoral communities so that their standard of living may be improved through the provision of health services and education. This can only be achieved with the cooperation of the pastoralists. Their cooperation will not be forthcoming

unless they recognize the usefulness of the proposed range management system. This entails a strong emphasis on education, the establishment of grazing associations and their gradual assumption of responsibility for grazing control. In addition, the National Range Agency needs to be strengthened so that it may carry out its initiating, educational and supervisory role effectively.

The Project

The project is concerned with the development and management of the 149,000 sq. km. of the Central Rangeland areas of Somalia. It will encompass three administrative regions of the country - Galguduud, Mudug and Hirran. This represents almost 25 percent of the total land area of the country and is the region where the droughts of 1974 were most severe. It is estimated that 40 to 50 percent of the animals died as well as many people. Some of the nomadic families lost all of their livestock and were forced to seek governmental relief.

The number of livestock in the area have been variously estimated to be from 1,089,000 to 1,891,000 livestock units as shown in the IBRD study of the region and as reported in the staff appraisal report. Approximately 75 percent of the total population of the three regions, estimated to be 544,000, are nomadic in nature with the remaining livestock owners (15 percent) residing permanently in settlements throughout the area where permanent water is located.

The project is designed to assist the government in : (i) improving rangeland and livestock productivity through the introduction of range management, livestock water supplies and improved veterinary services; (ii) gaining the confidence and cooperation of the pastoralists by establishing a dialogue with them through non-formal training; and (iii) improving NRA's ability to implement range development by training of staff at all levels and by providing internationally recruited senior technical staff.

Project Description

The project would, over a period of six years, consolidate and improve rangeland and livestock production in the project area, increase the income of the pastoralists through the introduction of a system of range utilization, and make way for the gradual concentration of pastoral communities, which would help in the provision of social services. This would be achieved by conducting an aerial survey of the rangelands, including livestock and human habitation, and the preparation of a vegetation map. This would be followed by a ground survey of the rangelands and the pastoral communities. This survey would form the basis for the establishment of grazing reserves and selection of those reserves where stockwater supplies would be developed. The veterinary services would be expanded, non-formal and formal education would be provided. The National Range Agency's administration would be strengthened, and

nurseries, town shelter belts and water and soil conservation activities would be initiated. Specifically, the project would provide staff, equipment, housing and transport to carry out:

(i) range development comprising a range ground survey, the demarcation of 45 town and village grazing reserves, 12 famine reserves and 20 range grazing reserves; the drilling and equipment of 32 boreholes or surface water ponds to provide supervised stockwater points in the famine and range grazing reserves; the construction of 1,000 km of access tracks and the provision of staff housing, offices and workshops as well as transport and equipment for the National Range Agency field service in the project area;

(ii) non-formal training comprising: a survey of pastoral communities to establish a dialogue and collect information on seasonal movements and grazing; non-formal education on the objectives of the project; the formation of grazing associations; field training for the upgrading of field staff and the initial on-the-job training of range assistants; the production of simple educational materials directed at the pastoralists and a film on the pastoral way of life explaning the purpose of the project;

(iii) formal training comprising the provision of 4 lecturers for training courses in animal production, range and forestry at the technical level and 1 university lecturer in range management for the Faculty of Agriculture at Afgoi; 20 man-years of post graduate fellowships in range management; and overseas on-the-job training of counterpart staff for the range monitoring team;

(iv) rangeland studies and trials comprising 5 man-years of professional services for the establishment of range grazing trials to determine the effects of grazing intensity, range improvement experiments (firing, bush clearing) and forage analysis; 3.5 man-years of professional services to continue the identification and registration of range vegetation (taxonomy); funding for an aerial survey and vegetation mapping of the Tugder, Nugal and Sanag regions in northern Somalia; demonstration of soil and water conservation measures, experiments with and the evaluationof grazing cooperatives; strengthening of the NRA's forestry department, and establishment of three town shelter belts and three forestry/range nurseries;

(v) the strengthening of veterinary services comprising 16 man-years of professional services; 6 mobile vaccination teams and 12 mobile clinics in order to provide year round services;

(vi) the strengthening of National Range Agency Headquarters comprising 15.5 man-years of professional services to strengthen senior technical management; 4 man-years of professional services to establish a range monitoring unit for continuous monitoring of the range reserves; 6.5 man-years of professional services to set up a stockwater service to develop, operate and maintain stockwater supplies; 4 man-years of professional services to establish one central and three regional workshops to ensure the maintenance of vehicles, water pumps and engines; and funds for the construction of a headquarters building.

A total of 4,700 man-years of unskilled labor required for surveying and demarcation of range reserves, the establishment of town shelter belts and nurseries, soil conservation and water spreading and experimental grazing cooperatives would be provided under a World Food Program Project.

The details of components A.I.D. is financing are presented below.

Range Development

A Resource Inventory would be carried out consisting of two aerial surveys, undertaken in different seasons, and the production of a vegetation resource map (scale 1:200,000) as well as acetate transparencies. It would include a description of land systems in terms of geology, soils and vegetation, as well as information on human population and habitation, domestic animals, water points, wild animals by species, and cropping activities.

A Range Ground Survey would be conducted, based on the resource inventory, by a ground survey team consisting of two internationally recruited range ecologists and one Somali professional. The survey would: (i) verify and validate the resource inventory; (ii) establish range condition guides and condition standards; (iii) identify areas of high erodibility and areas suitable for village, town, famine and range grazing reserves, especially those suitable for stockwater development; and (iv) locate access tracks. In the selection of reserves, the survey team would liaise with the non-formal education team, conducting the community survey and non-formal training to confirm the agreement of the pastoralists to the proposed sites. Ninety hours of aircraft hire would be provided to allow for overflights of areas not traversed by the team.

Following the range ground survey, a Range Monitoring Unit would be established consisting of two internationally recruited range ecologists and three Somali professionals. The purpose of range monitoring would be to establish, by repeated field observations of selected monitoring sites, a record of the condition of the range vegetation as a basis for management planning. In all, 294 monitoring sites would be established. The expatriate team would complete the work in 18 months but would return during the last six months of the project to give refresher training and assist in the interpretation of the observations collected in the intervening period.

Range Investigations. In order to overcome the lack of basic data on the rangeland resource of Somalia and to build a research program on the basis of the information provided by aerial and ground surveys, the project would provide 8-1/2 man-years of professional services, equipment, staff housing and transport to establish 92 range reference areas in various ecological zones of the project area; the registration and chemical analyses of forage species, and trials regarding the effect of firing and bush-clearing.

To compliment the vegetative studies, priority in development of a research program will be given to conducting grazing trials to determine how much forage should be left ungrazed to best manage each of the major vegetation types in the project area. A given amount of forage must be left ungrazed to get optimum production from vegetation and livestock. This is the point where animals are in balance with vegetation.

Knowing this amount of forage provides a basis for answering the basic range management questions of when should livestock be put into an area, how many animals should be grazed there, when should they be taken away and where should they go?

Animals should be put into an area when there is more forage available than that amount determined by the grazing trials. A calculation of the number of animal days of grazing provided by forage in excess of the determined amount, serve as a guide for deciding whether to put many animals in for a few days or fewer animals for more days. Animals should be removed when forage is grazed down to the determined amount. They should be moved to an area that has more forage than the determined amount required to be left ungrazed for the vegetation type being considered for use.

Grazing trials can also give information on the possibility of using heavy grazing by goats and camels as a brush clearing practice. Grazing trials do give a direct measure of forage quality in that they show how individual animal production varies with changes in feed quality. Grazing trials also show quantity of forage production under different intensities of grazing use.

The grazing trials will also serve as demonstrations of reserves to begin gaining herder acceptance.

It is estimated that 5 trials areas of 100 hectares each will be sufficient to gain sufficient information on the major vegetative types. Each of these areas will be divided into grazing 3-4 blocks with varying intensities of grazing. Data on rate of gains of animals and vegetative growth on these varifies blocks can then be plotted on graphs which have proven to be statistically consistant in Iceland, the U.S. and in Niger to define the optimum balance of grass and animals. As this is refined over 3-5 years, the results give the optimum amount of vegetative matter to be left standing in order to gain optimum vegetative regrowth and optimum gains from animals.

40 person-months of consultant time are provided for in the project to set up and monitor these trials. Materials and supplies are included in the range reserves components as these trials serve as pilot reserves for the ongoing program.

Based on the information and experience generated in the studies and range trials 30 percent of the rangelands in the project area would be put under controlled grazing in the form of surveyed, monitored and guarded grazing reserves. A grazing association would be formed for each reserve prior to its establishment in order to involve pastoralists in management from the outset. The grazing associations would be trained to take over responsibility for the reserves under the supervision and direction of NRA field staff after a period of approximately 10 years.

Forty-five Town and Village Grazing Reserves each of 400 km^2, about 4 reserves per district would be established. Each year, one-fourth of each reserve would be closed for grazing. The period of rest would be one or two years determined by the monitoring of range conditions. The nonformal education and community survey team would solicit the cooperation of the pastoralists, assist in the formation of grazing associations and provide training in the range management system to be practiced.

20 Range Grazing Reserves each covering 900 km^2 would be established around water points selected by the hydrogeologist in an area designated by the survey team as being suitable and safe for stockwater development, and each demarcated quarter of 225 km^2 would be rested in turn in similar fashion to the village and town grazing reserves. The installation of water points in the range grazing reserves would extend the grazing period by 4 months. However, in order to avoid overgrazing, this would be conditional upon grazing associations being formed by the pastoralists habitually using these areas, and their agreement, if necessary, to limit the numbers of animals they would graze around a new watering point and

to follow the range management directives of the NRA. The non-formal education team would identify groups and individuals who could conveniently form a grazing association. The range reserve would initially be policed by 20 guards.

In each of the twelve districts, one famine grazing reserve of 600 km^2 would be established and equipped with a borehole designed to supply the maximum quantity of water during periods of use. The reserves would be selected by the survey team in consultation with the regional range officers and the pastoralists. They would be opened for grazing in times of drought or as required for the purpose of bush control.

The total distance to be surveyed and demarcated to establish the boundaries and subdivisions of the reserves would be 10,200 km. It is assumed that 5,100 km would be cleared by bulldozers and motor graders. The dozers would "pioneer" the demarcation lines where the bush was particularly heavy. The motor graders would finish those demarcation lines serving as roads and construct others where the bush vegetation was light. The 5,100 km assumed to be too rocky for the machinery would have cairns erected by crews of laborers directed by the surveyor.

A.I.D. is financing all the technical assistance, the equipment except for passenger vehicles and operating costs for the equipment for this component. Other donors are providing the civil works, passenger vehicles, partial financing for local salaries, and food for work.

Formal Training. In order to alleviate the acute shortage of NRA staff trained in range management, the project would provide 21-1/2 man-years of professional services, equipment, transport, educational material and staff housing in support of the Livestock and Range School at Afgoi; the establishment of a Range Management Department at the Faculty of Agriculture of the National University of Somalia; and overseas post-graduate training.

The project would provide four internationally recruited lecturers: in Range Management (two); in Animal Husbandry (one); in Forestry (one); as well as transport, housing and equipment needed for classroom and field training. The lecturers would be recruited in time to prepare the course curricula and field training program, together with their Somali colleagues. Similarly, the project would provide an instructor in range management, transport, housing and training equipment for the Faculty of Agriculture as well as 20 man-years of post graduate fellowships in range management. An additional 20 man-years of fellowships would be financed by USAID. A.I.D. will provide two lecturers and one instructor, participant training and equipment for this component.

To increase the knowledge of what may be gained by applying soil conservation and water spreading techniques in the project area, two man-years of professional services, equipment and transport would be provided to design and execute trials in Far Libax, Roux and third location to be selected, as well as to demonstrate anti-erosion activities in other parts of the project area as required.

In the above mentioned three locations the project would also support three experimental grazing cooperatives by providing 2 man-years of professional advice and training. The cooperative advisor, together with his counterpart, would undertake an indepth evaluation of existing grazing cooperatives and make recommendations to government regarding their viability, and would assist the three experimental cooperatives in the project area with respect to collective buying, marketing and improvement of living conditions through provision of health and education services.

A.I.D. will provide technical assistance, vehicle operating costs and some equipment for this component.

Summary Table of AID Provided Technical Assistance

Technical Director, Range and Environment	5 yrs.
Range Scientist (2)	10 yrs.
Taxonomist	3-1/3 yrs.
Soil and Water Conservationist	2 yrs.
Cooperatives Advisor	2 yrs.
Water Development	4-1/2 yrs.
Lecturer in Range Management (2)	8 yrs.
Instructor in Range Management	5-1/2 yrs.
Total	40-1/2 yrs.

Components Full Financed by Other Donors

Non-formal Training. The success of the project would depend on the participation of the pastoralists affected by the proposed interventions. The reversal of range deterioration does not present a technological problem. The problem is human, namely to arrive at a consensus which subjects the short-term ambitions of the livestock owner to long-term development objectives. The alternative to force in the form of police type actions is a non-formal education dialogue which provides a slower but more enduring change.

The project would provide 9 man-years of professional services, with equipment, transport and housing for field staff, to conduct a community survey of all pastoral communities in the area; train 15 regional and district range educators; conduct seminars and workshops with the pastoral elders and government officials; produce simple educational materials, radio programs and a film about pastoral livestock production - all aimed at explaining the purpose of range development and

and the promotion of the understanding and participation of the pastoralists.

The first step would be visits to all pastoral communities in the project area by a Somali team headed by the Pastoral Training Advisor seconded from the Academy of Somali Studies. The team would establish a dialogue and in the process collect information regarding the population and seasonal movements of the livestock, thus, preparing the way for negotiations with the NRA range staff on the formation of grazing associations and the establishment of grazing reserves. The team would liaise closely with the regional range service and the range ground survey team.

The internationally recruited Adult Education Officer and counterpart staff would establish the NRA Audio-Visual Center in Mugdisho in collaboration with the National Adult Education Center of the Ministry of Education. They would use the training support equipment, train the audio-visual technicians and other staff and develop a program of writing, printing and taping of material to be used by the project field trainers. Radio programs would be prepared in cooperation with Radio Somalia and an educational film would be produced with the assistance of the Somali Film Agency. The center would also support the field training programs of the Livestock and Range School and the Range Department at the University.

The internationally recruited Range Training Officer would, together with his Somali counterpart, provide on-the-job training and support for the community survey team, regional range education officers and the district range educators. They would organize short staff training courses and pastoralists' seminars, and assist in field training programs which would be part of the formal range-training curriculum. They would work closely with the Pastoral Training Advisor and would liaise with the nomadic training centers of MCE at Awooney and Gur El.

Range Education Officers located at each of the three regional headquarters, as well as one Range Educator per district, would be provided. The latter would be pastoralists from the district who had some previous education and training in a responsible government job or similar activity.

Forestry. An internationally recruited Technical Director of Forestry would be provided for a period of four years to be responsible for the technical aspects of forest evaluation and administration, and to advise the General Manager of the NRA with respect to the operation of the Forestry Department. He would participate in the training of forest guards and forest officers, in cooperation with the forestry lecturer appointed to the Agricultural Secondary School of Afgoi, and supervise the establishment of the town shelter belts and nurseries.

Towards the end of his assignment he would submit a plan for the implementation of a forestry program for the country and assist the NRA in drawing up a relevant project for submission to aid agencies.

At each of the three regional capitals - Galkayo, Dusa Mchreb and Beletwein - the project would provide fencing, tools, equipment and labor for the establishment of a 10 km^2 large town shelter belt and a tree forage plant nursery, as well as the services of a nursery specialist for four years.

Veterinary Services. At the national level, technical assistance would be provided in the form of three internationally recruited veterinary specialists: a Senior Pathologist, a Disease Investigation Officer for the Vaccine and Serum Institute in Mugdisho and a Laboratory Technician. They would: (i) organize a central diagnostic unit; (ii) establish guidelines for the collection and dispatch of diagnostic material by the regional field services; (iii) conduct a national disease survey; (iv) monitor vaccination campaigns; and (v) train their counterparts and the technical staff on the job. To strengthen the regional field services, the existing post of Technical Director of Veterinary Services, presently financed under NRDP, would be extended for four years. The specialist holding this post would be responsible for: (i) organizing and supervising the development of the field services in the project area; (ii) advising the Director of Veterinary Services on all aspects of the national field service; (iii) training his counterpart and the regional veterinary officers; (iv) cooperating with the officers of the Central Diagnostic Unit, improving the efficiency of the field diagnostic service; and (v) in so doing, would pay special attention to the cost effectiveness and manpower needs of the service.

In the project area the physical facilities of the field service would be improved by the construction of a simple field diagnostic laboratory at Beletwein. Vehicles and equipment would be provided for six additonal mobile vaccination teams and 12 mobile clinics which would follow the seasonal movements of livestock and offer services including dipping of small stock and sale of veterinary drugs and chemicals throughout the year. Funds would be provided for incremental staff, radio communication as well as for postgraduate overseas training of one veterinary officer.

NRA Headquarters. The NRA is presently implementing NRDP, establishing 16 regional offices, supervising the stockwater reservoirs in the interriverine area, and has also been given responsibility for forestry and wildlife activities. This has put a great strain on the three-year old institution. Staff, both in administrative and technical fields, are not sufficiently qualified and lack experience. To ensure that both the project and the ongoing development activities get the benefit of strong headquarter support and direction, the project would provide:

(i) 1.5-1/2 man-years of professional services for management, with transport and housing;

(ii) funds for the construction of a headquarters office building;

(iii) 4 man-years of professional services, workshop buildings, equipment, transport and housing for the establishment of one central maintenance workshop in Mogdisho and three regional small workshops to ensure the maintenance of vehicles, water pumps and engines.

Analysis

General:

The UNDP/FAO Livestock Development Survey in 1966 was followed in 1970 by a survey of the Northern Rangelands (UNDP SOM/70/512) and in 1974 by the UNDP/FAO Rangeland Conservation and Development Project. In 1976, the government decided to establish the National Range Agency as part of the Nothern Rangelands Development Project with the initial task of implementing that project. In November 1976, a World Bank project identification mission visited Somalia at government's request and it was agreed that a project should be prepared to develop the Central Rangelands area of the country. In January 1977, a joint Government/World Bank team began project preparation. The preparation report was issued in October 1977 and government's request for appraisal followed in November. The project was appraised in February 1978 and negotiated in March 1979.

The main changes made in the project design at appraisal were: (i) the concept of range management by the opening and closing of boreholes evenly distributed throughout the project area was abandoned in favor of demarcation of grazing reserves covering 30 percent of the area and the development of stock water in selected reserves; (ii) the proposed Range Research Institute which was considered premature, was deleted; (iii) non-formal and formal training was considerably expanded; and (v) the woodlot planting component was replaced by 3 nurseries and town shelter belts.

In late 1978 the IBRD appraisal was carefully reviewed, components attractive to A.I.D. were identified, programmed for A.I.D. funding, and a PID was prepared based on the IBRD draft appraisal report. In April 1978, a team of six specialists from CH2MHill was fielded to assist the Mission in completing the analysis of the project with special emphasis on the portions funded by A.I.D. The results of this final analysis are summarized below and may be reviewed in Annexes 6 to 10.

Grazing Reserves

A key to the success of this rangeland development project will be the establishment of grazing reserves where animal numbers are controlled and balanced with available vegetation. A grazing association will be formed for each reserve prior to its establishment. Pastoralists who take part in the selection, establishment and management of their grazing reserves will have an opportunity to realize the benefits of balancing livestock with vegetation.

Range Studies and Trials

When livestock are in balance with vegetation a given amount of forage must be left ungrazed. This key amount of forage provides a standard for answering the basic range management questions of when should livestock be put in an area, how many should graze there, when should they be moved and where should they go?

It is critical that grazing intensity trials, to determine the key amount of forage required to be left on each major vegetation type, be started early in the project. Short-term grazing trials on a few of the major vegetation types will be initiated early in the project by a consultant team contracted to assist the project staff.

Ultimate success of the project will depend on the development of grazing systems to best manage the reserves and the rest of the project ranges. A strong research program should emphasize development of management techniques that blend the best use of each of the major vegetation types into a grazing system that balances livestock with vegetation on all the rangelands of the nation.

Technical Assistance

To provide continuity to the project and give emphasis to the importance of balancing livestock with vegetation, combine the three separate tours for two Range Ecologists into one six-year tour for each of two Range Scientist/Ecologists. Extend the tour of the Technical Director Range and Environment (U.S. A.I.D. Team Leader) to make him available for the full six years of the project. These three individuals must realize that vegetation and livestock are equally important in this project.

The Cooperatives Advisor will be available in years two and three, when the cooperatives are being formed and the Technical Director Stockwater Service tour will be extended two years to be operational during the last half of year two through year six.

Housing

If the two Range Scientist/Ecologists, the Soil and Water Conservation Specialist and the Cooperatives Advisor were stationed in Mogadiscio, the long hard trip to the project area would make the performance of their duties very difficult. These people will need to be housed in the project area possibly at Dusa Mareb. The two lecturers will be housed in Afgoi where they will be teaching.

Surface Water Development

It is anticipated that surface water development in the Central Rangelands will not provide a significant amount of the total water supply for the area. There are several reasons why groundwater is a preferrable source of supply.

(i) Rainfall is extremely variable in location and intensity. In any year a surface water catchment could fail partially or entirely, due to lack of rainfall. This causes extreme hardship on people and livestock who depend on the supply.

(ii) The success of the rangelands project lies in control of livestock through control of water supplies. Unlike a well, surface water catchments cannot be controlled so that people are prevented from taking water; they can always use a bucket to remove water.

(iii) The topography of the rangeland is extremely flat. It would be very difficult to find a catchment site with enough relief that an entirely gravity operated system could be built. Catchments will need to have a pump system to make the water available for use.

(iv) In soils with high permeability development costs for surface water are much higher than for a well with the same yield.

(v) Operation costs for a catchment are lower than for a well because water is not being pumped from such large depths, but maintenance costs will be higher. In addition to pump maintenance, silt accumulations must be removed annually.

Because of these problems, surface water will only be developed when groundwater development is infeasible because of poor quality or inadequate quantity.

GROUNDWATER ANALYSIS

Livestock water supplies in all range areas are a valuable tool for range management.

Twenty boreholes in the range grazing reserves and 12 in the famine reserves would be constructed and equipped in the project area. Surface water catchments and water ponds would be considered whenever this procedure would be an alternative to the preferred borehole.

The subsurface hydrology of the Central Rangelands is poorly understood because there has been no systematic development of a hydrogeolic data base. This includes aquifer locations, quality, safe yield, storage and subsurface water levels.

Sufficient data exists only to determine that there is a potential for developing the subsurface aquifers, the water quality is marginal and frequently aggressive to metal. This has led to the recognition that downhole geophysical investigations are necessary to develop good wells and an accurate data base.

Well failures will be reduced not only for future wells but also for the Central Rangelands by the inaguration of a Water Development Agency supported groundwater exploration program.

Vital to the success of a Range Reserve program is a consistent reliable water supply. The National Range Agency will be strengthened in this capacity by the formulation of a stockwater service division that will have a well supplied and trained operations and maintenance sections.

The Water Development Agency under a separate A.I.D. project will be conducting geophysical exploration and studies nation wide. In this program the Central Rangelands area will be given highest priority for initial activities.

Funds will be provided by the Central Rangelands Project for the purchase of up to 32 boreholes and as many as 4 storage reservoirs provided by the WDA through the USA.I.D. funded Groundwater Development Project. This arrangement would strengthen both agencies in their respective fields of stockwater supply and water resources development.

Both the NRA and the WDA would benefit by the respective projects through the acquisition of spare parts for continuing operation as well as developing trained personnel to carry out their respective functions.

The timely inception of both projects will be required for them to be mutually beneficial to both agencies.

The Central Rangelands will accumulate new low maintenance water delivery systems as a result of current technology being applied to the project needs by the U.S.A.I.D.-supported Groundwater Development Project through the WDA.

SOCIAL SOUNDNESS ANALYSIS

I. Socio-Cultural Feasibility: The Nature of the Beneficiaries and Principles of Social Organization:

The main beneficiaries of the project are the 400,000 inhabitants of the three districts, Hiiraan, Galgudud, and Mudug, The beneficiaries belong to two ethnic groups, the Hawiyas and the Dcroods (see social annex I)* Although ethnicity is an important factor for the Somali nomad's sense of identity, ethnic/tribal disputes are no longer a concern of present day Somalis. Somali is the only language spoken in the project area, and linguistic uniformity characterizes most of the three districts. Sunni Islamic practices are followed by devout nomads who attend Koranic schools and frequent mosques whenever possible.

Because of the semi-arid nature of the environment, pastoralism is the main occupation of the population. However, limited seasonal cultivation is practiced in parts of Hiiran close to the Shebelli River. Men, women and children all actively participate in caring for their herds. In the project area, rainfall is seldom if ever uniformly distributed, occurring as cloud bursts in an uneven distribution pattern directed by prevailing winds.

Although Somali nomads look forward to the two rainy seasons, the "Gu" (April-May) and the "Dayr" (September-October), there is no assurance that rain will fall consistently on a given spot during these seasons. Also, serious droughts occur periodically. Because of the non-predictability of the rain patterns, Somali nomads have to be continuously concerned with decisions about migration. As the rain pattern shifts within and between seasons, so does the grazing pattern. There are no restrictions on the utilization of pasture or herd size other than the limitation of labor and water availability. Flexibility and mobility are essential to the Somali nomads in order to overcome ecological limitations.

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*Refer to Social Annex for recommendations on including women as project participants.

The Somali nomads have two grazing units: the nomadic hamlet (Guri) consisting of nuclear families that are agnatically related to one another. Women and their children are the main stable social units living in these hamlets. Goats, sheep and a few milch camels are kept to provide the family with milk, ghee, and meat. Camel camps consist of adult men and boys who migrate long distances seeking better pasture conditions. Camp membership is often based on agnatic ties.

The Central Rangeland Project will gradually help nomads establish a system that is geared toward self-sufficiency in forage and stock-water in the project area. Over time the project will lead to the following social benefits: (1) shorter migration distances; (2) improve the milk yield of livestock; and (3) possible increase access to social and educational services.

On the basis of brief field work in the Central Rangeland and knowledge of the available anthropological literature, it appears that knowledge of the total Somali pastoral complex leaves much to be desired. It is true that general information about Somali social organization is available. But lacking is the type of detailed anthropological knowledge that should be available before undertaking this project. Hence, baseline data should be collected and analyzed before the implementation stage takes place.

Two of the most problematic areas in the project are the following issues:

1. <u>Traditional Forage Practices and Rangeland Management:</u>

   Individualism and pragmatism are two main characteristics of the central rangeland nomads. Individuals make decisions about migration, herd size, and sale of animals. Traditional forage practices lead to overgrazing certain desirable areas. Overstocking is a direct response to ecological insecurity (see Social Annex I).

   However, an encouraging point is that Somali nomads seem to be more responsive to change than other nomads of the world. Bitter drought memories, and a sense of pragmatism have made Somali nomads willing to consider alternative ways of caring for their flocks. The Central Rangeland Project will introduce new rangeland management practices to pastoralists living in the project area. Pasture closure, and limiting heard size are two sensitive topics to the Somali nomad since they limit the individual freedom enjoyed by nomadic populations. Also, Somali herders do not look favorably upon sale of animals. Livestock are not grown primarily

for sale or for sale of their products, instead they are kept as a capital repository. Thus, extreme attention has to be paid to the nonformal educational component of the project in order to explain to the nomads the benefits of limiting herd size. They have shown great interest in range management principles and small reserves are functioning in many places in the central and northern regions.

2. Nomadism vs. Settlement:

Somali nomads value their ability to move freely in search of pasture and water sources. However, settlements are formed whenever conditions are favorable. Hence, the idea of settling in an area on a temporary basis is not alien to the nomads of the Central Rangeland. Small clusters of huts, and larger hamlets are inhabited periodically, especially by women and their children. Men sometimes settle, and they live either alone or with their families to follow a transhumant pattern of migration that they see as the best way to utilize their environment. It is important to maintain this type of flexibility, and the project will not result in the formation of large settlements. However, people might be tempted to stay around permanent water sources. A plan has to be followed in order to balance population, water and livestock distribution with vegetation.

II. Participation and Diffusion:

Funds will be allocated by IBRD and ILCA to hire an applied anthropologist who is proficient in Somali to conduct a human survey of the people living in the project area. Moreover, this person will work closely with an educational specialist to produce educational materials that appeal to the nomads culturally. The applied anthropologist will collect information on the following topics: (1) the dynamics of seasonal migration in the rainy and dry seasons; (2) traditional forage practices;and (3) identification of local influential elders. Water utilization practices and health problems related to water are also important subjects that should be investigated by the anthropologist.

A major component of the Central Rangeland Project is the nonformal educational program that will be conducted to encourage the participation of the nomads. The nonformal educational program will (1) introduce the main principles of rangeland reserve utilization to the nomads, (2) recruit members for reserve associations, (3) disseminate knowledge about the objectives of the project, and (4) initiate a dialogue between pastoralists and officials involved in the implementation stage. Koranic schools, mosques, and prayer groups are

indigenous institutions that enjoy the confidence and respect of Somali nomads. They offer flexible learning environments that can be instrumental in gaining acceptance to the project's main principles.

It is hoped that as nomads recognize the accrued economic and social benefits of the project (see Economic and Social Annexes), new rangeland management techniques will diffuse to other areas. Social benefits related to the general improvement of the quality of educational and health services will serve as incentives for individuals to participate in the project.

ECONOMIC ANALYSIS

1. An established traditional marketing system is in place throughout the project area. Herders usually sell animals to or through traders for both local consumption and export utilizing this marketing system. Improvements in the system are desirable but are not critical to the success of the present project.

2. Strong demand for the livestock has resulted in higher prices to the herders. 1976 and 1977 found prices, in real terms increasing by 25-30 percent for large ruminants and 50 percent for small ruminants.

3. The project will have positive impacts on per capita incomes of herders in the project area, with incomes projected to increase by 15 percent due to project interventions between year 5 and year 15 as well as stabilize.

4. Non-monitized ecological benefits from project interventions are great. The balancing of animal use and vegetation gives some increase in productivity of the animals but more importantly maintains good ground cover to deter erosion and deterioration of the land base. Traditional discounted cash flow analysis does not do justice to these savings because of the need for large initial investments to get a very long-term benefit.

5. The ERR for this project has been optimistically estimated at 15 percent by the IBRD appraisal. Even an ERR of less than 10 percent would be acceptable in a project with numerous non-quantifiable benefits both social and environmental.

ENVIRONMENTAL ANALYSIS

The IEE for this project was submitted, reviewed and approved with the PID. The recommendations of the IEE in terms of environmental expertise have been incorporated in the Director of Range and Environment and in the Range Scientists scopes of work.

ENGINEERING ANALYSIS

The project has been reviewed by a REDSO Engineer who finds the requirements of Section 611-A of the FAA have been met for the construction components (non-A.I.D. funded) of the project.

FINANCIAL PLAN:

Project costs will amount to U.S.$46.3 million over the six-year implementation period. The foreign exchange component amounts to U.S.$32.7 million or 71 percent of total cost. The project cost estimates are summarized below.

Project Component	Local Cost	Foreign Cost	Total Cost	Foreign Exchange %
	US$ million			
Range Development	5.0	7.7	12.7	61
Training	1.8	4.9	6.7	73
Range Studies & Trials	0.4	2.9	3.3	88
Veterinary Services	0.8	2.4	3.2	75
NRA Headquarters	1.5	6.1	7.6	80
Physical Contingencies	0.7	1.8	2.5	72
Price Contingencies	3.4	6.9	10.3	67
Total Costs	13.6	32.7	46.3	71

Costs are estimated on the basis of the January, 1979 prices. Physical and price contingencies combined represent 38% of the base cost. Costs of internationally recruited staff are estimated between US$50,000-US$100,000 per man year, depending on the job to be performed and the source of recruitment.

The financing of the project would be shared in the following amounts and proportions.

	Amount US$ million	% of Total
IDA	8.0	17
IFAD	9.0	20
USAID	15.0	32
ODM	4.0	9
WFP	4.3	9
Government	6.0	13
Total	46.3	100

Under a joint financing arrangement, IDA will contribute a credit of US$8 million, and IFAD a loan of US$9 million equivalent for financing civil works, vehicles and equipment, technical assistance, and local salaries. Both contributions would be on IDA and IFAD standard terms to the Government of Somalis, who would pass on the proceeds to NRA as a grant under a subsidiary agreement. The joint IDA/IFAD financing would consist of 67 percent foreign exchange and 33 percent of local costs. The local cost financing is justified in view of the country's poverty. Assistance from U.S.A.I.D., ODM and WFP would be under parallel financing arrangements. The U.S.A.I.D. grant would assist in financing the range and stock water development components, part of the formal education and training, the range investigations, soil conservation and grazing cooperatives components, technical assistance to NRA Headquarters and the Range Monitoring Unit and Stockwater Service. ODM would finance technical assistance and specialized equipment for part of the formal training and the Livestock and Range School, the Town Shelter Belts and Nurseries, the Veterinary Services and the Maintenance Service. The WFP would provide food for unskilled laborers under an ongoing project. The government would gradually take over all local salaries and allowances by year 4 of the project. The government will deposit a sum of So.Sh. 5.0 million (US$0.8 million) in National Range Agency's account with the Central Bank of Somalia and would replenish this advance every six months throughout project implementation.

Details of A.I.D. contribution are shown below.

A.I.D.
Summary Budget
$000

Item	Yr. 1	Yr.2	Yr. 3	Yr. 4	Yr. 5	Yr. 6	Total
Capital	- 0 -	- 0 -	127	398	398	- 0 -	923
Commodities	1017	547	169	911	- 0 -	- 0 -	2644
TA	450	741	1141	901	896	896	5025
Training	160	194	- 0 -	- 0 -	- 0 -	- 0 -	354
Op. Costs	34	282	371	397	433	429	2006
Contingency	115	140	114	191	119	104	783
Inflation	129	313	349	849	741	829	3209
Total	1905	2217	2270	3647	2647	2258	14944

Details of all budgets may be found in Annex 12, broken out by donor and by component.

Category	IDA	IFAD	USAID	ODM	WFP	GOVT	Total Category Cost
	US$ Million						
Construction	2.84	3.19	1.5	—	—	—	7.53
Vehicles and Machinery	0.80	0.90	1.7	0.49	—	—	3.89
Equipment & Furniture	0.44	0.49	1.62	0.28	—	—	2.83
Professional Services & Fellowships	1.04	1.18	.40	0.04	—	—	2.66
Technical Assistance Staff	1.10	1.24	6.01	2.58	—	—	10.93
Local Salaries & Allowances	0.38	0.43	—	—	—	5.00	5.81
Vehicles & Machinery Operation	0.88	0.99	1.94	—	—	—	3.81
Maintenance & Utilities	0.40	0.45	1.35	—	—	—	2.20
Food Rations (WFP)	—	—	—	—	4.30	—	4.30
Miscellaneous Operating Costs	0.12	0.13	0.48	0.61	—	—	1.34
Total Contribution (US$ Million)	8.00	9.00	15.00	4.00	4.30	5.00	45.30
= % of Total Project Cost	18	20	33	9	9	11	100
Foreign Exchange Contribution (US$ Million)	5.43	6.10	13.40	3.80	3.87	0.14	32.74
= % of Total Contribution	68	68	89	95	90	3	72
= % of Total Foreign Exchange Cost	16	19	41	12	12	...	100

FINANCIAL ANALYSIS:

The project is costing approximately $120.00 per capita based on 400,000 ultimate direct beneficiaries. On a per animal unit basis, it costs approximately $15.00 per animal unit in the Central Rangelands area. A large portion of the project cost is for technical assistance ($10,930,000) due to the dire need for institutional strengthening at all levels.

The GSDR contribution amounts to $5,000,000 which will be utilized for local salaries and allowances for which they are primarily responsible. The government receipts from the project in the form of water charges, sale of drugs and export taxes will recover about one-third of the annual recurrent costs of the project, leaving a theoretical annual shortfall of 18.8 million Somali shillings. However, this assumes that staffing levels remain constantly high over the next 30 years when, in fact, if the range system is to be effective the herders will begin policing and managing their own reserves and staff costs will be much lower. Also, under the A.I.D.-financed water project, water charges will be adjusted to permit full recovery of operation and maintenance costs on the water system.

There is good potential for increasing the government's taxation revenues by levying reasonable taxes or fees on the animals utilizing the area. A charge of approximately $1.00 per animal unit would recover all the recurrent costs of the project. The IBRD has required that the government undertake a full study of the cost recovery problem and begin programs to recover sufficient funds for recurrent costs.

The government contribution of $5,000,000 to the project represents 33.3 percent of the A.I.D. contribution, and 11 percent of the total project cost. This multilateral project is not covered by Section 110(a) of the FAA in regards to the 25 percent contribution.

IMPLEMENTATION

Institutions:

The National Range Agency will be the executing agency for the project with the exceptions of: (i) the Veterinary Services component which would be executed by the Veterinary Department of the Ministry of Livestock, Forestry and Range (MLFR); (ii) the formal training at the Livestock and Range School which would be the responsibility of the Project Management Unit of the Ministry of Education; and (iii) the training in range management at the Faculty of Agriculture which would be the responsibility of that faculty. Procurement and accounting for all project expenditures will be handled by the NRA.

The NRA is headed by a General Manager who reports directly to the Minister, MLFR. The General Manager, with the approval of the Minister, issues internal rules governing NRA, concludes contracts on behalf of NRA, and is responsible for financial accounts and management of funds. NRA headquarters is divided into five functional departments, each headed by a Director, namely: general administration; range and environment; research, training and planning; forestry; and wildlife. In the field, NRA has sixteen regional field offices each under a Regional Director responsible for coordination with local authorities and other government agencies. In regions where development projects are being implemented, technical management under his supervision is carried out by the Regional Range Officer with an assistant who supervises District Range Assistants in charge of range activities in each district.

A. NRA

Legislation: The NRA was established by Law No. 23, 1976, Law No. 15 of October 26, 1969, on Fauna (Hunting) and Forest Conservation, and Law No. 68 of October 20, 1970, on Forestry, Range and Wildlife. A new law for the development of range management has been signed but not yet gazetted. This law authorizes the Secretary of State, MLFR, on the recommendation of the General Manager of NRA to establish range development and conservation areas and gives NRA the authority to: (i) open and close grazing reserves; (ii) establish grazing associations; (iii) control development and use of stock water supplies in the rangelands; (iv) undertake search, seizure and arrest for offenses; and (v) establish a Range Fund to finance range development activities. The law further authorizes the President of the Republic to issue decrees concerning its implementation.

Responsibilities for Project Implementation. The General Manager of NRA would be Project Manager assisted by an internationally recruited Project Coordinator who would supervise and coordinate the implementation of all project components by working through the responsible departments which would be strengthened by internationally recruited specialists.

NRA Field Organization. Three Regional Range Directors would be responsible to the General Manager of the NRA for the administration and management of the rangelands in the project area and would coordinate project activities with other government agencies concerned with rangeland development. Under their direction, three Regional Range Officers would supervise the activities of the District Range Assistants and be responsible for the establishment and management of range reserves and town shelter belts, the supervision of the watering points and the maintenance of the dialogue with the pastoralists. They would cooperate closely with

the teams conducting the aerial and ground surveys, as well as the range investigations and community surveys. The District Range Assistants would be responsible for overseeing the management of the reserves in their district, for supervising grazing associations and range guards, and keeping records of the number of livestock and people using the reserves. They would liaise with the District Range Educators in establishing and maintaining communication between the pastoralists and the administration. With time, it is expected that all three Range Assistants at each district office would have the combined function of Range Management Assistant, Animal Husbandry Advisor and Range Educator.

Headquarters Support. The Department of Administration of NRA would be responsible for administrative support for the project, for procurement, property control and personnel matters. The transport section would be responsible for vehicle control and maintenance to be carried out in one central and three regional workshops. A section for receivables would be established to deal with payments to NRA, initially water charges from stock water points arising out of the operation of the stock water service.

The Department of Range and Environment would consist of three services: soil and water conservation; range management and extension; and stock water. The Soil and Water Conservation Service would be responsible for the implementation of the soil and water part of the range studies and trials component including the experimental grazing cooperatives. The Range Management and Extension Service would be responsible for the range resource inventories, the range ground survey, establishment and operation of town and village, range grazing, and famine reserves as well as for range monitoring. A new Stock Water Service would be established, responsible for siting and establishment of stock water supplies in the reserves selected by the Range Gound Survey Team. This service would also be responsible for maintenance and operation of these boreholes and other stock water points under the management of NRA, including the collection of water charges.

The Department of Research, Training and Planning would consist of the three named services. The Research Service would be responsible for the range investigations subcomponent including taxonomy and forage analysis. The Training Service would be responsible for the implementation of the nonformal training component. In this it would cooperate closely with the National Adult Education Center and the Academy of Somali Studies from which a Pastoral Training Advisor would be seconded. The Planning Service would have as its initial task the monitoring and evaluation of the project.

A Monitoring and Evaluation Unit would be established under the Planning Service of the Research, Training and Planning Department. The International Livestock Center for Africa (ILCA) has agreed to provide technical assistance for establishing a monitoring package, with particular reference to establishing an appropriate methodology. This would be achieved by short visits fo ILCA staff, as well as the training of the head of the unit, through visits to similar activities elsewhere in Africa in which ILCA were involved. This level of involvement would be funded from ILCA's core budget. The project would provide a locally recruited economist and transport.

The Department of Forestry would consist of two services: Forest Utilization and Forest Plantation. The latter service would be responsible for the nurseries to be established under the range studies and trials component which would provide seedlings for the town shelter belts and for sand dune stabilization.

B. Formal Training

The Project Management Unit of the Ministry of Education would be responsible for the implementation of formal training at the Livestock and Range School, which would be part of the Afgoi Secondary Agricultural Training Complex. The Dean of the school would be responsible to the Project Implementation Unit of the Ministry of Education and would be in charge of the day-to-day management of the complex. A Board would be formed by representatives of the concerned agencies (MIFR, NRA, MOE, and MOA) which would decide on the budget, curriculum and numbers of students in the various disciplines.

Degree level training in range management and postgraduate fellowship training would be executed by the Faculty of Agriculture of the Somali University in consultation with NRA.

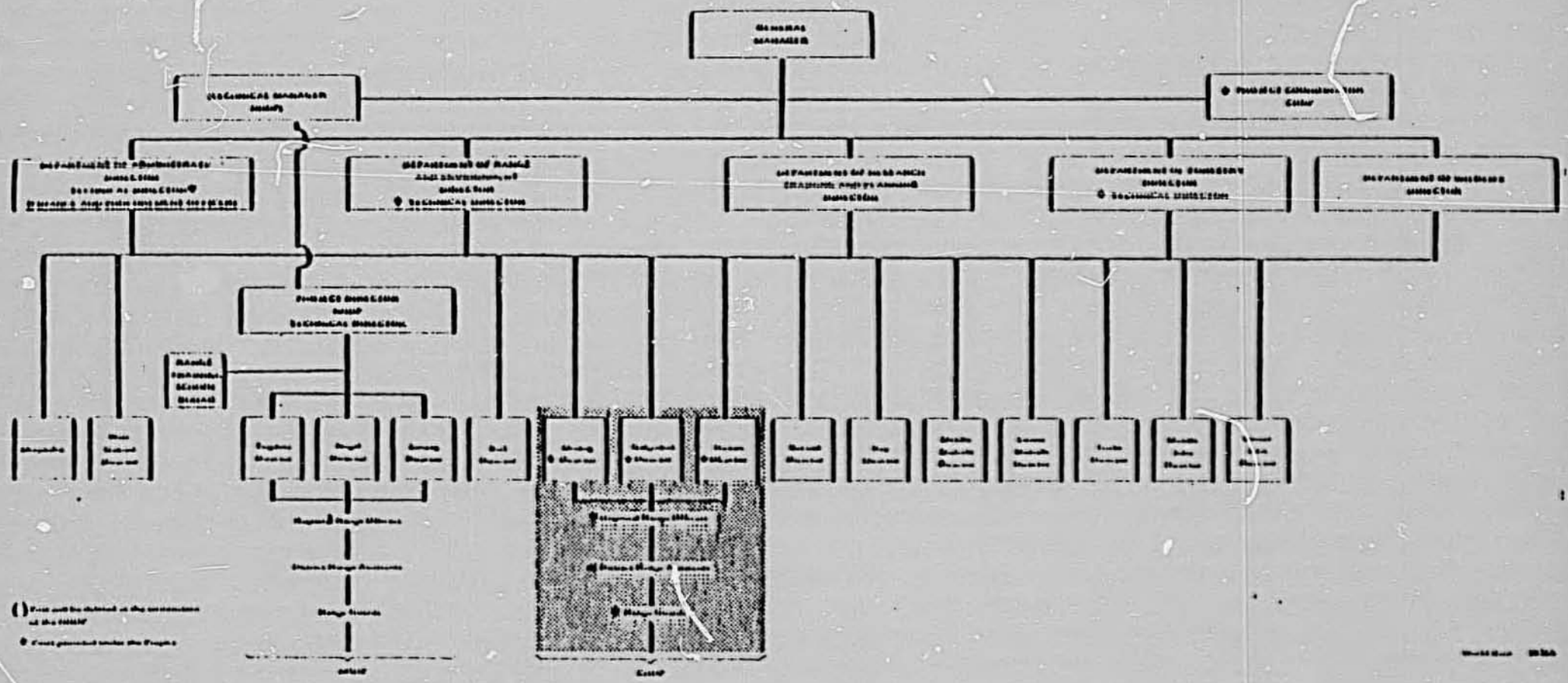
C. Veterinary Services

The Department of Veterinary Services of MIFR would be responsible for implementation of that project component. The Technical Director, at present provided under NRDP, would be financed under the project for four additional years and be responsible to the Director of Veterinary Services for supervising implementation. The Project Coordinator CRDP would, through the Director, coordinate field activities with those of NRA in order to achieve maximum impact.

D. Regulation of Grazing Reserves

Grazing associations would be established by NRA in consultation with local government authorities. Grazing guards would be selected from among the membership of the association and initially be employed by NRA under the Food for Work Program. They would, under the supervision of District Range Assistants, police the grazing reserves and assure that closed reserves would not be grazed and that the open reserves were only used by the members of the association. If they were unable to persuade pastoralists to leave a closed reserve, they would report through the Range Assistants, to the local police authority who would then be responsible for removing the offenders and for impounding animals or imposing fines according to the law.

SOMALIA
CENTRAL RANGELANDS DEVELOPMENT PROJECT
NATIONAL RANGE AGENCY
ORGANIZATION CHART



Procedures:

The project will be implemented under the host country contracting procedures with the NRA as the contracting agency. U.S.A.I.D and the GSDR feel that either a private sector or a Title XII institution is capable of implementing the project and we request open procurement.

Commodities will be procured from A.I.D. Geographic Code 941 countries utilizing a procurement services agency such as AAPC to assist the NRA in the procurement process.

Training will be done through PIO/Ps at U.S. institutions.

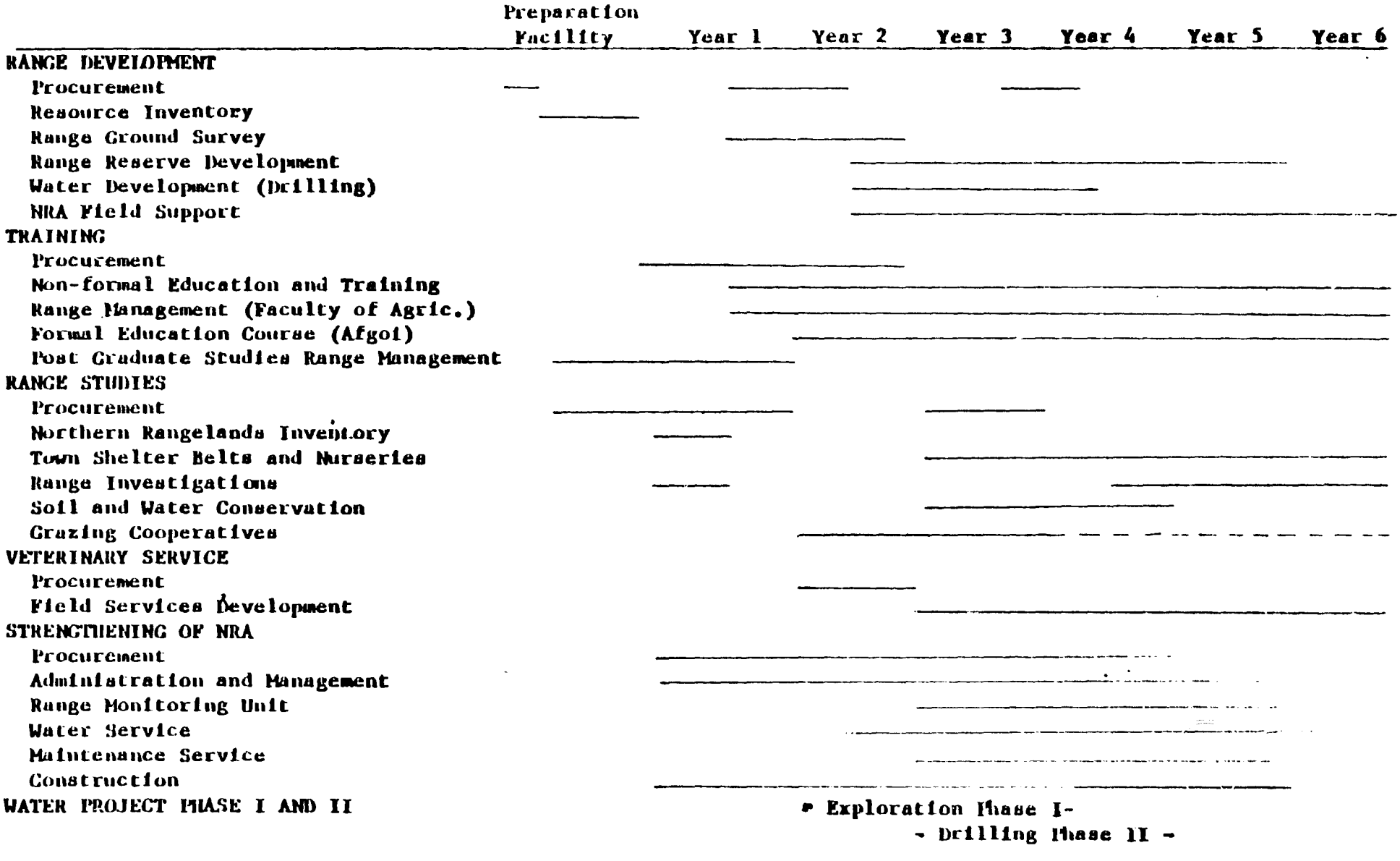
No waivers are expected in this project.

Timing

The following table provides a general implementation plan for the project. The NRA will develop detailed annual work plans and budgets for submission in November of each year.

The most critical immediate step for the A.I.D.-financed portions of the project is the recruitment of the T.A.team. The technical coordinator for the NRA is due to arrive in Somalia in June and will immediately begin the RFTP for the team.

SOMALIA
CENTRAL RANGELANDS DEVELOPMENT PROJECT
PROJECT IMPLEMENTATION SCHEDULE



Evaluation:

Mechanisms are built into the project to monitor and evaluate ecological impacts and socio-economic impacts of the project. The Range Monitoring Unit in the Range and Environment Unit will systematically evaluate the effects of the range reserves on the vegetation and ecology of the area. The baseline data for comparative purposes will be collected by the Range Survey Team which conducts the initial rangelands inventory.

Under a grant from the International Livestock Center for Africa (ILCA) an Evaluation Unit will be created in the Planning Division of NRA. This Evaluation Unit will consist of a local economist and a local sociologist supported by regular assistance from ILCA economists and sociologists. The unit will initially conduct baseline surveys using local staff. The baseline survey will more closely define the socio-economic status of the herders in the area, as well as contribute to the herd and human population definition. In the follow-up surveys as the project progresses, the Evaluation Unit will evaluate changes in the socio-economic status of participating herders while maintaining a small sampling of herders not in the project area who will serve as a control.

In addition to the internal mechanisms for project evaluation, funds are included in the consultancies in the A.I.D. financing to permit an external evaluation in years 3 and 5 of the project. This external evaluation will review the work done by the internal monitoring and evaluation units, do field work for verification of results and prepare summary reports of project impacts.

On the operational side, A.I.D. will participate in semi-annual supervision missions, whose purpose will be to monitor physical progress and make adjustments in design of the project as required.

Conditions and Covenants:

The Mission recommends the following conditions precedent to disbursement:

1) The law for development of range management, as enacted, is gazetted.

2) All conditions precedent of other financers have been met.

The Mission suggests the following covenants:

1) No stock water supplies would be developed unless a) they are incorporated in a range grazing reserve, b) a grazing association had been formed for supervision of the reserve, and c) the grazing association had agreed to abide by an restrictions of grazing and water imposed by the NRA in accordance with the Range Law.

2) The government would prepare and submit to A.I.D. by December 31, 1983, proposals for increasing cost recovery.

ANNEX 1

AID 1025 3 (9-71)

LOGICAL FRAMEWORK MATRIX – CENTRAL RANGELANDS DEVELOPMENT PROJECT

Summary	Objectively Verifiable Indicators	Important Assumptions
A.1. Goal To implement a system of range management which balances animals and forage to optimize livestock production while preserving the range resource.	A.2. Measurement of Goal Achievement 1. Improved range management on 40% of grazing lands in the country. 2. Livestock exports increased by 100% by 1995 over 1980 base.	A.3. (as related to goal) 1. Marketing improvements done as part of future projects. 2. Arab markets continue strong with no restrictions on Somali livestock.
B.1. Purpose Develop and initiate a range management program in the Central Region of the country.	B.2. End of Project Status 1. 30% of area in Central Rangeland in controlled grazing reserves. 2. One-third of the herders in the area are members of grazing associations. 3. Incomes of herders participating show 10% increase. 4. Range quality in reserves equal to or better than non-reserve grazing areas.	B.3. (as related to purpose) 1. No excessive long-term drought occurs in the first five years. 2. Range resource inventory confirms existence of presently underutilized grazing lands.
C.1. Outputs 1. Definition of range resources. 2. Definition of management program. 3. Institutional strengthening. 4. Organization of grazing associations. 5. Installations of grazing reserves.	C.2. Output Indicators 1. Base line study and vegetative study. 2. Existence of implementation plan for range reserves. 3. NRA doing own annual work plans and budgets. 4. Minimum of 20 associations formed and controlling own range. 5. Minimum of 20 range reserves created, target of 35.	C.3. (as related to outputs) 1. Herders continue to view range management as positive step. 2. Sufficient counterpart staff provided. 3. Newly enacted range law will be enforced.
D.1. Inputs 1. Technical Assistance 2. Training. 3. Commodities. 4. Water Development. 5. Operating costs.	D.2. Budget/Schedule See Budget	D.3. (as related to inputs) 1. AID Project 649-0104 is implemented to provide water development component. 2. Proper technical assistance can be found.

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b); Sec. 671 (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure	A Congressional Notification will be forwarded to Congress. Funds are allocated in the ABS for the first year's funding.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	Yes.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	Legislation has been enacted and only remaining action is gazetting of the Law. A CP requiring gazetting is suggested.
4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per *the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973*?	**Yes. See Annex 10, Economic Analysis, Comprehensive Groundwater Development Project Paper.**
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	**Yes.**
6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?	Project is multilateral Project.

A

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

a) Projections indicate increased livestock export

c) Grazing associations are an important part of the Project.

e) Project is aimed at technial improvements in the U.S. private sector.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Most of the A.I.D. funds will be expended in the U.S. private sector.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

The Government is contributing $5 million to the Project. They do not have sufficient foreign exchange to support contracts.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

No.

11. ISA 14. *Are any FAA funds for FY 78 being used in this Project to construct, operate, maintain, or supply fuel for, any nuclear powerplant under an agreement for cooperation between the United States and any other country?*

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

a) The nomadic peoples are recognized as some of the most needy. Food for Work is a $4 million component of the Project.

b) A co-op advisor is part of the TA team to help establish grazing cooperatives.

31

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [Include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

1. Project is directed at nomadic livestock raisers. It is projected that it will result in a 25% increase in their incomes.

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(b) to help alleviate energy problem;

(c) research into, and evaluation of, economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

Project is multilateral and does not require 25% contribution. Somalia is one of the RLCCs as well.

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

No.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained workerpower in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

1) Heavy emphasis in organizing herders to control their own grazing.
2) Increased meat and milk production is a benefit.
3) Training programs at middle-level is integral part of project design.
4) N/A
5) New Range Law is result of Project preparation.
6) Women are active herders and will be part of grazing associations.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

1) Project is one of highest priorities in the development plan.

g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(8). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

Project makes direct contribution to country's export earnings. It is part of comprehensive development plan recognizing that livestock are most efficient utilization of land in some areas of the country. The analysis considers technical economic and social feasibility.

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on positive effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

The majority of the funds provided by A.I.D. will be utilized for U.S. procurement of goods and services.

2. Development Assistance Project Criteria (Loans only)

N/A

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources? N/A

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Security Supporting Assistance N/A

a. FAA Sec. 531. How will this assistance support promote economic or political stability?

b. FAA Sec. 533(c)(1). *Will assistance under the Southern African Special Requirements Fund be used for military, guerrilla, or paramilitary activities?*

4. Additional Criteria for Alliance for Progress N/A

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	Yes
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?	N/A
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	N/A
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	Yes
6. MMA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	Yes
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,	Yes

A7

are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

3. International Air Transport. Fair Competitive Practices Act, 1974

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available? — Yes

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? — N/A

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? — N/A

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million? — N/A

C. Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? — N/A

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? — N/A

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-bloc countries, contrary to the best interests of the U.S.? — Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction? — Yes

5. Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions, *to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to practice sterilization?* — Yes

b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? — Yes

c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? — Yes

d. FAA Sec. 662. for CIA activities? — Yes

e. App. Sec. 103. to pay pensions, etc., for military personnel? — Yes

f. App. Sec. 105. to pay U.N. assessments? — Yes

g. App. Sec. 106. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). — Yes

h. App. Sec. 112. *to finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?* — Yes

i. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? — Yes

Annex 3

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country/Entity: Somalia Name of Project: Central Rangeland Development Project

Number of Project: 649-0108

Pursuant to Part , Chapter , Section of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to Somalia the "Cooperating Country" of not to exceed One Million United States Dollars ($1,000,000) the "Authorized Amount" to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of a multi-donor effort to install a range management program in the Central Range surveys, range trials, the establishment of range reserves, water resource development, formal training, a veterinary program and institutional support for the National Range Agency. AID will provide technical assistance training and commodities for the range and water development components.

I approve the total level of A.I.D. appropriated funding planned for this project of not to exceed Fourteen Million Nine-Hundred FortyFour Thousand United States Dollars ($14,944,000), to be Grant funded including the funding authorized above, during the period FY 1979 through FY 1984. I approve further increments during that period of Grant funding up to $13,944,000, subject to the availability of funds in accordance with A.I.D. allotment procedures.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate:

a. Source and Origin of Goods and Services

Except for Ocean Shipping, goods and services financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in the United States or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

b. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, Borrower/Grantee shall furnish in form and substance satisfactory to A.I.D., proof that the range law has been gazetted.

c. Borrower/Grantee shall covenant

1. No stockwater supplies would be developed unless (1) they are incorporated in a range grazing reserve, (2) a grazing association had been formed for supervision of the reserves, and (3) the grazing association had agreed to abide by any restrictions on grazing and water imposed by the NRA accordance with the Law.

2. The Government would prepare and submit to A.I.D., by December 31, 1983, proposals for increasing cost recovery.

		Typed Name	Office Symbol	Date	Initials
Clearances	A.				
	B.				
	C.				
	D.				
	E.				
	F.				

Signature _____

_____
Typed Name of Authorizing Officer

A/AID _____

ANNEX 4

ACT: VV ESA6S2SRA437 UNCLASSIFIED STATE 31414
AID RR RUGMDI
DE RUEHC #1414/01 037111
INFO ZNR UUUUU ZZH
R.B. R 06091 : FEB 79
FM SECSTATE WASHDC
BCM TO RUGMDI/AMEMBASSY MOGADISCIO 3645
CERON INFO RUVGC/AMEMBASSY NAIROBI 8855
BT
UNCLAS SECTION 01 OF 02 STATE 031414/01

ACTION COPY
Action taken:
No action
Initials

AIDAC

E.O. 12065 N/A

TAGS:

SUBJECT: PID APPROVALS: CENTRAL RANGELANDS DEVELOPMENT PROJECT 649-0108 AND COMPREHENSIVE GROUNDWATER DEVELOPMENT PROJECT 649-0104

1. SUBJECT PIDS JOINTLY REVIEWED AND APPROVED 15 JANUARY IN MEETING ALSO ATTENDED BY REPS OF WORLD BANK, CO-FINANCER OF CENTRAL RANGELANDS PROJECT. MISSION IS CONGRATULATED ON PREPARATION OF WELL ORGANIZED AND DETAILED DOCUMENTS MAKING POSSIBLE RAPID REVIEW AND ENDORSEMENT OF THEM TO PP PREPARATION STAGE.

2. AS MISSION AWARE, APPROVAL OF GROUNDWATER PID HAD BEEN DELAYED AWAITING PREPARATION AND SUBMISSION OF CENTRAL RANGELANDS PID. COMMITTEE HAD FOUND DURING 28 NOVEMBER REVIEW OF GROUNDWATER PID THAT AS PROJECT CLEARLY LINKED TO AND INDEED ALMOST INTEGRAL PART OF RANGELANDS PROJECT, APPROVAL OF GROUNDWATER PID SHOULD AWAIT SUBMISSION OF RANGELANDS PID FOR CLEARER UNDERSTANDING OF RELATIONSHIP BETWEEN THE TWO INCLUDING STRUCTURE OF FINANCING. AS A RESULT OF REVIEW COMMITTEE RECOMMENDS THAT BOTH PROJECTS PROCEED IMMEDIATELY TO PP STAGE WITH BOTH BEING DEVELOPED IN TANDEM IF POSSIBLE AS DESIGN TEAM SKILL REQUIREMENTS OVERLAP IN SEVERAL INSTANCES.

3. TIMING FOR PREPARATION OF RANGELANDS PP IS SOMEWHAT TIGHT. WE ARE PLANNING ON APRIL PROJECT AUTHORIZATION WITH DESIGN ESSENTIALLY COMPLETED BY END MARCH. FIRST STEP HOWEVER WILL BE THE FURNISHING TO WORLD BANK BY 1 FEBRUARY OF OUR LETTER CONFIRMING AID'S INTEREST IN AND AGREEMENT IN PRINCIPLE TO CO-FINANCING OF RANGELANDS PROJECT. AID/W PREPARING REQUIRED LETTER. WITH AID'S AND OTHER DONOR'S REQUIRED COMMITMENTS IN HAND, BANK PLANS TO OPEN NEGOTIATIONS WITH GSDR BY 5 MARCH IN WASHINGTON ON FRAMEWORK OF PROJECT AND IN PARTICULAR ON DETAILS OF BANK LOAN. BY LAST WEEK IN MARCH BANK HOPES CONVENE DONOR MEETING IN MOGADISCIO TO CONFIRM MAJOR DETAILS OF PROJECT. THEREFORE WE WORKING TOWARD FIELDING OUR PP TEAM BY 15 FEBRUARY ENABLING IT TO HAVE DRAFT DOCUMENT SUBSTANTIALLY COMPLETED BY TIME OF DONOR MEETING, AT LEAST FOR CENTRAL RANGELANDS PROJECT.

4. IN ADDITION TO REVIEWING AND [illegible] BANK PREPARED PROJECT ANALYSIS, THE COMMITTEE RAISED THE FOLLOWING POINTS IT WISHES THE PP TEAM TO ADDRESS.

A. WHAT IS THE REQUIREMENT FOR COUNTERPARTS AND THE NATURE OF THE GSDR COMMITMENT FOR MEETING THE REQUIREMENT.

B. WHAT WILL BE THE EXTENT OF THE RECURRENT COST BURDEN PLACED ON THE GSDR BY THE END OF THE PROJECT. ASSESS ITS CAPABILITY TO ASSUME THESE COSTS.

C. WHAT MEANS WILL BE REQUIRED BY THE NATIONAL RANGE AGENCY TO ENFORCE THE NEW GRAZING LAWS. ASSESS THE PROSPECTS OF THE NOMAD SUPPORTING THE CONCEPT OF RANGE CONTROL.

D. DEVELOP PROPOSALS ON HOW THE PROJECT WILL MEET THE NEEDS OF WOMEN.

E. INCLUDE WITHIN THE PROJECT FUNDING FOR WATER DEVELOPMENT ACTIVITIES, BOTH WELLS AND SURFACE WATER AS DEEMED APPROPRIATE. CAPABILITY FOR DEVELOPING SURFACE WATER, INCLUDING EQUIPMENT, WILL BE I
CLUDED IN
THE RANGELANDS PROJECT. FUNDS FOR DRILLING OF WELLS WILL ALSO BE INCLUDED I
RANGELANDS PROJECT. INSTITUTIONAL
CAPABILITY, HOWEVER, FOR DRILLING WELLS WILL BE COMPONENT OF ONLY THE GROUNDWATER PROJECT.

F. INCLUSION OF ENGINEERS, EITHER CIVIL OR AGRICULTURAL AS MEMBERS OF RANGELANDS PROJECT TEAM TO ASSIST WITH DEVELOPMENT OF SURFACE CATCHMENTS.
[illegible] ENTS.

G. CONSIDER PROVIDING FINANCING FOR OPERATIONS FOR THE FIRST TWO YEARS OF BOREHOLES DRILLED FORRANGELANDS PROJECT WITHIN RANGELAND PROJECT.

H. INCLUDE ALL PARTICIPANT TRAINING FOR RANGELAND PERSONNEL WITH IN RANGELANDS PROJECT.

I. RECOMMEND WHERE TECHNICIAN HOUSING SHOULD BE LOCATED. FINAL DECISION HOWEVER WILL ONLY BE TAKEN WHEN PROJECT COORDINATOR ON BOARD.

J. QUESTION OF TYPE OF TECHNICAL ASSISTANCE TEAM TO BE CONSIDERED FOR IMPLEMENTATION OF RANGELANDS PROJECT NEEDS BE CONSIDERED. AS PROJECT IS MULTI-DONOR EFFORT AND GREAT BULK OFDESIGN WORK IS ALREADY COMPLETED BY WORLD BANK, PROJECT DOES NOT REQUIRE THE EXTENSIVE DESIGN EXPERTISE IMPLIED BY THE TITLE XII COLLASORATIVE STYLE. GIVEN NATURE OF PROJECT ACTIVITIES AND TYPES OF EXPERTISE REQUIRED RESERVING PROJECT FOR TITLE XII IMPLEMENTATION SEEN NOT APPROPRIATE IN THIS CASE. THEREFORE SEEMS

CLEAR THAT MODE OF EITHER COMPETITIVE SELECTION OF TA TEAM OR RESERVING PROJECT FOR USDA PASA TEAM WOULD BE APPROPRIATE.

UNCLASSIFIED TRANSLATION

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ANNEX 5

V E R B A L N O T E

NO.15/5/1027/79.

The Ministry of Foreign Affairs of the Somali Democratic Republic presents its compliments to the Embassy of the United States of America in Mogadishu and has the honour to enclose herewith a Verbal Note No. EA/SDA/3/373/79 dated 28/1/79, concerning the reques for the Co-financement of the Central Rangeland Development Project.

The Ministry of Foreign Affairs of the Somali Democratic Republic avails itself the opportunity to renew to the Embassy of the United States of America the assurances of its highest consideration.

Mogadishu 29/1/79

TO:

THE EMBASSY OF THE UNITED STATES OF AMERICA
M O G A D I S H U

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BEST AVAILABLE COPY

JAMHUURIYADDA DIMOQRAADIGA SOOMAALIYA

State Planning Commission
Mogdishe

Lam. ——— Waxaa ku xiran ———

Jawaabta warq. L. ———
Ref: SA/DDA/3/ 373 /79

Ujeeddo:

Your Excellency,

Subject: Request for the Co-financement of the Central Rangeland Development Project

I have the honour to inform you that a Central Rangeland Development Project was prepared with the assistance of the World Bank. The project is designed to assist the Government of the Somali Democratic Republic to improve the resource base of the traditional livestock industry through range management, alleviate the constraints on livestock productivity by providing better veterinary services and achieve a gradual concentration of pastoral communities.

His Excellency The Ambassador
United States Embassy
Mogdishe
Somali Democratic Republic

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The total cost of this project is estimated [illegible] million, of which about US$ 27.2 million would represent foreign exchange requirements.

The project is expected to be financed by a combination of credits and grants to the Government of the Somali Democratic Republic and Government's own contribution. Up to now the Somali Government has approached IDA, UNF, OOM, and IFAD which have shown interest in financing parts of the project.

Therefore, the Government of the Somali Democratic Republic earnestly requests the US Government to participate in the co-financement of this valuable project, which USAID is aware of.

Yours Sincerely,

(Hussein H. Mahamed Ied)

Director General

State Planning Commission

GUDDIDA QORSHEEYNTA QARANKA

ANNEX 6

SOMALIA

CENTRAL RANGELANDS DEVELOPMENT PROJECT

RANGE SPECIALIST REPORT

MAY 1979

I. INTRODUCTION

This report is based on reviews of the World Bank staff appraisal report and implementation volume for the Somalia Central Rangelands Development Project and other publications available in Mogadiscio. It includes material from discussions with members of the National Range Agency, U.S. Agency for International Development, World Bank and the U.S. Food and Agriculture Organization. Observations and discussions made during ten days in the field in the Central and Northern Rangelands Project areas also contributed to the report.

II. FEASIBILITY OF GRAZING RESERVES

Balancing animal numbers with the fluctuating feed supply provided by arid rangelands is the objective of effective range management. Control of animal numbers is required to maintain this balance. In order to establish control, people who own and manage livestock in the area must be brought into the Central Rangelands Development Project early and be willing to cooperate in developing a sound range management system. If pastoralists take part in establishing and using the grazing reserves, they have an opportunity to see the benefits of balancing animals with vegetation.

It is important to establish areas where animal numbers can be controlled and the resulting effects on livestock and vegetation can be seen by the people who live by harvesting the vegetation with their animals. The Project plan provides for such areas by establishing the three kinds of grazing reserves. It is also important that some part of each reserve be used each year. The primary reason being that it is difficult for the local pastoralist to rationalize complete non-use of a grazing reserve. Another important reason for some grazing is that certain grasslands will produce more forage and healthier plants under a controlled grazing system than under non-use or harvesting only once after the growing season.[1/] The grazing system required to produce and maintain the greatest feed supply in each reserve can be developed by short-term grazing trials as the Project proceeds. The proposed four pasture rest rotation system is a good one to use initially until management systems can be developed from grazing trials.

1/ Elmi, A. A. 1979. Studies on effect of clipping on *Cenchrus ciliaris*. Somali Range Bulletin No. 7, pp 8-12.

III. NATIONAL RANGE AGENCY ENFORCEMENT OF NATIONAL RANGE LAW

Several reserves, shelterbelt areas and demonstration areas were observed where livestock grazing was not permitted. Some were town shelterbelt areas, fenced and guarded. The control was effective and undoubtedly difficult to maintain near the towns with so many local livestock looking for something to eat. Several reserves were observed in the Central and Northern Rangeland Project areas and the Bay area where grazing was controlled and the vegetation had made remarkable recovery as evidenced by the contrast at the fence or demarkation line.

The National Range Agency has effectively controlled grazing in the areas observed and it is believed that they will also be able to control livestock numbers, season of grazing and intensity of grazing use to balance animal numbers with the amount of available forage on reserves and cooperative ranches. Control under the National Range Law will be easier to maintain if realistic orders are issued by the National Range Agency for reserves and cooperative ranches as to which area to graze, how many animals to use, when to put them on and when to remove them. Short-term grazing trials on the major vegetation types will provide the basis for answering the above questions realisticly.

IV. RESOURCE INVENTORY

The vegetation mapping and animal and human resources survey would be conducted by systematic reconnaissance flights and aerial photography. This work will be contracted to a firm capable of making the inventory.

A set of contour topographic maps, scale 1:100,000, showing water points, wells and vegetation types was seen in Burao. The maps were published in 1976 developed from photos taken in 1974. If similar maps were made of the Central Rangelands Project area, the cost of the resource inventory might be reduced.

V. RANGELAND GROUND SURVEY

The plan calls for two Range Ecologists hired for one and one-half years upon completion of the Resource Inventory to work with a Somali professor to conduct a Rangeland Ground Survey. They would verify and validate the Resource Inventory, establish range condition guides and condition standards, identify areas for grazing reserves and areas of high erodibility and locate access tracks.

VI. RANGELAND MONITORING

After completion of the ground survey two internationally recruited range ecologists hired for two years and three Somali professionals would establish a Range Monitoring Unit. This unit would make repeated field observations on selected monitoring sites to record changes in range vegetation. This information would be used in management planning.

The Range Monitoring Unit should stress the importance of collecting data on when, by what, kind of animals and how intensively the monitoring sites are grazed within each reserve. Such information along with data from grazing trials will help assess the cause of changes in the vegetation that occur.

VII. RANGE STUDIES AND TRIALS

This group would consist of one Range Ecologist and one Senior Range Technician internationally recruited for two and one-half years beginning the middle of year four to conduct range investigations. A taxonomist would be hired for three and one-half years beginning the third year of the project. He is presently working with the National Range Agency hired with Kuwait fund. USAID will fund him when Kuwait funds are terminated.

The range ecologist and range technician would develop a research program on the basis of the information provided by aerial and ground surveys, make chemical analysis of forage species and conduct trials to study the effect of firing and bush clearing.

Priority in development of a research program should be given to the conduct of grazing trials to determine how much forage should be left ungrazed to best manage each of the major vegetation types in the project area. A given amount of forage must be left ungrazed to get optimum production from vegetation and livestock. This is the point where animals are in balance with vegetation.

Knowing this amount of forage provides a basis for answering the basic range management questions of when should livestock be put into an area, how many animals should be grazed there, when should they be taken away and where should they go.

Animals should be put into an area when there is more forage available than that amount determined by the grazing trials. A calculation of the number of animal days of grazing provided by forage in excess of the determined amount serves as a guide for deciding whether to put many animals in for a few days or fewer animals for more days. Animals should be removed when forage is grazed down to the determined amount. They should be moved

to an area that has more forage than the determined amount required to be left ungrazed for the vegetation type being considered for use.

Grazing trials can also give information on the possibility of using heavy grazing by goats and camels as a brush clearing practice. Grazing trials do give a direct measure of forage quality in that they show how individual animal production varies with changes in feed quality. Grazing trials also show quantity of forage production under different intensities of grazing use. See Attachment 1 to this Annex for details of the trials concept,

Initiation of some of these trials should be moved as far forward into the Project as possible so an understandable system of management can be demonstrated early to the pastoralists that are going to be involved.

Portable livestock scales and portable steel corrals should be included in the equipment ordered for range investigations.

VIII. ADMINISTRATIVE PLAN

The National Range Agency would be the executing agency for accomplishing the proposed rangeland development activities of the project. The General Manager would be Project Manager assisted by an internationally recruited Project Coordinator who would supervise and coordinate the implementation of all project components by working through the responsible departments which would be strengthened by internationally recruited specialists.

This administrative plan is a good one because it doesn't separate the project from the organization of the National Range Agency.

If the expatriot staff for Rangeland Inventory, Rangeland Monitoring, Studies and Trials, Soil Conservation and Cooperative Advisor are headquartered in Mogadiscio, the long, hard trip between the headquarters and the project area will make performance of their duties very difficult.

IX. TECHNICAL MANPOWER

There is probably no place in the world where people are more experienced in handling and providing for livestock under arid conditions than in Somalia. Most of the people must be experts with animals to survive.

Experience and expertise in caring for range animals is equally as important as understanding range vegetation in the development of a successful range management program. A person with long experience in management of livestock can learn, from a competent teacher, about vegetation management more quickly than one only with training in vegetation can learn how to manage livestock.

The Somali Government has the ability to assign capable counterparts to the Project. Some of them are range trained. With their basic livestock husbandry background and associated with experienced understanding expatriate counterparts, the National Range Agency personnel assigned to the Project can receive outstanding on-the-job training that couldn't be equaled by formal training.

X. DISCUSSION

This Project is heavily weighted with vegetation analysis and gives slight consideration to the livestock grazing that vegetation. In a range situation where the objective is to have pastoralists adopt a better range management system both vegetation and livestock are equally important. If the system is successful the livestock must be balanced with the vegetation.

Condition and trend analysis do not provide the day-to-day information the pastoralist needs to know when and where to move livestock. Grazing trials conducted on major vegetation types will show how much vegetation should be left ungrazed to get optimum vegetation production and animal performance. With this information the herder can look at the range each day and know whether to stay longer or plan to move to keep the animals gaining at their maximum while leaving sufficient vegetation stock behind.

XI. RECOMMENDATIONS

A. Combine positions 1, 3 and 12 Range Ecologist into one Range Scientist/Ecologist position. Similarly combine positions 2, 4 and 13. Hire two Range Scientist/Ecologists for the full six years of the Project.

B. Extend the Technical Director Range and Environment (U.S. AID Team Leader) position 23 for two and one-half years to be filled the full six years of the Project. This position along with the two Range Scientist/Ecologist positions would give continuity to the Project.

C. The Technical Director Range and Environment and the two Range Scientist/Ecologists should be individuals who appreciate the importance of balancing livestock with vegetation and realize that vegetation and livestock are equally important to this Project.

D. Hire a team of consultants to work with the Project staff to establish short-term grazing trials on a few of the major vegetation types. The trials would establish the quantity of forage that should be left ungrazed when livestock are in balance with vegetation.

E. Develop a strong research program emphasizing grazing systems best for managing the reserves and the rest of the project ranges.

F. Make the Cooperatives Advisor available in years two and three when the cooperatives are being formed.

G. Extend the Technical Director Stockwater Service two years to be operational the last half of year two through year six.

H. House the two Range Scientist/Ecologists, the Soil and Water Conservation specialist and Cooperatives Advisor in the Project area, probably at Dusa Mareb.

I. House the two Lecturers in Afgoi where they will be teaching.

J. Consider the purchase of an aeroplane for the National Range Agency. The Heleocourier type is a high wing STOL aircraft with a minimum speed of 40 knots and a maximum speed of 100 knots. It has sufficient range for this Project and can land on a 10 meter strip. Such a plane would make it possible for the National Range Agency to make timely management decisions for the rangelands of Somalia.

Chart I

Central Sonoran Rangelands Development Project
AID Employment of International Recruited Staff

Position No	Post	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1	Range Scientist/Ecologist 1						
2	Range Scientist/Ecologist 2						
7	Lecturer 1 (Range Mgmt)						
8	Lecturer 2 (Range Mgmt)						
11	Range Instructor Fac. of Agr.						
14	Taxonomist						
16	Soil & Water Cons. Spec.						
17	Cooperative Advisor						
23	Technical Director Range & Eco (US Team Leader)						
27	Technical Director Sbr Water Service						

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ATTACHEMENT 1

ANNEX 6

BIOLOGICAL RESPONSE CURVES FOR BALANCING LIVESTOCK WITH VEGETATION

R. E. BEMENT

Harvesting rangelands with livestock is one of the more difficult forms of agriculture. In most agriculture everything is done to favor the growth of the crop until growth is completed and then the plants are harvested. With grazing, many of the plants are being harvested at the same time they are expected to make growth. The balance of livestock with vegetation is a delicate one, especially in arid regions where the opportunity for plant growth is restricted. When an opportunity for plant growth does occur, it is important that enough leaf material be left ungrazed for the plant to make the most rapid growth possible while moisture is available. This is the point where animals are in balance with vegetation.

Biological response curves that make it possible to determine the amount of forage that should be left ungrazed on a given type of vegetation were developed at the Central Plains Experimental Range in eastern Colorado, U.S.A.[1/] The curves showing the livestock-vegetation relationship were developed, refined and tested with over thirty years of data from the Experimental Range. They have been used on many vegetative types from Africa to Iceland.

Animals from pastures stocked at different levels were weighed in and out of the pastures and standing forage was measured on each pasture at the beginning and end of the grazing period. Animal gain per hectare was calculated and both individual animal gain and gain per hectare were plotted over the quantity of forage that was left ungrazed at the end of the grazing period. An example of the resulting chart is shown in Figure 1.

The left side of the chart represents heavy grazing where there is little forage left ungrazed and the amount of feed available to each individual animal is so low that no gain is made. As the number of animals is reduced more feed is available to each animal and the individuals gain more and more as the right side of the chart is approached where there are few animals and much forage remaining ungrazed.

1/ Bement, R. E. 1969. A stocking rate guide for gramagrass ranges. Jour. Range Mgmt.

Bement, R. E. 1975. Ecological management of arid and semi-arid rangelands. FAO EMASAR Proceedings.

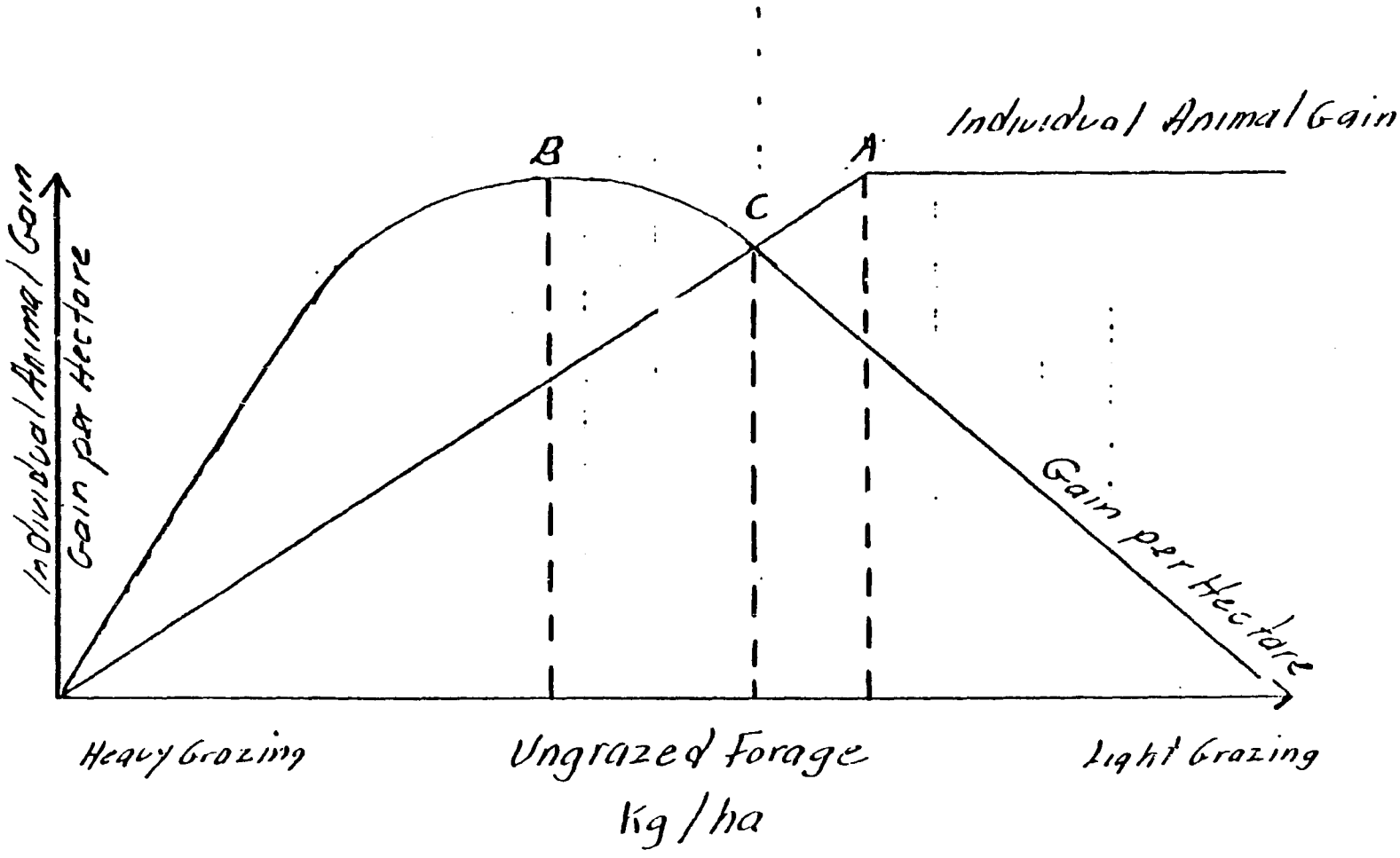

Figure 1 Biological Response Curves for Balancing Livestock with Vegetation

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For any given type of vegetation there is a point (A on the chart) where no matter how much more the animal numbers are reduced or how much more feed becomes available to each individual, the individual gain or animal response remains at the same level.

When gain per hectare is plotted, the maximum occurs at point B. If the chart is prepared so the maximum gain per hectare and the maximum individual gain are plotted at the same level, the lines will intersect at point C. This is where the animals are in balance with the vegetation and optimum livestock and vegetation production can be maintained.

Stocking heavily enough to make maximum gain per hectare, point B, is too heavy and results in decreased forage production followed by decreased livestock production. Stocking at point A will give the highest individual animal gains but will result in lower animal production per hectare than than made by stocking at the balance point.

Knowing this key amount of forage that should be left ungrazed provides a standard for answering the basic range management questions of when should livestock be put into an area, how many should be grazed there, when should they be moved and where should they be moved.

Animals should be put into an area only when there is more forage available than the key amount. A calculation of the number of animal days of grazing provided by the forage in excess of the key amount serves as a guide to the number of animals and the length of time they might graze the area.

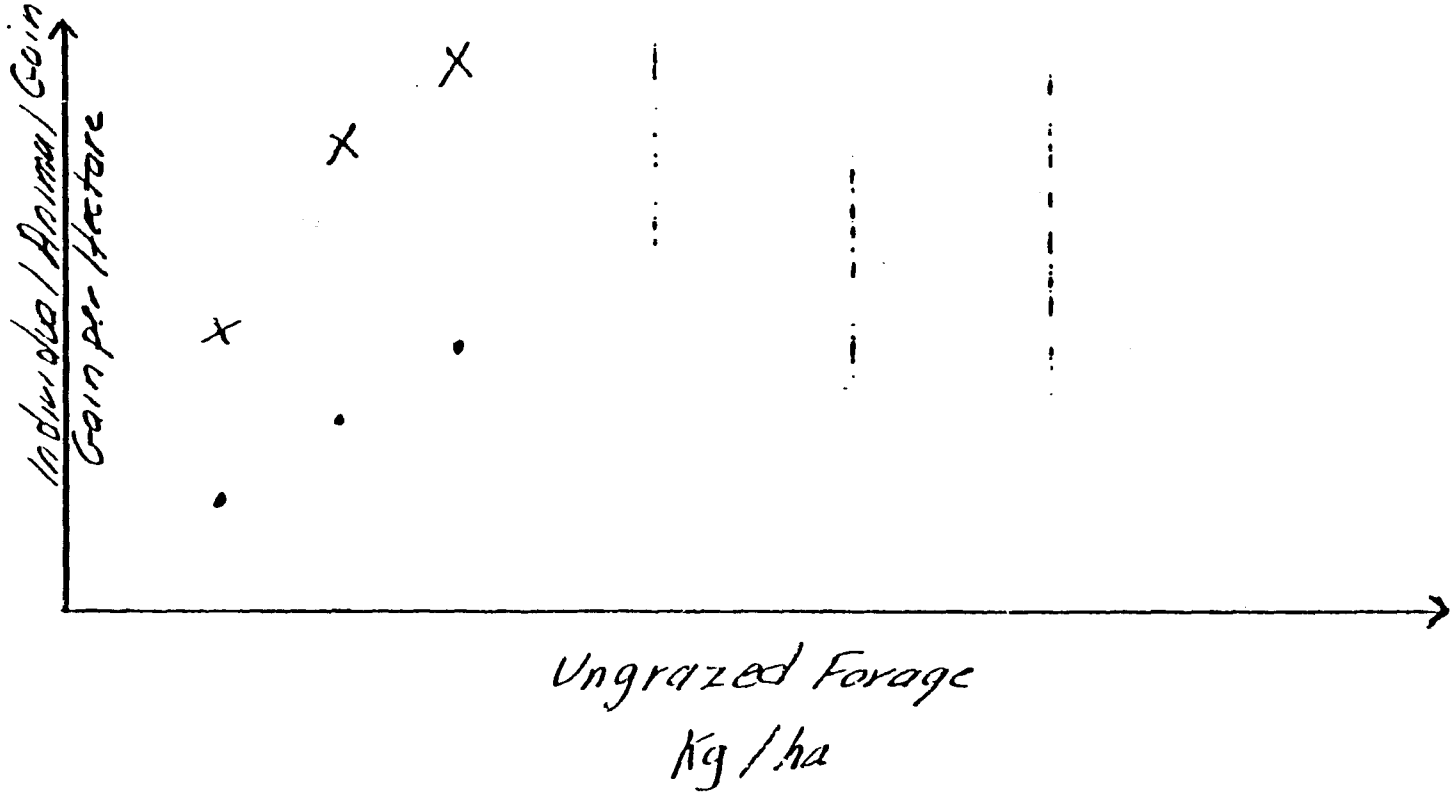
An animal eats about three percent of its body weight in dry forage per day so the number of animal days of grazing can be estimated for the area being considered. The pastoralist can then decide whether to put many animals in for a short period or fewer animals for a longer time.

The livestock should be moved when forage is grazed down to the key amount regardless of what the calculated time was. They should be moved to an area that has more than the key amount of forage for its vegetation type.

Use of the biological response curves has eliminated the need for long-term grazing trials. Short-term grazing trials using three or more grazing intensities are sufficient to establish the intersection. Each grazing intensity will determine one point on the individual animal response curve and one point on the gain per hectare curve.

Examination of the plotted points will show quickly if and how stocking levels need to be changed to include the intersection. Figure 2 is an example of a trial where the grazing intensities are too heavy. Animal numbers should be reduced to locate the intersection.

Figure 2. Development of Biological Response Curves
Pastures Stocked too Heavily



X = Gain per Hectare
• = Individual Animal Gain

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In Figure 3 the pastures have been stocked too lightly to include the intersection and when the trials are repeated additional animals should be used.

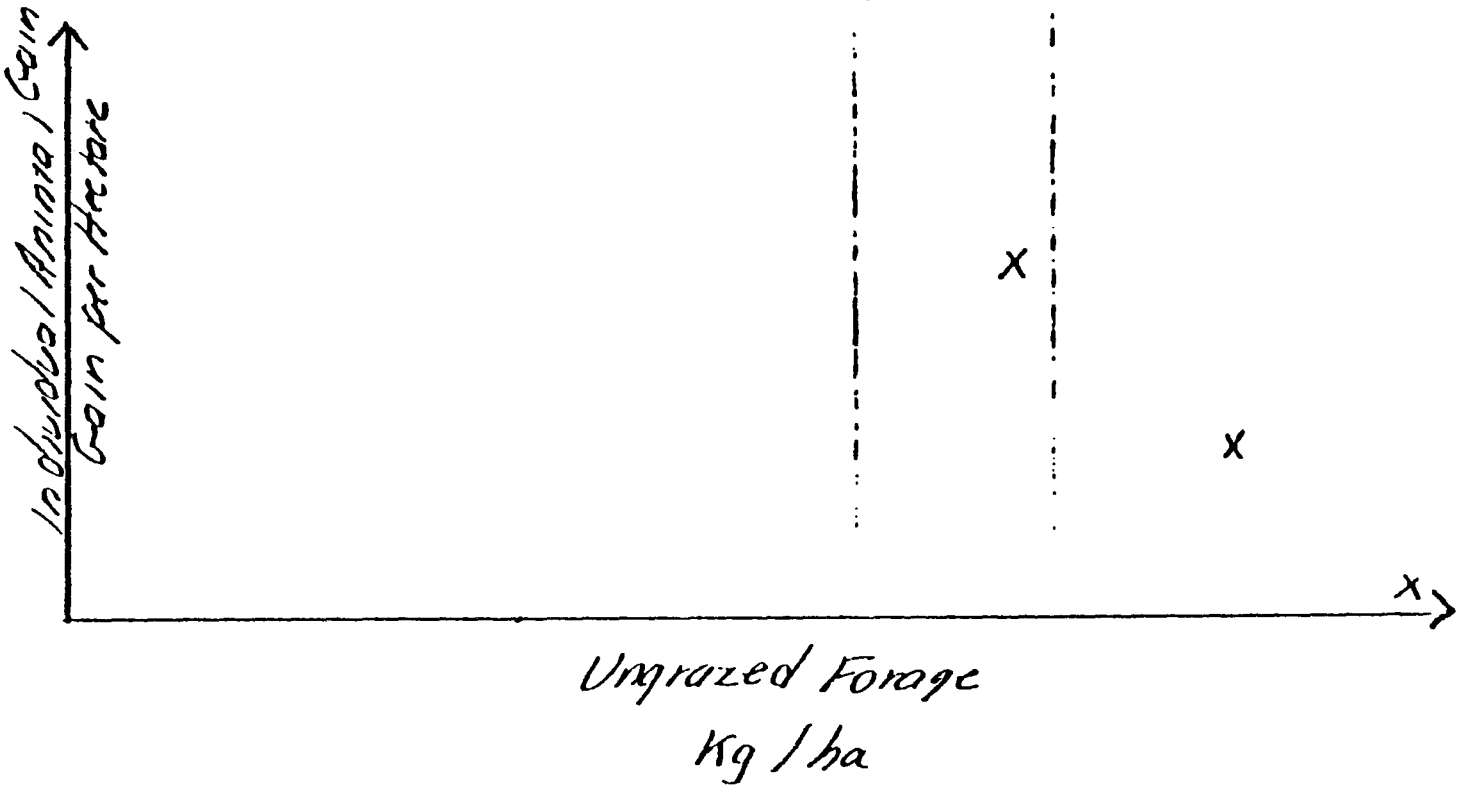
Figure 4 is an example of a trial where the stocking levels have included the intersection. In this case the trials should be continued until points A, B and C have been located. This usually takes from two to five years with only three grazing intensities. With a situation similar to that in Figure 4, an extremely good estimate of the key amount of ungrazed forage can be made in one year.

In addition to the animal measurements and the measure of ungrazed forage, plant species composition of the vegetation should be measured at least once a year. This is necessary to define the plant community being studied as the curves are only valid for the type of vegetation upon which the trials were conducted.

In some cases the plant composition will change with differences in grazing intensity and the changes need to be defined. Either light or heavy grazing can change the vegetation to a more productive type than that on which the trials were started. When this happens trials need to be conducted on the resulting vegetation type.

Priority for trials should be given to the vegetation type most important to the region and trials should be conducted during the growing season and the dormant season.

Figure 3. Development of Biological Response Curves
Pastures Stocked too Lightly



X = Gain per Hectare
• = Individual Animal Gain

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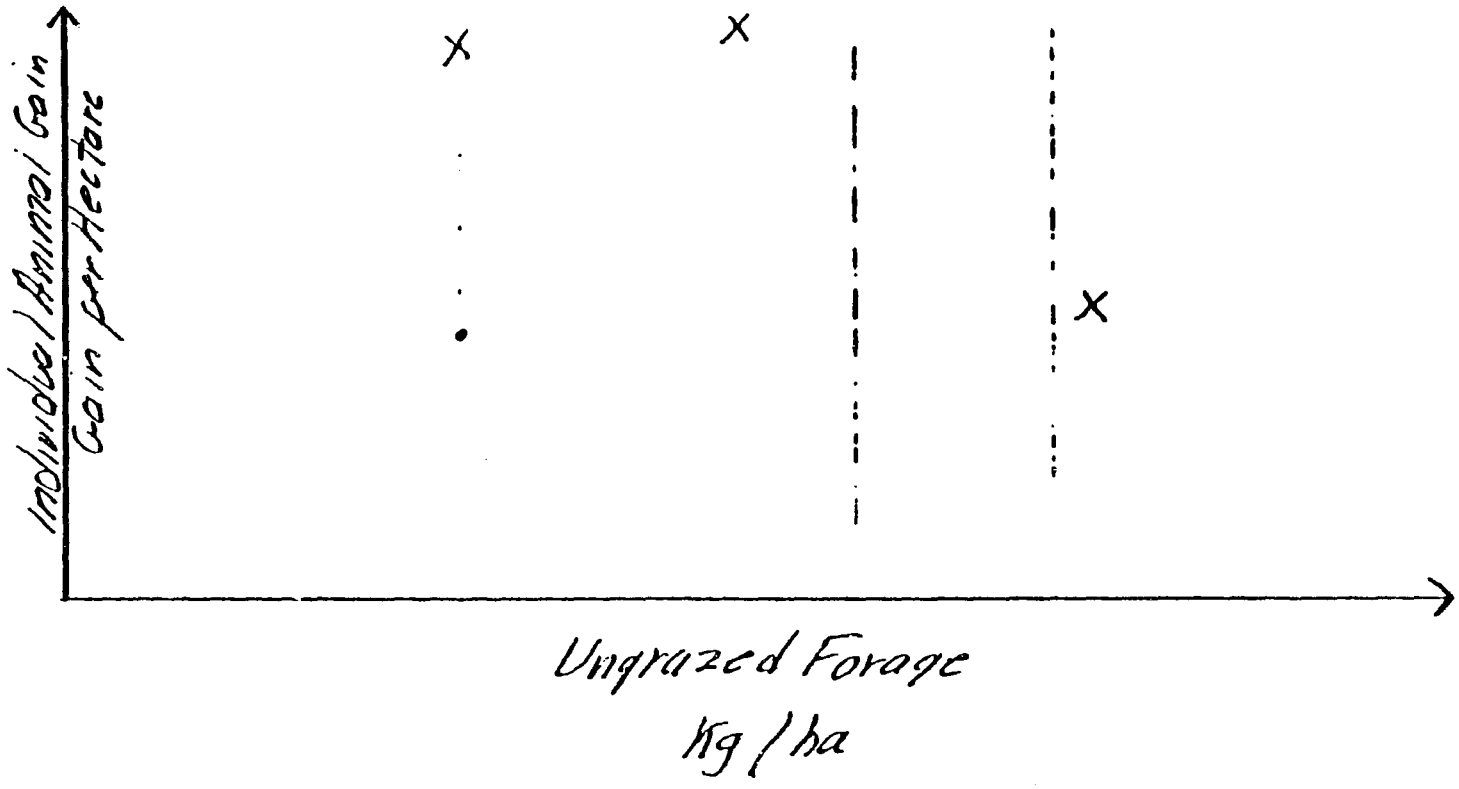
Figure 4. Development of Biological Response Curves
Pastures Stocked to Include Intersection



X = Gain per Hectare

• = Individual Animal Gain

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Annex 7

SURFACE WATER DEVELOPMENT

Introduction

Surface water development alternatives are severely limited in the Central Rangelands because there are no perennial streams. Only two sources of surface water can be developed in the Central Rangelands: 1) intermittent streams called wadis; 2) sheet flow runoff. Both sources offer several possibilities for development, however, any system which relies on direct rainfall is subject to periodic failure due to the high variability of rainfall in Somalia. Surface water cannot be considered a reliable source and consequently during a prolonged drought, people who depend on surface water will be forced to move to locations with groundwater supplies. Developing surface water creates a dependence on a supply that is certain to fail at some time, whereas groundwater supplies are very reliable and therefore preferrable over surface water supplies. It will always be necessary, however, to develop some surface supplies because groundwater is not available in the required quantity or quality in parts of Somalia.

The Central Rangelands Development Project (CRDP) will rely primarily on groundwater sources (boreholes) for livestock water needs. It is anticipated that some surface water development will be necessary but the extent of the need cannot be determined until after completion of the rangelands inventory and groundwater survey. The design considerations and institutional requirements for surface water development are described here assuming that a limited amount of surface water development will be required. This assumption is consistent with existing information on groundwater potential and water needs.

Existing Surface Water Development

Present practice in surface water development (except on perennial streams) is limited to two types of surface water storage reservoirs: birkhads and gars. These reservoirs rely on sheet flow runoff for their supply and usually do not have carryover storage from one year to another. They are filled during the rainy seasons and provide a supply during the following dry seasons.

The most common storage reservoir is the privately-owned birkhad. It consists of a rectangular hole excavated into the ground and lined with clay or concrete to make it water tight. The tank is covered with brush and sticks in an attempt to reduce evaporation losses. Improvements to the catchment area to increase runoff are limited to small ditches that concentrate and direct the flow. Water is removed from the birkhad with buckets and sold to villagers and nomads for both human and livestock use. The size of the birkhad is variable but many of them store up to 150 cubic meters.

The other type of storage reservoir, the uar, is much larger than the birkhad but fewer of them have been built. They are found mostly in the area between the Juba and Shebelli Rivers but some have been built in the Central Rangelands and Northern Regions. The storage capacity ranges from 20,000 to 70,000 cubic meters. They are usually rectangular below ground reservoirs, with an earth berm to keep animals out and a pump system to deliver the water to distribution troughs. In soils with high permeability, a PVC liner has been used to stop infiltration. The uars that have been constructed to date were all planned, financed and constructed by the Somalia Government. Operation and maintenance is provided by the Government and water fees are collected to cover those costs.

Much of the rural population of Somalia does not have continual access to a developed water supply. Many people rely on natural low spots in the terrain that collect sheet flow runoff during the rainy season. This intermittent supply is generally very poor quality because there is no control to prevent bathing or to prevent animals from entering the water. These natural ponds do, however, supply a major part of livestock water needs during the rainy season.

The other major source of surface water, wadis, has not been developed. Very little is known about the amount of flow in the wadis or the statistical frequency of flow. During intense rainstorms surface water drains into the wadis where it eventually infiltrates or evaporates. In some places, shallow wells have been dug in the stream bed to recover water that infiltrated. The potential is very good for developing storage reservoirs filled by a wadi. Either an underground dam or an offstream storage reservoir could be built. More information is needed about the quantity of water available before a design can be made to develop this source.

Technical Feasibility

Surface water development for livestock and human needs is technically feasible, provided basic design data is available. Current surface water development practices do not rely on rainfall and soils data and consequently many failures have occurred due to lack of adequate rainfall catchment or inability to contain water in the reservoir.

To assure successful operation of a surface water reservoir, data such as monthly rainfall, monthly evaporation, and soil permeability is needed for designing the reservoir. Rainfall data specific to the proposed storage site is generally unavailable and would take years to collect. Average monthly rainfall maps are available and should be used as a guide for determining areas with enough rainfall for surface water development.

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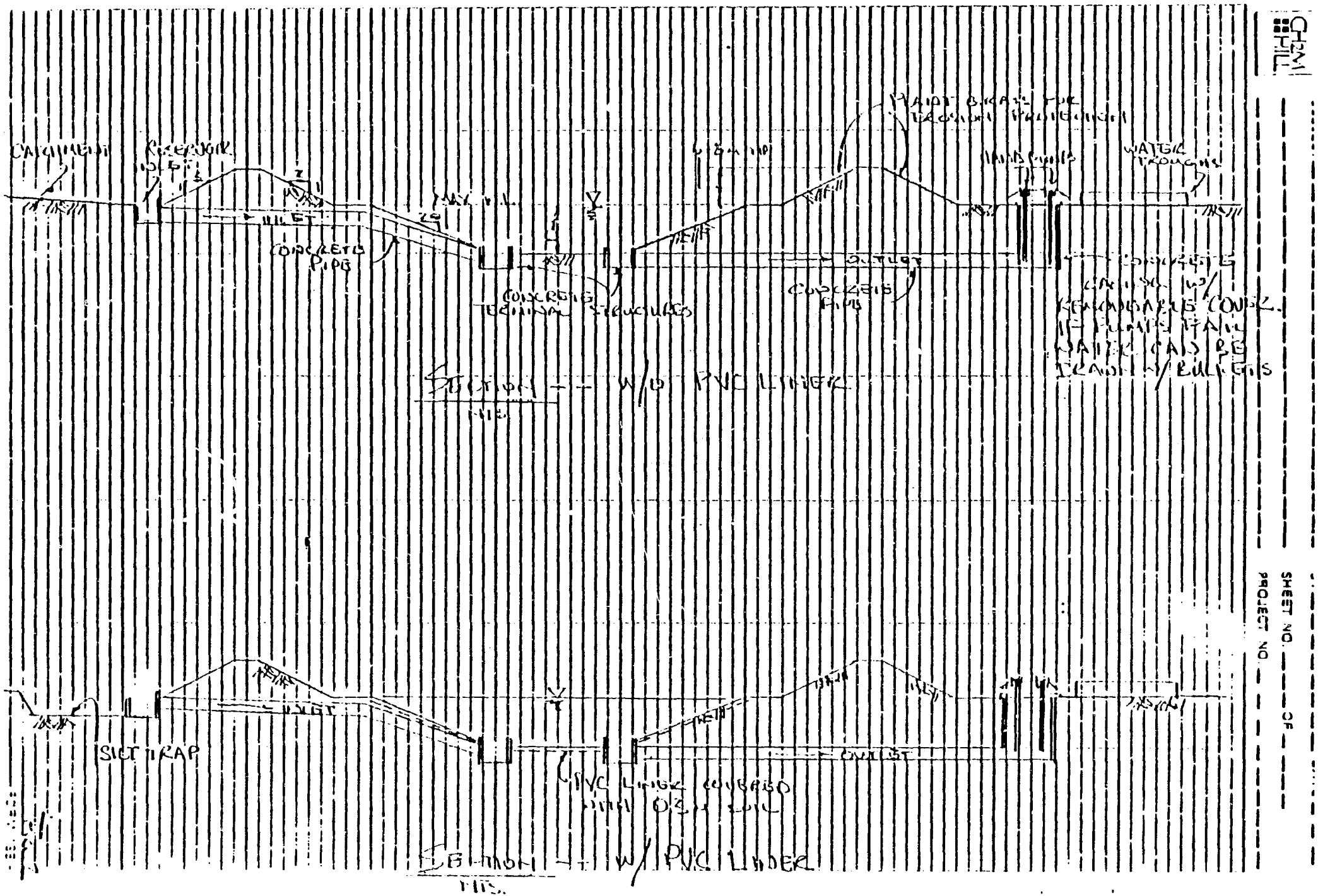
The maps should be used carefully because they are based on only a few widely separated rainfall gauges. Permeability data can be easily estimated based on soil type. Evaporation is generally uniform over large areas and can be estimated from existing monthly evaporation maps.

Rainfall data is the most critical item to the success of the catchment and should be estimated as accurately as possible. Rainfall data is also very scarce in Somalia which makes design of storage reservoirs difficult. A report prepared by the Food and Agricultural Organization (Reference 1) contains an analysis of existing data in the inter-river area. They found that the average storm is 27.3 mm during the April-June rainy season and that 5 such storms usually occur each year. During the September-November rainy season, the average storm is 29.1 mm and 5.7 such storms occur each year. The catchment area required for each uar can be calculated using the average storm and an assumed rainfall-runoff relationship (actual rainfall-runoff measurements have not been made). The reliability of the reservoir is dependent on the number of storms that are assumed to occur each year; assuming less than the average requires a larger catchment area and increases the odds that the reservoir will fill. Assuming more than the average has the opposite effect. Based on the average storm it is apparent that surface water storage should be built only in areas where the average annual precipitation is 100 mm or greater. During design of surface water storage, the rainfall analysis should be updated using all available data. The rainfall analysis will provide data to size the catchment and storage reservoir.

There are two basic catchment designs that should be used; one design applies to soils with high permeabilities and the other to soils with low permeability. Drawings of the two designs are shown in Figures 1 and 2. Both designs are very similar to catchments that have been construced in the inter-river area. Modifications have been made to the design to reduce construction, operation and maintenance costs. In soils with high permeability, a PVC liner is installed in the reservoir to prevent infiltration. A silt trap outside the reservoir is necessary to allow sediment in the runoff to be trapped and removed without damage to the PVC liner. In soils with low permeability, the PVC liner and silt trap are not needed. Both designs rely on hand pumps to remove water from the reservoir for use by people and livestock. If the hand pump fails, water may easily be withdrawn using buckets. Because there is no power driven pump, the operation costs will be minimal and the maintenance can be done by low skilled workers with a minimal number of tools and spare parts.

PLAN -- TYPICAL UNIT


CHEM HILL
CATCHMENT
RESERVOIR
INLET
CONCRETE PIPE
CONCRETE TRANSITION STRUCTURES
OUTLET
CONCRETE PIPE
WATER TROUGHS
SECTION - - W/O PVC LINER
SLOT TRAP
PVC LINER COVERED
SECTION - - W/ PVC LINER
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The uars proposed for the Central Rangelands are large enough that heavy earthmoving equipment will be required for excavation and embankment construction. Equipment to lay concrete pipe and construct concrete structures will also be required. All of this equipment is available in limited quantities in Somalia and has been used on previous construction projects.

Operation of uars is very simple and does not require special equipment or highly-trained personnel. Each uar should have a full-time resident operator whose main function is to collect water fees and report maintenance needs to proper government agency. Water will be removed from the uar using hand pumps operated by the person buying the water.

Maintenance should be very minimal at each uar. A regular program for sediment removal will be required to prevent the reservoir from filling with silt and reducing the storage capacity. No data is available to estimate the silt load of surface runoff in the rangelands so predictions of required sediment removal cannot be made until the reservoir is in actual operation and silting is observed. It is reasonable to assume that annual silting could amount to as much as 10 percent of the reservoir storage capacity. The handpumps are the only other item that will require periodic maintenance.

There should be few problems with the quality of water from uars. Salts left on the catchment by evaporating rainwater could be washed into the reservoir but the concentrations should be very low -- lower than levels found in groundwater sources. Bacteria could be a slight problem, especially if livestock are allowed to graze in the catchment area. The quality of water stored in the reservoir should not deteriorate with time because people and livestock are prevented from taking water directly from the edge of the reservoir.

The economics of surface water development are not as attractive as groundwater development. Less water can be developed, the reliability is not as good and consequently the construction unit cost is higher. The operation and maintenance costs, however, are lower for surface water than for groundwater.

Surface water development is compatible with the objectives of the rangeland development project. Controlling the availability of water for livestock is not as easy as with groundwater because of the unreliability; more water may be available than is needed at some times and less than is needed at others. This makes balancing livestock numbers with the available feed a more difficult process. The quality of surface water is expected to be better than groundwater (less magnesium sulphate) and, therefore, livestock do not require as much water.

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Institutional Capabilities

The Water Development Agency (WDA) is the most logical agency to assume responsibility for design and construction of uars. The Engineering Department within WDA is presently responsible for 1) constructing the storage and distribution facilities for wells; 2) constructing surface water storage facilities; 3) constructing water distribution systems for small towns. Because of under-funding and understaffing, the department has not been able to carry out programs in all areas of responsibility. Figure 3 shows the organization of the department and the two main projects currently underway.

The Engineering Department's experience constructing surface water storage is limited to 40 uars built in the inter-river area, and 6 built in the northern regions. Each of these were built under contract to the National Range Agency; most of the 46, however, were subcontracted by WDA to private construction firms. Although the Engineering Department has equipment and trained staff, the amount of work they can do is limited by the lack of trained equipment mechanics and repair tools, and the lack of management level staff.

Table 1 lists the equipment owned by the Engineering Department and Table 2 gives the number of staff assigned to the Department. Staffing is done on a project basis rather than a department basis. Some of the staff shown in Table 2 are hired locally for the duration of the project. The Department has a strong need for upper-level engineering staff capable of planning and design work.

TABLE 1

Water Development Agency; Engineering Department
Construction Equipment

Description	Year of Delivery	Condition	
		Operable	Inoperable
Wheel Tractor-Scraper CAT-621B	1975	3	4
Bulldozer CAT D8k	1975	1	1
Bulldozer CAT D7	1960	0	1
Bulldozer CAT D6	1960	0	1
Bulldozer CAT D4	1975	1	1
Grader CAT 14G	1975	0	1
Compactor CAT 815	1975	1	0
Loader CAT 966C	1975	1	1
Bulldozer Allis HD21	1975	0	1

TABLE 2

Water Development Agency; Engineering Department
Management and Construction Staff

Office Staff	
Engineers	6
Juba Sugar Project	
Management Staff	13
General Foreman	2
Earthwork Foreman	8
Equipment Operators	46
Mechanics	5
Electrician	2
Surveyors	2
Carpenters	31
Mason	15
Steel Fixer	11
Drivers	11
Misc. Labor	76
Unskilled Labor	148
Jowhar Off-Stream Storage Project	
Engineers	2
Higher Technicians	4
General Foreman	2
Mechanics	6
Equipment Operators	27
Carpenters	24
Steel Fixers	10
Masons	19
Plumbers	3
Welders	2
Electricians	2
Misc. Labor	145
Unskilled Labor	90

Recommended Development Plan

Phase 1 of the CRDP is a survey of rangeland resources, primarily concentrating on vegetation inventories. Coincident with the survey, a groundwater exploration program will be undertaken as part of the Groundwater Development Project of U.S.A.I.D. The rangelands survey will identify where water sources are needed for livestock and the groundwater survey will indicate if the water needs can be met by groundwater development. In areas where groundwater quantity or quality is inadequate, surface water storage will need to be considered as an alternative source.

Several factors must be evaluated to assess the feasibility of surface water development in each specific location:

1) Soil permeability characteristics - soil samples must be collected and analysed to give an approximately permeability based on soil type;

2) Site topography - a site must be found with a natural catchment area draining toward a site for the storage reservoir;

3) Average annual rainfall - it is unlikely that any recorded rainfall data will be available near the project site, however, estimates of rainfall may be made by observing vegetation patterns, measuring erosion channels, talking to nearby villagers and consulting published rainfall maps.

The plan for data collection and reservoir design and construction has been formulated only in general terms because at this time it is not known how much surface water will be required. After the groundwater and rangelands survyes are completed, detailed plans can be formulated showing precise numbers and scheduling for staff and equipment.

It is recommended that surface water development be accomplished under the same plan as groundwater development -- namely, through the Groundwater Development Project. An expatriate civil engineer with a background in hydrology, hydraulics and water system development will coordinate the data collection, design and construction for surface water storage reservoirs. He will at the same time, train Somali counterparts in design and construction techniques thus increasing the institutional capability of WDA in surface water development.

Sufficient equipment and materials have been budgeted to allow construction of two uars in the Central Rangelands. After completion of Phase 1, the budgeting should be reevaluated; if more uars are needed, then fewer wells will be needed and budgets can be adjusted accordingly. If no uars are needed then funds can be transferred to well construction.

Each uar should be designed by the water engineers with assistance from Somali counterparts and the Engineering Department. Collection of design data will be the responsibility of the engineer. Input on sizing, locating and special features will be provided by the National Range Agency (NRA).

The WDA, through the Engineering Department, will construct the uars using existing equipment and new equipment provided through the Groundwater Development Project. All materials (pumps, pipe, PVC liner, etc.) will be provided by the NRA. Since few uars will be constructed, all construction management and equipment can be centered in Mogadishu. Regional capabilities should not be developed at this time.

Operation of the uars will be the responsibility of the NRA. They will provide an operator, pay the operator's salary and expenses, collect fees for the water and control the timing of water use to best meet the rangeland management objectives. The NRA will also provide maintenance for the uars through the Stockwater Service.

ANNEX 8

GROUNDWATER RESOURCES

ANALYSIS

General

Livestock water supplies in all range areas are a valuable tool in the introduction of range management in a controlled environment.

Although the exact number or location of new boreholes would not be established until the vegetation resources mapping, the range ground survey as well as the human resources survey were completed, the assumption has been made that 20 boreholes in the range grazing reserves and 12 in the famine reserves would be constructed and equipped in the project area. Cost estimates have been based in the establishment of boreholes.

Surface water catchments and water ponds would be considered whenever this procedure would be technically appropriate. All stock water points would be operated in accordance with good range management practices and their use would be controlled. The installation of water points in the selected areas would be conditional upon the formation of grazing associations. The average yield requirement of a grazing reserve well is 71,250 liters per day. Storage would not be provided since this would encourage longer pumping hours.

Two aquifers (or more) exist in the project area. One, when present is shallow and uncertain, and the other is at a greater, unrecorded depth. Usually the pressure level stands in the 100 meter to 150 meter depth range. Maximum yields and quality is only regionally known. The direction of flow is only known generally as down gradient and eventually to the Indian Ocean. The aquifer system is largely unstudied and undefined at the present time.

Water quality generally improves with depth where surface contamination has not reached the lower aquifer. Quality ranges from TDS 1500 mg/l to 4500 mg/l where sampled. This is within stock water limits.

A hydraulic model of the aquifer systems cannot be constructed due to lack of data. It also cannot violate the mechanics of underground flow. Additionally a basin cannot undergo stagnation unless it is a closed basin. Closed basins are as yet undefined in the Central Rangelands areas.

The conceptual bore hole design will have inert casing and well screen against those aquifer horizons that yield good quality water in sufficient quantities to deliver to the surface the water required to adequately water the reserve livestock.

A bore hole geophysical program is required and necessary to determine the presence of aquifers that can provide good quality water and adequate yields. The strategraphic position and hydraulics of such aquifers are previously undefined. This lack of knowledge, best provided by simple borehole geophysical survey, is perpetuated when the wildcat approach to drilling is adopted.

The materials to be drilled will include loose sands, hard calcates, siltstones, shales, limestones, marls, basalts and ruffs. The use of drilling fluid additives will prevent circulation losses during drilling. All wells will be fitted with casing and screens.

Much of the water in the Central Rangelands area is either corrosive or encrusting. Plastic casings and screens will be used to prevent corrosion and some forms of encrustation. All poor quality aquifers will be blanked off and the wells completed with a sanitary seal for the top 20 feet of hole. The well will be topped by a 1 meter high concrete pedestal on a 6-inch concrete slab to prevent surface contamination of the bore hole.

Development of the well will include surging, air jetting, and bailing and overpumping until the well operates sandfree (less than 5 ppm).

The costs for each well were established by estimating that each well would require 130 meters of casing and 15 meters of well screw.

With the proper exploration and data base program carried out by the WDA, it is estimated that the wells drilled will have a 90% success ratio.

Stockwater Service

In order to strengthen NRA, a storckwater service would be organized within the Agency. It would consist of a Director of Stockwater Service in charge of a Maintenance section headed by the Chief of Maintenance and an Operations Section, headed by the Chief of Operations.

Drilling

The project would provide funds for the purchase of 32 boreholes drilled by the WDA under contract to the NRA. Likewise any surface water development and distribution systems would be funded by the NRA and provided by the WDA under contractual arrangement. The NRA would not have its own drilling team. The operating costs of the WDA rigs, crew and supporting equipment, casing, screens, and materials would be furnished by this project. A similar arrangement would be worked out for the 10 planned boreboles for the Northern Rangelands.

The costs to the project for an international contractor to drill the wells would be excessive under the present laws that prevent export of heavy equipment brought in to perform work in Somalia.

The WDA, strapped by shortages of manpower, equipment and maintenance capability, plus an overwhelming demand for wells throughout the whole rural sector could not provide the service necessary to either the Central or the Northern Rangelands projects without the assistance of the Groundwater Development Project proposed and funded by USAID.

A main constraint, in addition to the lack of skilled manpower and equipment, to the efficient implementation of borehole development in Somalia are the delays in obtaining essential materials such as casing, screens, spare parts, fuel and oil. The WDA is always short of stocks at their District offices. If the work is to proceed on schedule, the essential well materials such as casings, screens, pumps, motors and generators should be directly imported for the project by the Director of Stockwater Services for the project and stockpiled before the drilling program commences.

The WDA, under the Project Manager of the Groundwater Development Program must order, at the inception of the project, the drilling rigs, drilling accessories and spare parts to initiate the drilling program on schedule for the NRA.

The NRA, under the National Stockwater Law has been given the authority to manage all wells affecting rangelands (see Title 7) and must give approval as to where wells can be drilled in the rural sector. The NRA is also empowered to set and collect fees at stockwater points but under its authority by the Rangelands Law.

The identification and establishment of boreholes and surface water catchments will be carried out by the WDA as part of the USAID supported Groundwater Development Project which will be implemented in conjunction with the Central Rangeland project. Operation and maintenance of these storckwater points will be under the Director of Stockwater Services for the Central Rangelands project.

Maintenance of Water Points

Funding for equipment and staffing has been provided for the maintenance of water points in the range areas. This initial amount could include a 30% spare parts inventory for the submersible pumps and motors. The presence of spare parts at the Regional Centers would allow the maintenance personnel to affect rapid repair of the broken unit with a minimum of downtime at the well. In addition to adequate supply of spare parts in the field a spare parts van would be available for field repair.

A bulldozer with some support equipment would be on hand to maintain earth stockwater reservoirs. A maintenance truck with cable rig would be available for pump removal and field repairs. Other vehicles would be part of the inventory of the maintenance section.

Bore Hole Equipping

Each new borehole would be equipped with a 2-5 Hp deep well submersible pump on a plastic column pipe. Each unit would be powered by a gasoline or diesel operated portable generating unit.

The unit would be housed and a distribution line would lead from the pump to concrete water troughs. No storage other than the troughs would be provided to aid in management of the water supply. The flow of water could be regulated by a small valve on the discharge line.

Bore hole equipping would be carried out by the Maintenance Section under the NRA Stockwater Service. The work would be under the general direction of the Maintenance Superintendent as advised by the Hydrogeologist testing the well for the WDA.

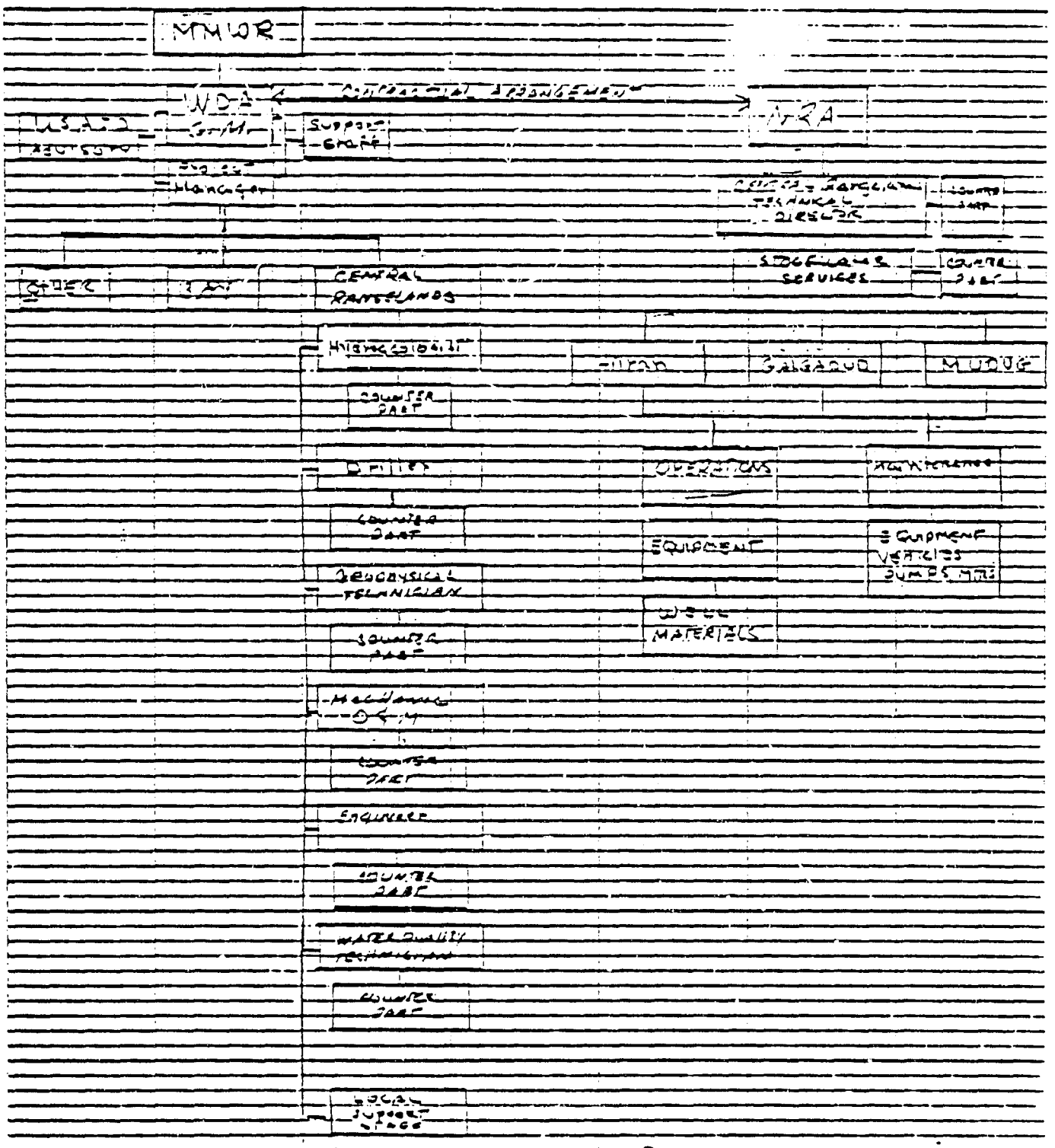
CH2M HILL

SUBJECT: WATER DEVELOPMENT INTRA-AGENCY ORGANIZATIONAL PLAN

BY _____ DATE _____

SHEET NO. ____ OF ____

PROJECT NO. CENTRAL RANGELANDS



Annex 9

The Social Annex

I. Introduction: The Somali Democratic Republic and the Central Rangelands Project

II. Research Methodology

III. A. Somali Nomadism: A Minimum Participator Profile

B. Principles of Social Organization

C. Descent Rules and Authority Patterns to the Somali Nomad in the Central Rangelands

D. Housing and Women's Labor

E. The Dynamics of Livestock Marketing

IV. Conclusion and Recommendations

I. Introduction

The Somali Democratic Republic is situated on the Northeastern coast of Africa. The country's 3.5 million people live on 637,000 square kilometers. Rangelands constitute about half of the total area of the country. Consequently, pastoralism, the herding of camels, cows, goats, and sheep, is the occupation of about two-thirds of the total population. Faced with environmental constraints that include both erratic annual patterns of rainfall (about 50-220mm), and the threat of cyclical droughts every 4/5 years, the Somali nomads have developed a complex socio-economic system that allows them to utilize their meager water and pasture resources. Somali herders follow rain-clouds, often travelling hundreds of miles to locate water sources and pasture for their animals. A communal system of land tenure that is primarily based on the belief that rangeland is "God's gift to the nomad," allows nomads to have unlimited access to pasture.

As a result of the flexibility of the land tenure system, and because of limited water supplies and adequate pasture the problem of over-grazing desirable areas is a major concern of the Somali Government. The proposed Central Rangeland Project is designed to improve rangeland and livestock production in three administrative regions, Hiiran, Galgudud, and Mudug. About 30 percent of the project would be under controlled grazing in the form of monitored grazing reserves. The main beneficiaries of the project will be the 400,000 pastoralists who live in the project area. The project will include the following activities:

A. Conducting aerial and human habitation surveys during the wet and dry seasons to provide data on the nature of vegetation, description of land system, and existing patterns of human and livestock migrations.

B. Prioritizing localities of rangeland reserves and water boreholes.

C. Developing formal training programs for range managers.

D. Developing non-formal educational programs that will explain to the pastoralists the objectives of the project, help in forming grazing associations, and initiate a dialogue between pastoralists and officials involved in the implementation of the project.

II. Research Methodology

The data base for the social soundness analysis section of this project paper is based on one month of field work in Somalia. Field visits to Afgoi, Kurtunwaare, Balad, Gichar, Belet-Weyne (capital of Hiiran district), Dusa-Mareb (capital of Galgudud), and Galcaio (capital of Mudug) were conducted to find out whether the main principles of the Central

Rangeland Project are congruent with local beliefs and practices or not. Also these visits helped in getting first-hand information on the nomads of the central rangeland.

Because of the time constraints, and other logistic reasons, the informal free flow of information method was preferred over structured questionnaires. Sometimes conversations were carried on in Arabic and also a Somali rangeland government representative acted as an interpreter whenever needed. This paper relates briefly to nomadic attitudes toward new rangeland techniques and further systematic anthropological studies are crucial to fill data gaps on topics of traditional forage practices that are individual specific, local criteria for allocation of reserve localities, and the dynamics of human and and animal migrations.

The field visits were useful in providing information on the nature of the beneficiaries, ethnic groups, principles of social organization, Somali nomadism, and local attitudes and values toward livestock, water utilization, marketing of animals, and leadership patterns. Moreover, informal discussions with Somali officials helped clarify the Government's attitudes toward development issues. A detailed analysis of the sociological and anthropoligical literature available on Somali nomadism also proved helpful in writing this section of the Project Paper.

III. A. Somali Nomadism: A Minimum Participator Profile

Somali nomads share with other pastoralists of the world a way of living based on animal herding. Seasonal migratory movements are practiced to search for better pasture conditions. They also share with other pastoralists a love for the animals they herd. This close relationship between men and animal is captured in a Somali elementary school textbook where a Somali boy says "My camel is my friend. I hurt anyone who hurts my friend. Please, then do not hurt my camel." They also share with other nomads a definite pride in their way of life and their value system.

However, Somali nomads are faced with severe environmental constraints. Rainfall is scarce; and uneven in distribution. The time of the arrival and the amount of rainfall are two major determinents of whether grazing will be adequate for livestock consumption or whether pasturage and water will be in short supply. Somalia experiences cyclical droughts every four or five years. Drought conditions are complicated by over-stocking and over-population of desirable areas.

Beginning in March and extending into June, the "gu" brings the heaviest rains to the central rangelands of Somalia. By July pastures begin to dry up, and nomads have to travel for long distances to locate water and pasture. The second wet season, the "dyar" brings intermittent rains in October and November. Somali herders follow the rain clouds in search of succulent forage for their animals. Even national boundaries do not hinder their attempt to find better pasture.

In droughts, livestock die and people become destitute. Memories of the 1974-75 drought are still vivid in the minds of people that I talked to in the Hiiraan region. An old man said, "Many of my cows and sheep died. No one washed...water was not available for us or our animals...we had to walk for very long distances to find just a little drink." The death of an animal is an economic disaster to the nomad whose wealth is represented in the number of animals one owns.

This basic ecological insecurity influences Somali nomads' decisions about the size of their herds. In times of relatively good rains, nomads breed their animals and increase the size of their herds. A combination of increased human and animal population produces the over-grazing that is one of the primary causes of desert encroachment. It should be emphasized that overgrazing is also a function of the uneven distribution of suitable pasture.

A Somali nomad has to be continuely concerned with questions of when and where to move their herds. The pressures of limited water supply and pasture necessitate migration. In Somalia, underground water often contains a high amount of magnesium phosphate which causes diarrhea to humans and animals. This forces nomads to migrate for long distances searching for "sweet water", i.e., rain water.

The normal grazing pattern for the central rangeland is that during the "gu" and "dayr" seasons, herders move from their permanent water sources and spread over the rain covered rangeland. Somali herders prefer grass during its growth stage. An old nomad stated that he measures the length of the grass with a cane that he carries with him all the time. He was referring to about 10 inches of grass height, the height that is more nutritive during its growth than at other stages. During this stage the plant mass contains a higher component of digestible crude protein and carbonhydrate. The old nomad said that "when grass is this high (10 inches), it makes the animals fat and healthy." It is interesting to note that scientific information confirms the old man's knowledge that through utilization of selected pasture a high portion of the forage can be assimilated rather than passed through as feces.

The Somali nomad acquires knowledge about the environment that surrounds him and animals that he herds rather early in life. Nomad children start herding at age seven. Boys graze camels, and girls graze sheep, goats and cows. However, these are normative rules that are not strictly followed in the south and around towns. Children are often reluctant to herd the animals and parents sometimes have to resort to verbal abuse or physical coersion. A school textbook expresses these concerns: "Every morning I wake up very early. I cannot sleep late. I must not sleep late. They do not like lazy boys in this place. If someone is caught sleeping at a late hour, those who are older and stronger will wake him up with a stick. They will beat him and sometimes they will

beat him hard. People also laugh at the boys who wake up late... They think they are silly boys. I do not want them to beat me, and I do not want them to think that I am a silly boy."

The Somali nomads' needs are minimal. Fresh or sour (geroor) milk from cows, camels, and goats provides a stable diet. Spiced tea with lots of sugar is served several times a day. Meat is not eaten on a regular basis. Small amounts of ghee are taken on long trips. A nomad's need for capital is not great. Money is needed for purchasing a few necessities and possibly for buying water.

After a quick breakfast of milk, animals are taken to pasture. Everyone participates in caring for the animals and in fetching water for household use. Women and young girls normally perform the latter. Women also cut wood and haul it home for fuel or construction.

B. Principals of Social Organization

Somali nomads have two main grazing units; the nomadic hamlet, and the camel camps. The nomadic hamlet (guri) consists of nuclear families that are agnatically related to one another. Women and their children are the main stable social units. A woman has her herd of goats, sheep and cows. Sometimes a few milch camels are also kept to provide the family with milk. Camels are used as animals of burden in carrying water and in moving homes. Each woman builds her own hut that she shares with her children and her husband whenever he is present. Pens for sheep and goats are fenced by thorn bushes to provide protection for the animals.

Hamlets are usually established close to sources of water and they change as sources of water and pasture are exhausted. Individuals move in and out of hamlets to join relatives in other localities where better conditions of pasture are available. Hamlets usually consist of an average of four or five nuclear families. This cluster might grow up to eight or ten families depending on the pasture and water resources in the area.

Camel camps consist of adult males and boys. Starting from age seven a boy is expected to take an active part in camel camps which are established during the dry seasons. Men and boys migrate for hundreds of miles to the Haud to seek better pastures for their camels. Camel milk is often the only diet available for the men living in these camps. Camp membership is usually based on the presence of agnatic ties between the men participants of the camp.

In Somalia, camels are used as sources of milk, beasts of burden, as currency for marriage and blood-compensation, and above all as a man's source of pride and wealth. Somali nomads try to avoid the sale of their camels. An old man mentioned to me that he never sells his camels not even in droughts. On the other hand, goats, sheep, cows are sold to procure money for th purchase of tea, sugar, clothing, water and other miscellaneous items. The emotional bondage between a man and his camel is stronger than between man and any other animals.

During the dry season, hamlets and camel camps tend to separate from one another. Whenever water and pasture are plentiful, hamlets and camel camps congregate and form "degmo" (temporary grazing settlements). It is during the rainy season when people congregate, and marriages are arranged on the basis of the individual's choice pending family approval. Brideprice, "yarad," is paid both in camels and money and marriage is seen as a union between two extended families. Polygamy is sometimes practiced, and different wives live in different huts or different hamlets.

C. Descent Rules and the Somali Nomad in the Central Rangeland

The Hawiyas and the Deroods are two patrilineal descent groups that occupy the central rangeland area. The Hawiyas trace lineal descent to an ancestor called Somaali. The Daroods also trace descent from Somaali although their myth or origin varies from that of the Hawiyas (see figure no. one). Somali nomads learn to trace their descent back to the founding fathers of their clans very early in life. Ethnic affiliation is important to an individual's sense of identity, but ethnic conflicts are not a problem to the present day Somali nomad. After the 1969 revolution, ethnic conflicts are minimal because of the presence of government law enforcement agencies that strongly discourage tribalism.

Somali nomads marry early in life, seventeen years for females and early twenties for males. Bride price consists of camels and cash to be given to the bride's family which reciprocates by giving the couple a gift of goats, sheep, cows and building materials for a hut. The transfer of the camels from the groom's holdings to the bride's family symbolizes the creation of a marital bond, and legitimizes the male's claim over the female's labor and children. Traditionally, a male secures the approval of his family before he negotiates the bridal price.

Polygenous marriages are not uncommon to the nomads of the central rangeland. However, wives live in separate huts and keep separate herds. Polygenous arrangements suit male nomads as they provide more access to human labor. It should be stated that male-female realtions are not based on any western notions of romantic love. Marital relations are established for having children, and for providing continuity to the male line.

Although kinship rules might be crucial to a nomad's sense of identity, or to issues related to marriage, an overriding pragmatism and a definite sense of individualism characterize nomadic actions when it comes to grazing rights. The welfare of one's herd takes priority over other matters. Authority is only respected and obeyed when the rules do not endanger the animal's access to good pasture and water sources.

Peacemakers (oday) are often elders who are well versed in Islamic tradition. Disputes over pasture and water are handled by elders, elderly councils, "Wadaads" (sheikh) or "Akils" (go-betweens).

Matters are discussed at length before a decision is made. The exchange of points of view, and the ability to express oneself elegantly are two important ingredients to nomads. Nowadays more serious crimes are handled by the state police force.

D. Housing and Women's Labor

There are four types of home structures (Aqals) that can be observed in the central rangeland area. The simplest and most common type in a domed-shaped house built out of sticks and rags. Plastic covers are thrown on the roof to provide protection from the rains. These homes are dismantled by women who load the camels with their belongings and set out to find new pasturage. It takes about three to four houses to build a home of this type.

A more elaborate circular shaped hut with tin or thatch roof is often present in hamlets. Nomads live in these huts only during the rainy seasons. These homes are built close to permanent water sources. Moreover, rectangular shaped huts are seen in abundance in the Hiiraan District. Homes built out of stone are usually occupied by wealthy traders or government officials.

Nomadic life does not encourage the accumulation of material goods. Mats and animal hides are used for sleeping. Wooden bowls, tin cups, yellow plastic containers, and bark fiber water storage vessels are part of the few belongings of a nomadic family.

The house and all the household belongings are owned by females. Females build the huts, fetch water, wash clothing, graze their animals, milk the herds, participate in agriculture whenever it is practiced, raise the children, and weave ropes and baskets in their leisure time.

E. The Dynamics of Livestock Marketing

It has already been stated that nomads do not favorably look upon the idea of selling animals. However, in order to procure cash some animal sales have to take place. Animals are sometimes sold in town markets directly by individual owners. Other arrangements involve middle-men who buy a large number of animals from town markets and take them to large towns like Berbera or Mogadishu.

Livestock markets are referred to as "camel-markets". Camels, cows, sheep and goats are sold in the market by both individual owners and middlemen. A healthy camel sells for about 3500 Somali shillings and a baby for about 500 shillings. Each trader kept his camels separate from the other trader's camels. Prices are not fixed, and lengthy negotiations have to take place between sellers and buyers. Markets are some times located in a residential area where economic transactions take place during early morning hours and in the afternoons the field is converted into a soccer field.

Cows occupy another areas in the market and extreme attention is paid to the cow's size and health conditions. Cows are brought to the market before they are milked so prospective buyers can evaluate their milk capacity. Cows sell on average of 1500 shillings. Also, goats and sheep were kept separately by their owners and many women are present in this section. Women have their children with them and they often are engaged in conversations with other traders. Sheep sell for about 400 shillings and goats for 300 shillings. The size, age, and health condition of the animal determines the price. Buyers remove their purchases out of the market area as soon as they have paid for them.

IV. Conclusion and Recommendations

From the above mentioned description of the nomads of the central rangeland, one can arrive at the following conclusions:

A. We are dealing with a highly individualistic group that values egalitarianism.

B. Social units are highly mobile and flexible in composition. Hence a sense of community is lacking.

C. Nowadays, ethnicity is overridden by pragmatic reasons related to the allocation of water and pasture.

D. Drought experience forces nomads to be more flexible toward new ideas that might ennance their chances to locate better pasture and maintain herd size.

E. There are traditional institutions, e.g., Koranic schools and mosques that are respected by the nomads.

Given these above mentioned qualities of the population, and the fact that this project is designed "from above," the following suggestions are offered:

1. Although general anthropological data on the nomads of Somalia is available, specific data related to local pastoral practices, the impact of settling nomads, the dynamics of migratory movements, and herd size determinents is not currently available. It is crucial to collect such data in order to incorporate it in the non-formal educational program.

2. The non-formal educational program is a crucial part of the implementation process of the Central Rangeland Project. It is highly recommended that both the social scientist and the educational specialist work closely together on preparing simple educational materials to inform nomads about new rangeland management techniques.

3. A Somali nomad has a wealth of information about the environment and livestock management. This information should not be belittled. It is hoped that the social scientist on the project assess the nomad's knowledge and incorporates it whenever possible in the general framework of the non-formal educational system.

4. An evaluation team should administer questionnaires to a random sample of the population periodically to assess the degree of acceptability of the project's main ideas. A socio-economic evaluation program should be helpful in measuring the success of the project. Knowledge gained from these evaluative programs should be shared with rangeland agents involved in implementing the project.

5. Last but not least, women form a large segment of the beneficiaries' population. Women are active participants in the herding complex in the central rangeland area. Hence, women should not be ignored in the non-formal educational program as well as in the evaluation stage. Women herders should also be involved in the decision process of setting criteria for reserve areas.

As of February, 1979

(In thousands)

Region	Male	Female	Total	%
N. Galbeed	220	212	440	12.6
Togdheer	137	121	258	7.4
Sanag	72	74	146	4.2
Dari	82	73	155	4.4
Hargeal	43	42	85	2.4
Bakhar	115	100	215	6.2
Galgadud	94	88	182	5.2
Hiiraan	76	71	147	4.2
Sh. Dhexe	124	113	237	6.8
Banadir	189	182	371	10.6
Sh. Hoose	204	194	398	11.4
J. Hoose	130	116	246	7.0
Gedo	112	100	212	6.1
Bay	157	145	302	8.6
Bakool	54	46	100	2.9
TOTAL	1,817	1,677	3,494	100.0

Note: Population figures are preliminary, and not yet officially published

Source: Data provided by the State Planning Commission.

(Table 2) **Somalia:** Population by Age Group in the Settlements and Area Under Cultivation as of April 1977)

Settlement Locations	Population 0-5	6-14	15-45	46-50	51+	People on Vacation	Total Settled	Area Under Culti-vation (Ha.)
Dujuma	5230	10096	14747	2003	566	141	40791	840
Sablale	2946	11050	8282	1191	357	-	23825	770
Kurtum Warey	2041	9724	7997	1024	329	149	23064	441
Total	11024	30870	31026	4218	1252	290	86680	2051

Source: Data provided by the Settlement Development Agency.

ANNEX 10

ECONOMIC ANALYSIS

I. PRODUCTION, MARKETS, PRICES, COST RECOVERY AND GOVERNMENT CASH FLOW

A. PRODUCTION

Introduction

The Project derives its production benefits from increased livestock off-take. The establishment of range reserves would increase the forage resource and allow for more animals to be grazed, and improved veterinary services would result in higher off-take rates by reducing mortalities and increasing fertility. Production benefits would also take the form of increased milk and meat consumption but due to lack of data, no attempt has been made to estimate incremental quantities and value of these products. Incremental livestock production has therefore been expressed entirely as higher sales of live animals to local or export markets.

Separate values for the production increase derived from range management and that from improved veterinary services have been obtained by using constant off-take parameters for range management and by measuring the impact of veterinary services in terms of increased off-take rates.

Incremental Production from Range Management and Water Development

Improved forage production and utilization in the range reserves through management and stock water development would result in an increase of the carrying capacity at full development by about 70,000 grazing livestock units (GLU) 1/, - or 5% - as follows:

Reserve Type	Sheep and Goats	Cattle	Camels	Total Incremental
	----------thousand head----------			GLU '000
Village and Town	422	41	23	68
Range Grazing	488	--	37	60
Famine 2/	(209)	(36)	(40)	(58)
Total	701	5	20	70

The incremental annual off-take resulting from this increase in carrying capacity -- assuming constant (1975) off-take rates -- would be:

1/ GLU is an expression of the grazing pressure exerted by one LU adjusted for age and weight and according to grazing habits. It is used to express the fact that camels only take 60% of their forage in competition with the other species.

2/ The negative figures indicate the production foregone, since a famine reserve could have been developed with the same investment as a range grazing reserve.

	Sheep and Goats	Cattle	Camels
	----------thousand head----------		
Incremental Herd	701	5	20
Annual Off-take Rate (%) 1/	11.2%	3.74%	3.0%
Annual Off-take from Incremental Herd	78.5	0.2	0.6

1/ As developed through herd model calculations.

Incremental Production Resulting from Improved Veterinary Services

Improved veterinary services would not only benefit the animals grazed in the new reserves but the entire livestock population of the Project area, for which the incremental coverage with repeated treatment has been calculated at 30%. Herd model calculations show that improved productivity and reduced mortality as a result of veterinary treatment would allow an increase in off-take rates of 2.06% for sheep and goats, 1.4% for cattle and 0.6% for camels. The animals produced annually in the Project area would therefore, at full development, increase by 8% as follows:

	Sheep and Goats	Cattle	Camels
	----------thousand head----------		
Incremental livestock under treatment	1,800	269	303
Incremental Annual Off-take rate (%) 1/	2.06%	1.40%	0.60%
Incremental Annual Off-take	37.1	3.8	1.8

1/ As developed through herd model calculations.

Total Incremental Production

At full development the total annual incremental off-take generated by the Project would be:

	Sheep and Goats	Cattle	Camels
	----------thousand head----------		
Range Management	78.5	0.2	0.6
Veterinary Services	37.1	3.8	1.8
TOTAL	115.6	4.0	2.4

This would represent a weighted average increase of livestock produced by 15% over the level before the Project.

Incremental production has been assumed from Project year 6. In the case of the range grazing reserves, where the grazing period is extended by four months as soon as stock water points become operational, the full benefit of the added grazing has been credited from Project year 6, whereas production increase from other reserves has been built up gradually over 10 years. The incremental repetitive cover in the veterinary treatment and the incremental off-take rates have been assumed to take place over a period of 5 years for sheep and goats and 7 years for cattle and camels.

B. MARKETS AND PRICES

Markets

Somalia has an established traditional livestock marketing system. Most towns or villages have a market place where buyers (traders, butchers) and sellers (pastoralists, farmers) gather regularly. The municipalities levy a head tax on animals brought to the market. Sales are generally carried out through middlemen or brokers who get a 3% commission from the buyer. In remote areas, traders use trucks or camels to reach the pastoralists, and often barter with consumer goods which they carry. Breeding stock are traded informally and independently of the market place, and are generally bartered in exchange for other stock. All livestock is traded on a per head basis and not according to quality and weight.

Most of the animal off-take of the Project area is consumed locally. The remainder is sold for export or for consumption in Mogadiscio. Prime male sheep and goats, and a small number of camels and cattle are exported to Near East markets, especially to Saudi Arabia. Total meat consumption in the Near East is projected to grow at 6% p.a., between 1969/71 and 1985. Lamb and mutton would remain the most popular meat and the demand is expected to grow at 6.7% annually.1/ The domestic demand would also grow, but much slower than the export potential. Rising prices would make the domestic demand follow a rate somewhat below the population growth figure, which is estimated at 2.6% p.a.

The existing livestock marketing system is not able to fully respond to the favorable market prospects. It does not transform market demand into price incentives in an adequate manner. No grading system exists and consequently no quality standards are established upon which traders, butchers and foreign dealers can rely. Transport of livestock on the hoof over long distances is costly and involves weight losses and mortality. Shipping service from the export ports is costly and erratic. Finally, the export of animals is hampered by a variety of institutions issuing permits and

1/ FAO/World Bank: The Outlook for Meat Production and Trade in the Near East and East Africa, December, 1977.

licenses and charging the exporter with service and non-service related fees and taxes amounting to about 14-18% of the f.o.b. value. Export traders, in turn try to evade currency exchange regulations and registration. Marketing development is expected to be addressed by a national livestock marketing project which is currently being prepared.

Prices

Strong demand has resulted in rising prices for Somali livestock. In 1976 and 1977, f.o.b. prices for sheep and goats increased by about 50% and for cattle and camels by 25-30% in real terms. Prices are cyclical, being influenced by drought years when pastoralists are forced to sell animals, followed by periods of maximum retention of breeding animals for herd re-building.

C. INCOME OF PASTORALISTS

The average per capita income of all pastoralists from animal sales and consumption would, in line with the incremental off-take, increase by about 15% from US $83 in year 5 to about US $98 in year 15 of the Project (in constant 1979 US $ and 1985 prices). The expected real price increase for livestock beyond 1985 has been neglected, since the producers would have to face slightly higher production costs resulting from water charges and increased use of veterinary drugs.

In addition, the income of the pastoralists would be more stable than without the Project. In drought years, the famine grazing reserves would save from starvation not only the incremental animal population built up under the Project, but also about 5% of the already existing herds. This would lead to a reduction in herd losses and market and price fluctuations caused by droughts; and the retention of animals thereafter would be less pronounced.

D. COST RECOVERY AND GOVERNMENT CASH FLOW

The Project would create some Government revenue, though not sufficient to cover all recurrent costs of the Project. NRA would collect water charges from stock water points. Rates would be consistent with those charged by WDA and the municipalities and would allow the NRA to recover administration, maintenance and operation costs for the water service. At full development of the Project, these revenues of NRA would amount to about 24% of the financial recurrent costs of the Project. In addition, the veterinary service would recover about 14% of its financial recurrent Project cost through the sale of drugs. Non-service related export and transit charges which are levied by the veterinary service, the municipalities, the Ministry of Finance, the Port Authority and the Chamber of Commerce in

the form of taxes, customs and permit fees are projected for 1979 to amount to about So.Sh. 28 per sheep or goat. Assuming that 50% of the incremental Project off-take of sheep and goats is exported, annual revenues would be created in the amount of So.Sh. 1.6 million (US $250,000) at full development. With the existing revenue system and charge levels, the total recovery rate for the financial recurrent Project costs would be only about one-third. About two-thirds of the recurrent financing for the Project would thus have to be provided from other Government income.

At present a higher level of cost recovery from pastoralists, such as taxation of livestock or grazing fees, would not be feasible considering their low income. Additional export taxation may adversely effect this desirable trade. More efficient collection as well as taxation of presently untaxed profits could, however, increase Government revenues substantially. This points to the need for a more efficient national livestock marketing system.

For some years to come, Government would have to subsidize range development. In the context of the Somali economy, and considering that only 60% of Project costs produce direct benefits, 33% recovery of total Project costs is acceptable. Nevertheless, the livestock industry should, in due course, be able to carry a larger share of development costs.

II. BENEFITS AND JUSTIFICATION

A. QUANTIFIABLE BENEFITS

The Project would produce quantifiable benefits in the form of increased livestock off-take based on the improved carrying capacity of the rangelands and reduction in animal losses from droughts and disease. The economic benefits resulting from the range management components of the Project would consist of the incremental off-take from the village, town, famine and range grazing reserves and the value of the incremental herd at year 30. Economic benefits of the veterinary component have been calculated from the incremental off-take rates resulting from increased disease prevention.

B. ECONOMIC RATE OF RETURN (ERR)

The incremental livestock production would be exportable but the growing internal demand and the closeness of the Project area to urban consumer markets is expected to attract an increasing number of animals. Foreign exchange would be earned mainly by the export of male sheep and goats to markets in the Near East. All animals, except those saved by the famine reserves (which, had they died, would still have had a certain residual value), have been valued at export parity prices. These prices have been determined by applying the beef price projections to actual f.o.b. prices

of live animal exports. Service related domestic marketing costs from the Project area to the port of Berbera have been excluded, but all non-service related direct fees, charges, customs and duties have been included. To reflect the scarcity value of foreign exchange, export earnings have been shadow priced at the rate of US $1 = So.Sh. 9, or about 43% above the official exchange rate.

The costs of the Project components grouped under range studies and trials, education and training have been omitted and the costs of the strengthening of the veterinary service and the NRA headquarters support have been included only to the extent they contribute to the quantified Project benefits. The exclusions amount to about 40% of Project costs. A shadow wage rate, estimated at 50% of the financial costs, has been used for the evaluation of the food rations for unskilled labor under the Food for Work Program and foreign exchange costs have been shadow-priced.

The Project, would, under the above assumptions and over 30 years, have an overall economic rate of return of 15%. The rate of return of the veterinary service component would be 28%, a relatively high figure explained by the sunk costs of the existing infrastructure and staff. The range management component alone would have a lower ERR of 12% as a result of the heavy initial investments required for infrastructure and institution building.

C. ECONOMIC PROJECT COST ESTIMATES

Financial Project and recurrent costs have been transformed into an economic cost stream. The following approach has been used:

1. Base year for all economic project costs and benefits is year 1 of the Project.

2. An average physical contingency of 7.5% has been included for all cost items.

3. The Project components grouped under "range studies and trials" and the education and training components have been excluded from the economic analysis since their benefits cannot be readily quantified.

4. The components grouped under "range development" and the "maintenance service" component have been included in the economic analysis with their full economic cost since they exclusively consist of inputs which will create the quantified Project benefits.

5. The following components have only partially been included, since part of them are directed towards activities or areas for which economic benefits are not quantified:

(a) The component "Veterinary Services" includes, during the development period, inputs like the internationally recruited Senior Pathologist, the Disease Investigation Officer and Laboratory Technician and about half of the capacity of the Technical Director of Field Services, which would bring about long term and nationwide benefits. The cost of these inputs, about 25% of the total of this component, has therefore been excluded from the economic analysis during the development period. However, due to the termination of these inputs from year 7 onwards, the full recurrent costs of the component have been included in the economic cost stream.

(b) Likewise, within the component "NRA Headquarters", the cost of the internationally recruited Technical Director of Forestry and related costs are omitted, since this input is not associated with the quantified project benefits. All other costs of this component and all recurrent costs are fully included. In addition, the full economic cost of two internationally recruited key staff is continued up to year 16, since it is assumed that not all expatriate staff can be replaced by nationals during project implementation.

6. Except the WFP food rations, all direct and indirect foreign exchange costs have been shadow priced at the rate of US $1 = 9 So.Sh. or about 43% over the official exchange rate.

D. RISKS AND SENSITIVITY ANALYSIS

A major risk in Project implementation would be a slower than expected acceptance by the pastoralists of Project interventions resulting in their withholding cooperation. Similarly, the Project might be slowed down by delays in recruitment of staff.

Stock water development in ecologically fragile areas without the recurrent enforcement of range management practice would lead to overgrazing and serious deterioration of rangeland productivity in which case the Project would compound the problems which it is designed to solve.

If the risks mentioned above were to have the effect of delaying benefits by two years, the ERR would drop to 12%. If the delay was five years, the ERR would be 9%. If costs increased by 20%, the ERR would be 13%.

If stock water development were inadequately managed, resulting in an overall decline in rangeland carrying capacity of 30%, the ERR would drop to 10%.

The quality of rangelands in Somalia is declining but the rate of decline is not established. Estimates which have gone as high as 3% annually, were not included in the economic analysis. If, however, an annual decline in carrying capacity of only 1% p.a. (compounded) were calculated for the Project from year 6 to 30, and applied to the conventional total off-take and the residual herd in year 30, the overall ERR of the Project would increase by one-third to about 20%.

If all shadow pricing were removed, the overall ERR of the Project would be reduced to about 12%.

In order to enhance the participation of pastoralists and their acceptance of restrictions on grazing, a strong non-formal training component has been incorporated into the Project. Establishment of reserves and stock water development has been made contingent on the formation of grazing associations and the declared willingness of the pastoralists to cooperate. In order to safeguard against ecological deterioration in connection with stock water development, assurances would be sought at negotiations that no stock water supplies would be developed if they were not incorporated in a range grazing reserve for which a grazing association had been formed which had agreed to abide by any restrictions on grazing and water imposed by the NRA in accordance with the law.

E. NON-QUANTIFIABLE BENEFITS

The Project would create a number of non-quantifiable benefits:

1. The subsistence of the pastoralists would be improved since larger and healthier herds would allow higher consumption of milk and meat, and their income and subsistence would be less vulnerable to droughts after the introduction of famine grazing reserves, which would gradually relieve Government of periodically undertaking relief and resettlement operations.

2. Additional employment would be created in NRA for about 846 people and in the veterinary field service for 30 people. The Project would also create employment for a total of 4,700 man-years of unskilled labor in Project-related works.

3. The Project would have beneficial environmental effects by arresting the ecological decline of the rangelands. Town shelter belts at the provincial capitals would provide shelter and firewood. Nurseries to be established under the Project would provide seedlings for these shelter belts and for sand dune fixation.

4. The Project would start the collection and evaluation of data by means of range investigations, soil conservation, water spreading and experimental grazing cooperatives. The results of these studies and trials

would not only be a feedback for the Project but also lay the foundation for future range research.

5. Veterinary diagnostic services and research would be strengthened through the provision of an internationally recruited disease investigation officer and an internationally recruited pathologist.

6. Adult education programs, by making range management a priority aim for teaching, would acquire relevance and add a new dimension to pastoralist education.

F. BENEFICIARIES

Main beneficiaries of the Project would be the pastoralist population of 400,000 people in the Project area, who would reach a higher level of subsistence. A gradually achieved self-sufficiency in forage and stock water in the Project area would, over time, lead to shorter distances of migration and eventually bring about a more sedentary way of life and increased access to social and educational services.

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CENTRAL RANGELANDS DEVELOPMENT PROJECT

Livestock model - sheep and goats

Without veterinary component — Year 1, Year 2, Year 3, Year 4, Year 5, Year 6

Assumptions

Season	Good	Drought
Lambing	65%	40%
Mortality		
Adults	10%	25%
Young	15%	35%

Sales All males 2+ years and ewes above flock maintenance.

Season	Basic Herd	Good	Drought	Good	Good	Good	Good
Flock structure	4						
Ewes	402	402	384	402	402	402	402
Ewe leggets	110	111	98	68	112	112	111
Ewe lambs	131	131	80	125	131	131	131
Sales		61		52	23	63	61
Rams 2+ years	99	99	83	88	52	101	100
Rams 1+ years	110	111	98	68	112	111	112
Ram lambs	131	131	80	125	131	131	131
Rams breeding	17		17	17	17	17	17
Sales		89	70	74	78	46	90
Total Sales		180	70	126	101	109	151

Sales in five years = 556 = 112 per annum
Annual offtake rate = 11.2%

With veterinary component

Assumptions

Season	Good	Drought
Lambing	70%	25%
Mortality		
Adults	5%	25%
Young	10%	35%

Sales. All males 2+ years and ewes above flock maintenance.

Season	Basic Herd	Good	Drought	Good	Good	Good	Good
Flock Structure							
Ewes	376	376	376	376	376	376	376
Ewe leggets	118	118	91	78	118	118	118
Ewe lambs	131	131	85	131	131	131	131
Sales		78	18	54	42	78	78
Rams 2+ years	109	109	91	78	71	109	109
Rams 1+ years	118	118	85	77	118	118	118
Ram lambs	131	131	84	131	131	131	131
Rams breeding	17	17	17	17	17	17	101
Sales		101	85	83	70	64	
Total Sales		179	93	137	112	142	179

Sales in five years = 663 = 132.6 per annum
Average offtake = 13.26%

Benefits from veterinary component = 2.06% incremental offtake per year

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
[illegible]										
[illegible]	Good	Drought								
[illegible]	80%	12%								
[illegible]										
[illegible] 7%	30%									
[illegible] 12%	77%									
[illegible] all [illegible] = [illegible] [illegible] 30% of [illegible] 1-4 years, [illegible] [illegible] in drought										

[illegible] Type	Initial Herd	Good	Drought	Good	Good	Good	Good	Drought	Good	Good	Good
[illegible] adult	318	316	266	290	311	306	304	146	171	293	287
[illegible] heifers	66	66	48	49	24	11	14	19	41	20	11
Heifers 2-3	48	48	33	36	15	32	36	43	21	13	49
Heifers 1-2	76	76	28	13	37	61	61	22	13	13	18
Heifer calves	114	114	20	27	93	93	90	19	21	40	16
Steers											
Steers 4+	19	40 34	34 34	34 33	29 31	14 27	7 13	17 3	29 26	21 28	12 12
Steers 3-4	66	31 13	48	48 9	19 8	9 4	29 1	29	13 8	14 7	8 3
Steers 2-3	48	46 14	33	28 18	12 3	32 3	36 10	43	21 8	11 4	31 1
Steers 1-2	76	79	28	13	37	61	61	22	13	13	18
Steer calves	114	114	20	66	93	93	90	19	21	66	16
Bulls		10	10	10	10	10	10	10	10	10	10
Sales		1/20	1/22	1/22	2/24	1/24	1/23	1/7	2/21	1/18	1/19

Sales in ten years = 174 = 17.4 per annum
Offtake few sale = 1.74%

[illegible]

[illegible]

[illegible]	Good	Drought
[illegible]	70%	17%
[illegible]		
[illegible] 7%	15%	
[illegible] 22%	70%	
[illegible] all [illegible] [illegible] years: 70% of [illegible] 1-4 years, [illegible] [illegible] in drought		

[illegible] Type	Initial Herd	Good	Drought	Good	Good	Good	Good	Drought	Good	Good	Good
[illegible] adult	316	316	285	318	353	364	364	289	374	419	430
[illegible] heifers	66	66	51	36	31	20	73	65	67	36	19
Heifers 2-3	48	48	37	32	21	29	37	37	36	20	32
Heifers 1-2	76	76	36	32	22	32	35	28	21	37	128
Heifer calves	114	114	29	111	123	127	127	28	120	144	130
Steers											
Steers 4+	19	30 16	19 17	21 17	16 6	14 14	11 12	43 7	49 43	41 41	20 19
Steers 3-4	66	32 13	36	48 10	19 10	13 4	30 1	65	36	37 11	13 4
Steers 2-3	48	72 14	36	32 12	20 3	29 4	37 16	71	36 14	20 7	42 1
Steers 1-2	76	65	36	21	22	32	35	28	21	37	129
Steer calves	114	114	28	111	123	127	127	28	120	144	130
Bulls	10	10	10	10	10	10	10	10	10	10	
Sales		72	1/14	1/16	1/18	2/17	1/17	1/7	1/16	1/16	1/17

Sales in ten years = 114
Offtake few sale = 1.14%

[illegible] = [illegible] offtake per year

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[illegible]

[illegible]

[illegible]

[illegible]

Total [illegible]

[illegible] . . . 1.3%

Annual Average [illegible] = 0.64

[illegible]

[illegible]

Total [illegible]

[illegible]

[illegible] = 0.64

[illegible]

[illegible]

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[illegible]

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[illegible]

[illegible]

[illegible]

	With Project 1/			Without Project 1/		
Total Range Production (M per Yr)	Carryover 1/	Production	Total	Carryover	Production	Total
Annual Gross Production Year 1	—	600	600	—	600	600
" " " Year 2	300	600	900	—	600	600
" " " Year 3	[illegible]	600	[illegible]	—	600	600
" " " Year 4	[illegible]	600	[illegible]	—	600	600
" " " Year 5	[illegible]	[illegible]	[illegible]	—	[illegible]	[illegible]
Production 1/ (M/Yr)	Accumulated over 5 years		375	Available Surplus - years		200

Increase Capacity of the Range Reserve

(a) Land enhancement 1/	750,000 ha x 1.770 AU/ha = 1,770 AU/G		134,286 $ 1 7 Overall Year 5	750,000 ha x 1.200 AU/ha = 1,200 AU/G		72,000 $ 1 7 over 4 years
Capitalization of Land 1/:	$ 1 7	$ 7	Total	$ 1 7	$ 7	Total
Sheep/goats	[illegible]	[illegible]	229,287	20,280	208,300	261,200
Cattle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Camels	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(b) Off-range over 5 years 1/						
Sheep/goats (1.24)	—	—	—	[illegible]	= [illegible]	
Cattle (1.74)	—	—	—	[illegible]	= [illegible]	
Camels (1.00)	—	—	—	[illegible]	= [illegible]	
Economic benefits over 5 years 1/	$ 7	Unit Value $a.Sh.	Total Value $a.Sh. Million	$ 7	Unit Value $a.Sh.	Total Value $a.Sh. Million
(a) Land value						
Sheep/goats	[illegible]	[illegible]	[illegible]	208,300	[illegible]	[illegible]
Cattle	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Camels	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
(b) Off-range value						
Sheep/goats	—	—	—	[illegible]	[illegible]	[illegible]
Cattle	—	—	—	[illegible]	[illegible]	[illegible]
Camels	—	—	—	[illegible]	[illegible]	[illegible]
Total benefits over 5 years ($a.Sh. Million)			256.7			220.1
Average annual incremental benefits ($a.Sh. Million)			51.3			47.6
Incremental average annual economic benefits of Range Reserve			3.7			—

1/ With Project situation assumes use of the Range Reserve for grazing every five years. Production in current year = 0.
Without Project situation assumes permanent use of the area with an average carrying capacity of 12 ha/G 1 1 . Production in current year = 0.
Accumulation of 1/2 of accumulated forage of previous year.
Cattle during grazing estimated at 1/2 in drought years and 1/2 in normal years.
Land enhancement in drought years: 1.770 AU per hectare per $ 1 7 ; in normal years: 1.200 AU per hectare per $ 1 7
Land capitalization = overall grazing biomass six before the project of 29;[illegible] for sheep/goats, cattle and camels respectively. Conversion factors between grazing livestock units $ 1 7 , grazing units $ 7 and animal numbers, see table 12, Part 2.
Conventional off-range value without veterinary components: sheep/goats 1.24; cattle 1.74; camels 1
Unit value per grazing unit of $a.Sh. 116 for sheep and goats, $a.Sh. [illegible] for cattle and $a.Sh. 1.730 for camels adjusted by 30% for the animals saved by the operation of Range Reserve, since not all animals would die and even those they would still have a value increase due of hides, skins and meat.

Sept 15, 1978

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CENTRAL RANGELAND DEVELOPMENT PROJECT

Incremental Livestock Off-take Resulting from the Strengthening of the Veterinary Service

	Unit	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15 and Onwards
Total Animal Numbers 1/											
sheep/goats	thousand head	5,395.1	5,419.1	5,443.0	5,481.0	5,268.1	5,743.5	5,860.0	5,951.2	5,966.6	5,999.4
cattle	thousand head	855.7	856.4	857.0	859.0	865.8	878.0	887.4	891.5	894.2	895.5
camels	thousand head	978.1	980.0	982.0	984.7	990.2	994.3	1,001.2	1,004.9	1,007.9	1,010.0
Incremental Repetitive Cover 2/	%	6	12	18	24	30	30	30	30	30	30
Animals Under Incremental Repetitive Cover											
sheep/goats	thousand head	323.7	650.3	979.7	1,313.4	1,670.4	1,723.1	1,758.0	1,776.4	1,790.0	1,800.0
cattle	thousand head	51.3	102.8	154.3	206.8	259.7	263.4	266.2	267.5	268.3	268.7
camels	thousand head	58.7	117.6	176.8	236.3	297.1	298.3	300.4	301.5	300.[illegible]	303.0
Incremental Off-take Rate 3/											
sheep/goats	%	0.4	0.8	1.2	1.6	2.06	2.06	2.06	2.06	2.06	2.06
cattle	%	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.4	1.4	1.4
camels	%	0.1	0.2	0.3	0.4	0.5	0.55	0.6	0.6	0.6	0.6
Incremental Off-take											
sheep/goats	thousand head	1.3	5.2	11.8	21.0	34.4	35.5	36.2	36.6	36.9	37.1
cattle	thousand head	0.1	0.4	0.9	1.7	2.6	3.2	3.7	3.7	3.8	3.8
camels	thousand head	0.1	0.2	0.5	0.9	1.5	1.6	1.8	1.8	1.8	1.8

1/ Animals before the project plus incremental animals resulting from range management (Annex 13, Para. 2 and Appendix II, page 1).
2/ Incremental repetitive coverage of 30% is assumed to be achieved within 5 years, starting in year 6.
3/ Incremental off-take rate is 2.06% for sheep and goats (achieved within 5 years, starting in year 6); 1.4% for cattle and 0.6% for camels (achieved within 7 years, starting in year 6). See Annex 13, Appendix I.

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BENEFITS

CENTRAL RANGELANDS DEVELOPMENT PROJECT

Economic Benefit Stream

	Unit	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Years 15 - 29	Year 30
A. Benefits Resulting from Range Management												
(a) Village and Town - and Range Grazing Reserves												
Value of Incremental Off-take 1/ 2/												
Sheep/goats	Sh.Sh.Million	10.8	11.7	12.5	13.8	16.9	21.1	27.0	29.4	31.0	32.0	32.2
Cattle	"	...	0.0	0.0	0.4	0.7	1.7	2.0	2.6	2.8	2.8	2.8
Camels	"	2.2	2.4	2.7	3.0	3.2	3.5	4.1	4.3	4.6	4.9	4.9
Incremental Value of Herd 1/ 3/												
Sheep/goats	"	--	--	--	--	--	--	--	--	--	--	230.0
Cattle	"	--	--	--	--	--	--	--	--	--	--	37.8
Camels	"	--	--	--	--	--	--	--	--	--	--	129.6
(b) Pasture Reserves 4/	"	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Total (A)	"	16.7	18.0	19.1	20.9	24.5	30.0	37.8	40.0	42.1	43.6	441.0
B. Benefits Resulting from Veterinary Service												
Value of Incremental Off-take 1/ 2/												
Sheep/goats	"	0.4	1.6	3.7	6.6	10.9	11.0	11.4	11.5	11.6	11.7	11.7
Cattle	"	0.2	0.8	1.7	3.0	4.9	6.0	6.9	6.9	7.1	7.1	7.1
Camels	"	0.3	0.2	1.4	2.4	4.0	4.3	4.8	4.9	4.9	4.9	4.9
Total (B)	"	0.9	2.9	6.8	12.2	19.8	21.2	23.2	23.3	23.6	23.7	23.7
TOTAL ECONOMIC PROJECT BENEFITS (A + B)	"	17.6	20.9	25.9	33.1	44.3	51.2	60.4	63.3	65.7	67.3	464.7

1/ Economic value per animal (grazing unit): sheep/goats Sh.Sh. 316; cattle Sh.Sh. 1,068; camels Sh.Sh. 2,700 (See Annex 13, Para. 19).
2/ Incremental off-take see Annex 11, Appendix II, Page 1.
3/ Total animal numbers of year 30 converted into grazing units using the conversion factors for sheep/goats: 0.8; cattle 0.5; camels 0.8; (Annex 13 Para 2).
4/ Average incremental benefits per year (See Annex 13, Appendix II, Page 2).
2/ Incremental off-take see Annex 11, Appendix II, Page 3.

... Negligible

October 16, 1978

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[illegible]

[illegible]

[illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]								
[illegible] (Financial cost)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:								
[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	—	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (Financial cost)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:								
[illegible]	—	—	[illegible]	[illegible]	[illegible]	[illegible]	—	—
[illegible]	—	—	—	—	—	—	[illegible]	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (Financial cost)	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:								
[illegible]	—	—	—	—	—	—	[illegible]	[illegible]
[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (Financial cost)	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:								
[illegible]	—	[illegible]	[illegible]	—	—	—	—	—
[illegible]	—	—	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	—	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (Financial cost)	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:								
[illegible]	—	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Subtotal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Add: [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] (Financial cost)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]:								
[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	—
[illegible]	—	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Subtotal	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Add: [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand total (1 + 2)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] 1, 1979

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SOMALIA

CENTRAL RANGELANDS DEVELOPMENT PROJECT

Sensitivity of the Economic Rate of Return
ERR in %

	Range Development	Veterinary Service	Overall ERR
1. Basic Run	12.15	28.35	14.95
2. Declining Range Production in without project situation considered			
2.1 1% p.a. of off-take and residual herd value			20.15
2.2 1% p.a. residual herd value alone (78%) (Off-takes remain stable in economic terms)	12.65		
3. Delay of Benefit Creation			
3.1 by 2 years	9.95	21.25	11.95
3.2 by 5 years	7.75	14.95	9.05
4. Changes of Livestock Prices or of Carrying Capacity			
4.1 20% lower	9.65	24.25	12.05
4.2 30% lower	8.15	21.35	10.35
4.3 20% higher	14.35	31.85	17.35
4.4 30% higher	15.35	33.45	18.45
5. Changes of Project Cost			
5.1 10% higher	11.05	26.65	13.65
5.2 20% higher	10.05	25.05	12.55
5.3 10% lower	13.45	30.35	16.35
5.4 20% lower	14.85	32.65	17.95
6. Foreign Exchange and Unskilled Labor not shadow priced	9.55	26.15	12.15

February 8, 1979

ANNEX 11

611(a) Determination

Central Range Project

All construction cost is to be financed by the World Bank. The USAID contribution to this project is in the form of technical assistance and project commodities. The World Bank has submitted technical analysis of construction including cost estimates in the Annex 16 of their report "Somalia Rangelands Development Project" staff appraisal report (implementation volume) dated April 17, 1979. The cost estimates and engineering planning have been studied by REDSO engineer. Cost estimates include 10% contingency and 10% A and E fees for the development of final construction drawings, and contract documents. In the total project 9% compounded inflation has been included. Construction of housing units is based on the standard housing plans developed by Ministry of Works of Somalia which have been used on previously AID-financed projects and meets the approval of the REDSO engineer. No drawings have been prepared for other construction activities, e.g., office buildings, non-formal training center, extension of central workshop at Mogadishu and central facilities at three centers, one each at Hiran, Galgudag and Mudug regions and 12 (twelve) centers at 12 districts. District locations have not been identified. Actual site locations also not identified. Funds have been allotted (10% of the total construction cost) for the preparation of site plans, contract drawings, and construction documents. All A and E services will be provided by the private architect firm. Construction is to be carried out by the local construction contractors. Construction cost estimates have been examined by REDSO engineer and appears to be reasonably firm. Construction implementation schedule (Annex I, Chart 2, World Bank Report No. 2163-80 dated April 17, 1979 on the subject project) is slipped by six months. Selection of architect and award for design services will not take place prior to June 30, 1979.

The total construction program of the Project would be implemented by the National Range Agency (NRA). NRA would employ an internationally recruited consultant Architect/Planner who would, together with a local Civil Engineer already at post, initiate and supervise the appointment of executive architects, site selection, site surveys, preparation and evaluation of tenders, and advise NRA on the implementation procedures. Buildings would be designed, tendered and supervised by the Somali Engineering Consulting Agency, a Government organization responsible for all architect and engineering services to Government.

All construction, except of the pumphouse, wateryards, access tracks and demarcation of grazing reserves which would be established by NRA on a force account basis, would be subject to international competitive bidding. In case that for parts or all of the building construction program reasonable bids would not be received, NRA would, in coordination with the Ministry of Works, proceed on a force account basis. Construction of staff houses would be given priority since they are the key to the timely start of Technical Assistance. The project includes funds for rental of facilities until construction is complete.

Shortage of construction materials (cement, steel, electrical fittings, building hardware, plumbing, sanitary fittings) is a common experience in Somalia. Most of the building materials have to be imported from overseas. The most feasible and economical source is Kenya. The delay in delivery of construction commodities may affect the construction completion from six to twelve months. As indicated in the World Bank's Report, all 18 expatriate staff houses (Class A) are to be built in Mogadishu, however, AID proposes to have four (4) Class A houses at the town of Dusa Marreb located about 430 kms. north of Mogadishu in Galgudud region. The cost of the Class A house at Mogadishu is 200,000/- So.Sh. (This includes 15% site works and 10% contingency, with 15% inflation) Per year, the cost of each house in Mogadishu would be 230,000/- So.Sh. Provinvial cost variation in Galgudud region is about plus 45% the cost in Mogadishu. To build the houses in Dusa Marreb it will cost additional 103,500/- So.Sh. per house or a total of 414,000/- So.Sh. additional for four houses (or U.S. $67,869 at the rate of U.S. $1 = 6.1/-So.Sh.). This additional cost will be financed from PL 480 Title I proceeds.

Based on the above technical information regarding planning and cost estimates, it is considered that the requirements of 611(a) of FAA 1961 (as amended) have been met.

ANNEX 12

FINANCIAL TABLES

Table A. AID Contribution

Tables 1 - 17. Detailed Project Budgets by Component.

Table 18. Government Cash Flow.

A.I.D. CONTRIBUTION
($000)

	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	TOTAL
Capital							
Stock Water Yards	-0-	-0-	-0-	80	80	-0-	160
Well Drilling	-0-	-0-	127	318	318	-0-	763
Sub-Total Civil	-0-	-0-	127	398	398	-0-	923
Vehicles and Machinery							
Range Reserves							
Bulldozer	454	-0-	-0-	-0-	-0-	-0-	457
Motorgrader	146	-0-	-0-	-0-	-0-	-0-	146
Fuel tanker	32	-0-	-0-	-0-	-0-	-0-	32
Service vehicle	28	-0-	-0-	-0-	-0-	-0-	28
4 wheel drive truck - 7 ton	23	-0-	-0-	-0-	-0-	-0-	23
Trailer	15	-0-	-0-	-0-	-0-	-0-	15
Spare parts	209	-0-	-0-	-0-	-0-	-0-	209
Range Survey							
Truck	27	-0-	-0-	-0-	-0-	-0-	27
Grazing Coops							
Tractor	-0-	45	-0-	-0-	-0-	-0-	45
Attachments	-0-	32	-0-	-0-	-0-	-0-	32
Spare Parts	-0-	13	-0-	-0-	-0-	-0-	13
Water Development							
Truck	-0-	-0-	-0-	130	-0-	-0-	130
Parts Van	-0-	-0-	-0-	70	-0-	-0-	70
Trailer	-0-	-0-	-0-	9	-0-	-0-	9
Spare Parts	-0-	-0-	-0-	63	-0-	-0-	63
Equipment							
NRA Field Support							
Camping Equipment	-0-	8	-0-	-0-	-0-	-0-	8
Radio Equipment	-0-	7	-0-	-0-	-0-	-0-	7

A.I.D. Contribution
($000)

	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	TOTAL
Grazing Reserves							
Ferrotents	-0-	195	-0-	-0-	-0-	-0-	195
Survey Equipment	-0-	5	-0-	-0-	-0-	-0-	5
Camping Equipment	-0-	158	-0-	-0-	-0-	-0-	158
Hand tools	-0-	2	66	-0-	-0-	-0-	68
Containers	-0-	1	54	-0-	-0-	-0-	55
Water Development							
Pumps	-0-	-0-	-0-	183	-0-	-0-	183
Engines	-0-	-0-	-0-	111	-0-	-0-	111
Casing	-0-	-0-	-0-	123	-0-	-0-	123
Screen	-0-	-0-	-0-	9	-0-	-0-	9
Cement and Chem.	-0-	-0-	-0-	14	-0-	-0-	14
Spare parts	-0-	-0-	-0-	88	-0-	-0-	88
Formal Education							
Tools	-0-	-0-	8	-0-	-0-	-0-	8
Camping Equipment	11	-0-	-0-	-0-	-0-	-0-	11
Range Studies							
Camping Equipment	-0-	-0-	3	-0-	-0-	-0-	3
Scientific Equipment	-0-	-0-	21	-0-	-0-	-0-	21
Lab Equipment	-0-	-0-	-0-	33	-0-	-0-	33
Ag Machinery	-0-	-0-	3	-0-	-0-	-0-	3
Herbarium	-0-	-0-	-0-	2	-0-	-0-	2
Grazing Coops							
Camping Equipment	-0-	11	-0-	-0-	-0-	-0-	11
Silo 10 m^3	-0-	-0-	-0-	3	-0-	-0-	3
Tools	-0-	6	-0-	-0-	-0-	-0-	6
Survey Equipment	-0-	5	-0-	-0-	-0-	-0-	5
NRA Administration							
Camping Equipment	2	1	-0-	-0-	-0-	-0-	3
Radio Equipment	-0-	-0-	-0-	2	-0-	-0-	2
Range Monitoring							
Camping Equipment	-0-	3	-0-	-0-	-0-	-0-	3
Ecological Equipment	-0-	2	-0-	1	-0-	-0-	3
Mapping Equipment	-0-	2	-0-	-0-	-0-	-0-	2
Visuals	-0-	3	-0-	-0-	-0-	-0-	3
Misc.	-0-	11	-0-	-0-	-0-	-0-	11

A.I.D. CONTRIBUTION
($000)

	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	TOTAL
Water Development							
Camping Equipment	-0-	-0-	-0-	4	-0-	-0-	4
Tools	-0-	-0-	-0-	11	-0-	-0-	11
Procurement Fees	70	37	14	55	-0-	-0-	176
Sub-Total Commodities	1017	544	169	911	-0-	-0-	2644
Technical Assistance							
Range Scientist	100	100	100	100	100	100	600
Range Scientist	100	100	100	100	100	100	600
Lecturer	-0-	-0-	100	100	100	100	400
Lecturer	-0-	-0-	100	100	100	100	400
Range Instructor	50	100	100	100	100	100	550
Taxonomist	-0-	-0-	50	100	100	100	350
Soil and Water Cons.	-0-	-0-	100	100	-0-	-0-	200
Coop Advisor	-0-	100	100	-0-	-0-	-0-	200
Technical Dir. Range	100	100	100	101	100	100	601
Water Development	-0-	50	100	100	100	100	450
Consultancies	100	191	191	-0-	96	96	674
Sub-Total - T.A.	450	741	1141	901	896	896	5025
Training	160	194	-0-	-0-	-0-	-0-	354
Operating Costs							
Vehicles and Equipment							
Surveys	6	13	-0-	-0-	-0-	-0-	19
Reserves	-0-	102	102	102	102	-0-	408
NRA Field	-0-	53	106	106	106	106	477
Studies	-0-	-0-	-0-	5	10	10	25
Cooperatives	-0-	-0-	9	9	9	9	36
Monitoring Unit	6	10	14	14	14	14	72
Stock water	-0-	-0-	-0-	-0-	63	85	148
Boreholes	-0-	-0-	-0-	-0-	15	31	46
Maintenance							
Survey	-0-	1	-0-	-0-	-0-	-0-	1
Reserves	-0-	38	51	51	51	48	239
Water	-0-	-0-	-0-	-0-	4	7	11
NRA Field	-0-	15	31	31	31	31	139
Studies	-0-	-0-	1	5	10	10	26
Cooperatives	-0-	-0-	7	7	7	7	28
Monitoring Unit	-0-	-0-	6	6	3	7	22
Stock water	-0-	-0-	2	2	4	4	12

A.I.D. CONTRIBUTION
($000)

	YR 1	YR 2	YR 3	YR 4	YR 5	YR 6	TOTAL
Misc. Operating							
Survey	17	23	-0-	-0-	-0-	-0-	38
Reserves	-0-	20	28	44	50	49	190
Formal Education	5	7	3	3	3	3	24
Studies	-0-	-0-	3	6	6	6	21
Cooperatives	-0-	-0-	-0-	-0-	2	2	4
Water	-0-	-0-	6	6	3	-0-	15
Sub-Total Operating	34	282	371	397	493	429	2006
Base Cost	1661	1764	1808	2607	1787	1325	10952
Contingency	115	140	114	191	119	104	783
Inflation	129	313	348	849	741	829	3209
GRAND TOTAL	1905	2217	2270	3647	2647	2258	14944

* AID PARTICIPATION

** AID PARTICIPATION UNDER (649-0104)

SOMALIA

CENTRAL RANGELAND DEVELOPMENT PROJECT

Summary of Project Cost by Component

1979 So. Sh. '000

Table No.	Component	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Years 1-6	Foreign Exchange Percent	Foreign Exchange Cost
2	★ Resource Inventory, CRDP	1,360.0	--	--	--	--	--	1,360.0	100	1,360.0
3	★ Range Ground Survey	1,330.0	1,342.3	--	--	--	--	2,700.3	91	2,539.5
4	★ Range Leasing Reserves	6,034.3	4,341.6	4,994.2	6,498.2	7,930.3	2,303.9	31,510.2	73	23,973.4
5	★★ Water Development, CRDP	--	--	18.0	4,237.0	1,031.9	690.5	5,968.3	74	4,330.2
6	★ NRA Field Support	1,379.2	2,481.8	12,466.1	3,490.0	3,747.3	3,209.3	24,100.6	42	15,361.9
	1. Sub-total Range Development	13,003.0	13,976.5	17,478.3	14,344.0	13,727.6	6,304.9	99,325.1	41	40,403.0
7	On Formal Education and Training	1,300.4	4,334.4	3,542.0	3,327.0	3,304.1	3,014.3	22,843.2	60	13,000.0
8	★ Formal Education and Training	2,200.0	3,513.2	3,867.2	3,765.9	3,765.9	3,765.9	24,701.3	71	17,298.2
	2. Sub-total Training	3,509.2	9,948.3	10,409.9	9,992.2	6,869.0	5,779.4	47,060.5	73	30,678.9
9	Resource Inventory, NRAP	1,360.0	--	--	--	--	--	1,360.0	100	1,360.0
10	Land Shelter Belts and Harvesting	--	1,330.2	1,334.3	1,334.3	1,334.3	1,334.3	6,673.4	82	5,474.5
11	★ Range Investigations	--	--	848.0	1,493.0	2,003.3	2,347.5	6,691.8	92	5,439.2
12	★ Soil Conservation, Water Harvesting, Grazing Cooperatives	13.0	1,030.2	1,034.2	1,737.0	1,709.2	1,011.0	6,360.0	84	5,410.2
	3. Sub-total Studies and Trials	1,373.0	2,360.4	3,119.6	4,643.3	5,137.5	4,533.5	21,078.2	87	18,483.0
13	Veterinary Services	815.0	4,100.3	4,487.2	3,[illegible]	3,684.0	3,684.0	19,[illegible]	79	15,264.4
	4. Sub-total Veterinary Services	815.0	4,100.3	4,487.2	3,[illegible]	3,684.0	3,684.0	19,[illegible]	79	15,264.4
14	★ Administration and Management	1,[illegible].6	3,139.3	4,373.0	5,037.5	3,739.1	2,914.1	20,603.0	83	17,082.3
15	★ Range Monitoring Unit	29.0	336.1	1,631.5	1,325.1	334.0	1,039.0	3,133.6	77	3,943.0
16	★☆ Warehouse Service	15.0	3,051.0	1,367.7	4,023.4	3,333.3	2,336.1	13,346.3	81	14,300.3
17	Maintenance Service	--	300.9	730.0	1,331.5	873.3	268.3	5,735.2	30	1,767.9
	5. Sub-total NRA Headquarters	1,046.5	10,720.5	8,100.0	12,331.7	7,739.5	7,443.7	48,191.7	79	38,293.5
	Base Cost	19,728.5	43,030.0	43,814.4	41,000.3	35,[illegible]	27,842.3	310,044.4	72	224,253.3
	Physical Contingency	1,536.1	3,242.3	3,300.9	3,063.5	2,565.9	1,859.3	23,007.3	72	16,[illegible]
	Price Contingency	1,395.5	6,623.5	11,370.3	11,812.4	13,609.4	13,687.3	64,937.3	67	43,431.4
	TOTAL ESTIMATED PROJECT COST	22,660.1	52,[illegible]	58,[illegible]	57,[illegible]	52,[illegible]	43,[illegible]	398,[illegible]	71	[illegible]

March 28, 1979

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CENTRAL RANGELANDS DEVELOPMENT PROJECT

Construction

A. Schedule of Accommodation

I. Headquarters Facilities, Mogadishu

	No. of Staff	No. of Units	Area m^2		Total Area m^2
1. Headquarters Office Building					
Offices: General Manager	1	1	X 45	=	45
Deputy Manager	1	1	X 30	=	30
Directors	3	3	X 30	=	90
Service Chiefs	7	7	X 20	=	140
Section Heads	13	7	X 30	=	210
Officers	12	6	X 20	=	120
Senior Secretaries	2	2	X 20	=	40
Secretaries	4	2	X 20	=	40
Administration	8	1	X 30	=	30
Taxonomist (includ. Laboratory)	1	1	X 45	=	45
Documentation Center		1	X 45	=	45
Meeting Room		1	X 35	=	35
Central Files		1	X 50	=	50
Duplication/Photo Room		1	X 25	=	25
Switch Board		1	X 15	=	15
Cleaners Room		1	X 15	=	15
Maintenance Room		1	X 25	=	25
Monitoring		1	X 50	=	50
Stores, Food and Office Supply		2			85
Toilets					70
		Net Area			1,205
		Grossing Factor (35%)			422
		Gross Area			1,627
Car Parking - 10 Cars		Net Area			70
		Grossing Factor (20%)			14
		Gross Area			84
		Total Gross Area			1,711

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[illegible]

[illegible]

[illegible]

Item	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Year 1 - 5 Total Units	Year 1 - 5 Total Cost	Variation in Unit Cost Percent	Variation in Unit Cost Cost
[illegible]															
[illegible] drawings															
Drawings Inventory	Lump sum		[illegible]	--	--	--	--	--	--				[illegible]	(100%)	[illegible]
Landmark Drawings	Lump sum		100	--	--	--	--	--	--				100	(100%)	100
TOTAL CAPITAL COST (A)			[illegible]	--	--	--	--	--	--				[illegible]	(100%)	[illegible]
[illegible]			--	--	--	--	--	--	--				--		--
GRAND TOTAL (A & B)			[illegible]	--	--	--	--	--	--				[illegible]	(100%)	[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] - [illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Year 6 Units	Year 6 Cost	Years 1 - 6 Total Units	Years 1 - 6 Total Cost	Foreign Exchange Percent	Foreign Exchange Amount
I																		
Construction				--		--		--		--		--		--		--		--
Vehicles and Machinery																		
* Four-wheel-drive Jeep, 3 ton	each	[illegible]	(1)	[illegible]		--		--		--		--		--	(1)	[illegible]	(70%)	[illegible]
Four-wheel-drive station wagon LWB	each	[illegible]	(1)	[illegible]		--		--		--		--		--	(1)	[illegible]	(70%)	[illegible]
Fitting of Jeep	set	[illegible]	(1)	[illegible]		--		--		--		--		--	(1)	[illegible]	(70%)	[illegible]
Spare parts (5% of vehicle cost)	lump sum			[illegible]		--		--		--		--		--		[illegible]	(70%)	[illegible]
Sub-total (b)				[illegible]		--		--		--		--		--		[illegible]	(70%)	[illegible]
Equipment and Furniture																		
Furniture for locked Staff House	lump sum	[illegible]	(1)	[illegible]		--		--		--		--		--	(1)	[illegible]	(70%)	[illegible]
* Camp Equipment Class A	set	[illegible]	(3)	[illegible]		--		--		--		--		--	(3)	[illegible]	(70%)	[illegible]
Class B	set	[illegible]	(1)	[illegible]		--		--		--		--		--	(1)	[illegible]	(70%)	[illegible]
* Survey Equipment	lump sum	[illegible]		[illegible]		--		--		--		--		--		[illegible]	(70%)	[illegible]
* Aerial Photographic Cover	lump sum	[illegible]		[illegible]		--		--		--		--		--		[illegible]	(100%)	[illegible]
Sub-total (c)				[illegible]		--		--		--		--		--		[illegible]	(70%)	[illegible]
Professional Services																		
Government Fees (2.5%)	lump sum			[illegible]		--		--		--		--		--		[illegible]	(100%)	[illegible]
Sub-total (d)				[illegible]		--		--		--		--		--		[illegible]	(100%)	[illegible]
TOTAL CAPITAL COST (A)				[illegible]												[illegible]	(70%)	[illegible]
II																		
Staff Salaries (including allowances)																		
Ranger Entrepot	man year	[illegible]	(1)	[illegible]	(1)	[illegible]		--		--		--		--	(1)	[illegible]	(100%)	[illegible]
Range Management Officer	man year	[illegible]	(0.5)	[illegible]	(1)	[illegible]		--		--		--		--	(1.5)	[illegible]	--	--
Driver	man year	[illegible]	(1)	[illegible]	(1)	[illegible]		--		--		--		--	(1)	[illegible]	--	--
Cook	man year	[illegible]	(0.5)	[illegible]	(1)	[illegible]		--		--		--		--	(1.5)	[illegible]	--	--
Per diem	lump sum			[illegible]		[illegible]		--		--		--		--		[illegible]	--	--
Uniforms	lump sum			[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
Sub-total (a)				[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
Vehicle Operating																		
Jeep (1)	per km '000	[illegible]	(10)	[illegible]	(10)	[illegible]		--		--		--		--	(20)	[illegible]	--	--
Four-wheel-drive station wagon (1)	per km '000	[illegible]	(10)	[illegible]	(10)	[illegible]		--		--		--		--	(20)	[illegible]	--	--
Sub-total (b)				[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
Maintenance																		
Furniture and Equipment (1%)	lump sum			--		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
Sub-total				--		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
Miscellaneous Operating Costs																		
Rent of Staff Houses (2)	flat year	[illegible]	(1)	[illegible]	(1)	[illegible]		--		--		--		--	(1)	[illegible]	--	--
Stationery and Printing Equipment	lump sum	[illegible]		[illegible]		--		--		--		--		--		[illegible]	(100%)	[illegible]
Hire of Aircraft	hour	[illegible]	(50)	[illegible]	(60)	[illegible]		--		--		--		--	(50)	[illegible]	(100%)	[illegible]
Travelling Expenses for Purchase of Equipment	lump sum	[illegible]		[illegible]		--		--		--		--		--		[illegible]	(100%)	[illegible]
Sub-total				[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
TOTAL OPERATION COSTS (B)				[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
GRAND TOTAL (A & B) NET OF TAXES				[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]
TAXES PAID				[illegible]		[illegible]		--		--		--		--		[illegible]		
GRAND TOTAL				[illegible]		[illegible]		--		--		--		--		[illegible]	(100%)	[illegible]

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[illegible]

[illegible]

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 1 - 5 Total Cost	Contingency Allowance	Revised Cost
* CAPITAL COST														
(a) Construction				--		--		--		--		--		--
(b) Vehicles and Machinery														
* Bulldozer, [illegible]	each	[illegible]	(2)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Motorgrader, [illegible]	each	[illegible]	(1)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Fuel Tanker	each	[illegible]	(1)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Service Vehicle	each	[illegible]	(1)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Four-wheel-drive Jeep, 7 Sm	each	[illegible]	(1)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Water Bowser (Trailer)	each	[illegible]	(1)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Fuel Bowser (Trailer)	each	[illegible]	(1)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Four-wheel-drive Pick-up	each	[illegible]	(4)	[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* Spare Parts (30% of vehicle cost)	lump sum			[illegible]		--		--		--		[illegible]	(20%)	[illegible]
Sub-total (b)				[illegible]		--		--		--		[illegible]	(20%)	[illegible]
* (c) Equipment														
Bulldozer	set	[illegible]	(100%)	[illegible]		--		--		--	(100%)	[illegible]	(20%)	[illegible]
Survey Equipment	set	[illegible]	(1)	[illegible]		--		--		--	(1)	[illegible]	(20%)	[illegible]
Camp Equipment, Class A	set	[illegible]	(1)	[illegible]		--		--		--	(1)	[illegible]	(20%)	[illegible]
" " Class C	set	[illegible]	(25)	[illegible]		--		--		--	(25)	[illegible]	(20%)	[illegible]
" " Class B	set	[illegible]	(100%)	[illegible]		--		--		--	(100%)	[illegible]	(20%)	[illegible]
Hand Tools	set	[illegible]	(5)	[illegible]	(10%)	[illegible]		--		--	(10%)	[illegible]	(20%)	[illegible]
Drums, 200 liters	each	[illegible]		--	(50%)	[illegible]		--		--	(50%)	[illegible]	(20%)	[illegible]
Additional Acetylene	set	[illegible]	(1.0)	[illegible]	(50%)	[illegible]		--		--	(50%)	[illegible]	(20%)	[illegible]
Sub-total (c)				[illegible]		[illegible]		--		--		[illegible]	(20%)	[illegible]
* (d) Professional Services														
Procurement Fees (2.5%)	lump sum			[illegible]		--		--		--		[illegible]	(100%)	[illegible]
Sub-total (d)				[illegible]		--		--		--		[illegible]	(100%)	[illegible]
(e) Construction Teams' Costs														
Staff Salaries (Including Allowances)														
Surveyor	man year	[illegible]		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Heavy Equipment Operator	man year	[illegible]		--	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]		--
Assistant Equipment Operator	man year	[illegible]		--	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]		--
Driver	man year	[illegible]		--	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]		--
Cook	man year	[illegible]		--	(3)	[illegible]	(3)	[illegible]	(3)	[illegible]	(3)	[illegible]		--
Semi-skilled Laborer	man year	[illegible]		--	(21)	[illegible]	(21)	[illegible]	(21)	[illegible]	(21)	[illegible]		--
Mechanic	man year	[illegible]		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Foreman	man year	[illegible]		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Storekeeper	man year	[illegible]		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Labourer	man year	[illegible]		--	(4)	[illegible]	(4)	[illegible]	(4)	[illegible]	(4)	[illegible]		--
[illegible] Mother (Cook Wage)	man year	[illegible]		--	(60)	[illegible]	(60)	[illegible]	(60)	[illegible]	(60)	[illegible]		--
Per diem	lump sum			--		[illegible]		[illegible]		[illegible]		[illegible]		--
Bedrooms	lump sum			--		[illegible]		[illegible]		[illegible]		[illegible]		--
Sub-total (e)				--		[illegible]		[illegible]		[illegible]		[illegible]	(100%)	[illegible]
* (f) Construction Machinery Operating														
Bulldozer (3)	per hours [illegible]	[illegible]		--	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]	(7)	[illegible]		--
Motorgrader (2)	per hours [illegible]	[illegible]		--	(2.0)	[illegible]	(2.0)	[illegible]	(2.0)	[illegible]	(2.0)	[illegible]		--
Fuel Tanker (1)	per hr'000	[illegible]		--	(30)	[illegible]	(30)	[illegible]	(30)	[illegible]	(30)	[illegible]		--
Service Vehicle (1)	per hr'000	[illegible]		--	(20)	[illegible]	(20)	[illegible]	(20)	[illegible]	(20)	[illegible]		--
Four-wheel-drive Jeep, 7 Sm (4)	per hr'000	[illegible]		--	(20)	[illegible]	(20)	[illegible]	(20)	[illegible]	(20)	[illegible]		--
Four-wheel-drive Pick-up (4)	per hr'000	[illegible]		--	(80)	[illegible]	(80)	[illegible]	(80)	[illegible]	(80)	[illegible]		--
Sub-total (f)				--		[illegible]		[illegible]		[illegible]		[illegible]	(20%)	[illegible]
(g) Miscellaneous Construction Operating Costs														
* Cost of Transport Truck/Trailer	per hour	[illegible]		--	([illegible])	[illegible]	(1[illegible])	[illegible]	(1[illegible])	[illegible]	(1[illegible])	[illegible]		--
* Cost of Cement	sacks	[illegible]		--	(4)	[illegible]	(4)	[illegible]	(4)	[illegible]	(4)	[illegible]		--
* Paint and Brushes	lump sum	[illegible]		--		[illegible]		[illegible]		[illegible]		[illegible]		--
* [illegible] - Bottom	per man year	[illegible]		--	(60)	[illegible]	(60)	[illegible]	(60)	[illegible]	(60)	[illegible]	(20%)	[illegible]
Sub-total (g)				--		[illegible]		[illegible]		[illegible]		[illegible]	(20%)	[illegible]
TOTAL CAPITAL COST (a)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	(20%)	[illegible]

1/ Excluding water development (see Table 5)

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Year 1 - 5 Total Units	Year 1 - 5 Total Cost	Year 5 Average Units	Year 5 Average Cost
A. OPERATION COST																
(a) Staff Salaries (Including Allowances)																
Range Boards	man year	5.0	--	--		--		--		--	(650)	1,300.0	(650)	1,300.0		--
MOF - Harbors (Cash Wage)	man year	0.5	--	--	(65)	182.0	(65)	182.0	(65)	182.0		--	(260)	1,300.0		--
Uniforms	lump sum		--	--		--		--		--		120.0		120.0	(0.05)	117.0
Sub-total (a)			--	182.0		182.0		182.0		182.0		1,420.0		2,920.0	(0.5)	117.0
(b) Vehicle operating (Included in DMA Field Service (Table 3))																
Sub-total (b)			--	--		--		--		--		--		--		--
(c) Maintenance of Equipment Handtools, Drums, Fertilizers (1% of capital cost)	lump sum		--	241.5		241.5		241.5		241.5		241.5		1,207.5	(0.05)	241.5
Sub-total (c)			--	241.5		241.5		241.5		241.5		241.5		1,207.5	(0.05)	241.5
(d) Miscellaneous Operating Costs																
* Rent of Canals	each	5.0	--	125.0	(25)	125.0	(25)	125.0	(25)	125.0	(25)	125.0	(125)	625.0		--
MOF - Bottom	man year	5.0	--	1,860.0	(65)	2,300.0	(65)	2,300.0	(65)	2,300.0	(65)	2,300.0	(325)	11,060.0	(0.05)	2,212.0
Sub-total (d)			--	1,985.0		2,425.0		2,425.0		2,425.0		2,425.0		11,685.0	(0.05)	2,212.0
TOTAL OPERATING COST (A)			--	2,410.5		2,849.5		2,849.5		2,849.5		4,086.5		15,813.5	(0.05)	2,570.5
GRAND TOTAL (A & B) NET OF TAXES			8,036.5	4,036.5		4,036.5		4,036.5		4,036.5		4,036.5		20,182.5	(0.05)	4,036.5
GRAND TAXES			--	83.0		83.0		83.0		83.0		83.0		415.0	--	--
GRAND TOTAL			8,036.5	4,041.5		4,036.5		4,036.5		4,036.5		4,036.5		20,597.5	(0.05)	4,036.5

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** – PROJECT 649-0104

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Operation Maintenance Units	Operation Maintenance Cost
A. CAPITAL COST														
(a) * (a) Construction														
Pump House 8 m²	each	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Trenches with siltings	set	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pipe and fittings to tiers	meter	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Construction Contingency (10%)	lump sum		--	--	--	--	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
Sub-total (a)			--	--	--	--	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
(b) Vehicles			Other Durable Construction and Maintenance will be supported by Vehicles of Water Service from MRA Headquarters											
* (c) Equipment and Materials														
Pumps	each	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Diesel Engines	each	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Casing, 6" Plastic	per m'tiers	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Screen, 6" Plastic	per m'tiers	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Cement, chemicals, etc.	lump sum		--	--	--	--	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
Camp Equipment, Class B	set	[illegible]	--	--	(1)	[illegible]	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
Spare Parts for Pumps and Engines (10%)	lump sum		--	--	--	--	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
Sub-total (c)			--	--	--	[illegible]	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
* (d) Professional Services														
Construction and Tender Fees (10%)	lump sum		--	--	--	--	--	[illegible]	--	--	--	[illegible]		
Procurement Fees	lump sum		--	--	--	--	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
Sub-total (d)			--	--	--	--	--	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
(e) Construction Team Costs (Including Allowances)														
Settler	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
Rig Hands	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
Cook	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
Driver	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
Per diem	lump sum		--	--	--	--	[illegible]	[illegible]	--	--	--	[illegible]		--
Uniforms	lump sum		--	--	--	--	[illegible]	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
Sub-total (e)			--	--	--	--	[illegible]	[illegible]	--	--	--	[illegible]	[illegible]	[illegible]
(f) Vehicle and Machinery Operating during Construction														
* Drill Rig	per hours' use	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
* Tanker (1)	per hr'use	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
* Four-wheel-drive Lorry, 3 ton (1)	per hr'use	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
* Four-wheel-drive Pick-up (1)	per hr'use	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (f)			--	--	--	--	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COST (A)			--	--	--	[illegible]	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]
B. OPERATING COST														
(a) Staff Salaries (Including Allowances)														
Pump Operator	man year	[illegible]	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
Fee Collector	man year	[illegible]	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
Per diem	lump sum		--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
Uniforms	lump sum		--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]		--
Sub-total (a)			--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
** (b) Vehicle Operating 4/														
Pump Operating 3/	per pump hours'use	[illegible]	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (b)			--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
** (c) Maintenance and Miscellaneous														
Construction (5% of capital cost)	lump sum		--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
Sub-total (c)			--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
TOTAL OPERATING COST (B)			--	--	--	--	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
GRAND TOTAL (A & B) MRA AS GRANT			--	--	--	[illegible]	--	[illegible]	--	[illegible]	--	[illegible]	[illegible]	[illegible]
GRAND TOTAL			--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GRAND TOTAL			--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--

1/ For 20 boreholes in project area plus 2 reserve pumps and engines.
2/ Vehicles and their operation are provided by MRA Field Headquarters (See Table 6).
3/ 2.5 hours per pump and per year. 16 pumps operationed during project year 3, 32 pumps operationed during year 4 and onwards.

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[illegible]

[illegible]

[illegible] DEVELOPMENT - [illegible] 1/

[illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	[illegible] Percent	[illegible] Cost
A. CAPITAL COST														
(a) Construction 2/														
Regional Facilities	lump sum		--	--		4,744.0	--	--	--			4,744.0	(50%)	[illegible]
District Facilities	lump sum		--	4,481.4		4,481.4	--	--	--			[illegible]	(50%)	[illegible]
Local Type Houses	each	1.0	--	(1.0) 96.0	(30) 90.0	--	--	--	--		(1.0) 186.0			--
Sub-total (a)			--	4,577.4	4,577.4	--	--	--				[illegible]	(50%)	[illegible]
(b) Vehicles														
Four-wheel-drive Lorry, 5 tons	each	116.0	--	(1) 68.0	--	--	--	--			(1) 68.0		(70%)	[illegible]
Four-wheel-drive-Pick-up	each	77.0	--	(15) 1,155.0	--	--	--	--			(15) 1,155.0		(70%)	[illegible]
Spare Parts (5% of vehicle cost)	lump sum		--	[illegible]	--	--	--	--				[illegible]	(70%)	[illegible]
Sub-total (b)			--	[illegible]	--	--	--	--				[illegible]	(70%)	[illegible]
(c) Equipment and Furniture														
Regional Offices and Stores	lump sum		--	[illegible]	--	--	--	--				[illegible]	(50%)	[illegible]
Regional Staff Houses	lump sum		--	[illegible]	--	--	--	--				[illegible]	(50%)	[illegible]
Regional Workshops	lump sum		--	[illegible]	--	--	--	--				[illegible]	(50%)	[illegible]
District Offices and Stores	lump sum		--	[illegible]	--	--	--	--				[illegible]	(50%)	[illegible]
District Staff Houses	lump sum		--	[illegible]	--	--	--	--				[illegible]	(50%)	[illegible]
Camp Equipment, Class A	set	4.0	--	(1) [illegible]	--	--	--	--			(1) [illegible]		(70%)	[illegible]
Camp Equipment, Class B	set	3.0	--	(12) [illegible]	--	--	--	--			(12) [illegible]		(70%)	[illegible]
Needle Tachometer	each	10.0	--	(3) 30.0	--	--	--	--			(3) 30.0		(70%)	[illegible]
Mobile Generator	each	5.0	--	(3) 15.0	--	--	--	--			(3) 15.0		(70%)	[illegible]
Sub-total (c)			--	[illegible]	--	--	--	--				[illegible]	(50%)	[illegible]
(d) Professional Services														
Construction and Tender Fees (10%)	lump sum		[illegible]	--	--	--	--	--	--			[illegible]		--
Procurement Fees (2.5%)	lump sum		--	[illegible]	--	--	--	--	--			[illegible]	(100%)	[illegible]
Sub-total (d)			[illegible]	[illegible]	--	--	--	--				[illegible]	(7%)	[illegible]
TOTAL CAPITAL COST (A)			[illegible]	[illegible]	[illegible]	--	--	--				[illegible]	(50%)	[illegible]

1/ Excluding non-formal training component. Total construction and construction related costs (Equipment, Furniture, Maintenance and Utilities) of the 8NA Regional and District Centres have been split by between Range Development (Table 6) and Training (Table 7) in the ratio of 2/3 to 1/3.

2/ Details see Annex 6, Appendix II

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Transfer Budget	Transfer Budget Cost
* Operating Costs														
(a) Staff Salaries (including allowances)														
Regional Range Director	man year	[illegible]	--	(1.5) [illegible]	(1) 66.6	(1) 66.6	(1) 66.6	(1) 66.6	(1) 66.6	[illegible]	(1.5) [illegible]		--
Regional Range Officer	man year	[illegible]	--	(1.5) 33.3	(1) 66.6	(1) 66.6	(1) 66.6	(1) 66.6	(1) 66.6	[illegible]	(1.5) [illegible]		--
Regional Range Assistant	man year	14.5	--	(1.5) 21.8	(1) 43.5	(1) 43.5	(1) 43.5	(1) 43.5	(1) 43.5	[illegible]	(1.5) [illegible]		--
District Range Assistant	man year	14.5	--	(6) 87.0	(12) 174.0	(12) 174.0	(12) 174.0	(12) 174.0	(12) 174.0	[illegible]	(54) [illegible]		--
Range Assistant	man year	8.1	--	(6) 48.6	(24) 216.8	(48) [illegible]	(72) 504.2	(72) 97.2	[illegible]	[illegible]	(156) [illegible]		--
Administrative Officer	man year	19.8	--	(1.5) 29.7	(1) 59.4	(1) 59.4	(1) 59.4	(1) 59.4	(1) 59.4	[illegible]	(13.5) [illegible]		--
Accounts Clerk	man year	10.6	--	(1.5) 15.9	(15) 159.0	(15) 159.0	(15) 159.0	(15) 159.0	(15) 159.0	[illegible]	(64.5) 651.0		--
Clerk/Typist	man year	8.7	--	(1.5) 13.0	(1) 26.1	(1) 26.1	(1) 26.1	(1) 26.1	(1) 26.1	[illegible]	[illegible]		--
Clerk	man year	7.8	--	(6) 43.8	(12) 86.4	(12) 86.4	(12) 86.4	(12) 86.4	(12) 86.4	[illegible]	[illegible]		--
Storekeeper	man year	8.1	--	--	(1) 26.1	(1) 26.1	(1) 26.1	(1) 26.1	(1) 26.1	[illegible]	[illegible]		--
Store man	man year	7.6	--	(6) 45.6	(15) 105.0	(15) 105.0	(15) 105.0	(15) 105.0	(15) 105.0	[illegible]	[illegible]		--
Driver	man year	7.0	--	(9) 63.0	(18) 126.0	(18) 126.0	(18) 126.0	(18) 126.0	(18) 126.0	[illegible]	[illegible]		--
Radio Operator	man year	7.0	--	--	(1) 21.0	(1) 21.0	(1) 21.0	(1) 21.0	(1) 21.0	[illegible]	[illegible]		--
Semi-skilled Laborer	man year	4.3	--	(4.5) 19.4	(30) 129.0	(30) 129.0	(30) 129.0	(30) 129.0	(30) 129.0	[illegible]	[illegible]		--
Messenger/Watchman	man year	3.7	--	(6) 22.2	(15) 55.5	(15) 55.5	(15) 55.5	(15) 55.5	(15) 55.5	[illegible]	[illegible]		--
Per diem	lump sum		--	53.9	107.9	[illegible]	[illegible]	[illegible]	[illegible]	347.1			--
Uniforms	lump sum		--	11.5	23.0	23.0	23.0	23.0	23.0	115.5	([illegible])	[illegible]	
Sub-total (a)			--	537.6	1,331.7	1,747.7	1,804.5	1,328.5		[illegible]	(18)	[illegible]	
** (b) Vehicle Operating														
Four-wheel-drive Jeep (3)	per km'000	1.9	--	(70) 133.0	(70) 133.0	(70) 133.0	(70) 133.0	(70) 133.0	(70) 133.0	[illegible]	(280) [illegible]		[illegible]
Four-wheel-drive Pick-up (15)	per km'000	1.6	--	(375) [illegible]	(375) 252.0	(375) 252.0	(375) 252.0	(375) 252.0	(375) 252.0	[illegible]	(1,500) [illegible]		[illegible]
Sub-total (b)				385.1	667.5	667.5	667.5	667.5		[illegible]	(2,500)	[illegible]	
** (c) Maintenance and Utilities														
Buildings (5% of capital cost)	lump sum		--	112.9	638.8	638.8	638.8	638.8		[illegible]	(638)	[illegible]	
Equipment and Furniture (10% of capital cost)	lump sum		--	97.8	195.2	195.2	195.2	195.2		[illegible]	(488)	[illegible]	
Sub-total (c)			--	210.3	833.3	833.3	833.3	833.3		[illegible]	(638)	[illegible]	
TOTAL OPERATING COSTS (b)			--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(3,138)	[illegible]	
GRAND TOTAL (A & B) NET OF TAXES			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(4,638)	[illegible]	
INCOME TAXES			--	25.3	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	--	--	
GRAND TOTAL			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(4,638)	[illegible]	

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[illegible]

[illegible]

[illegible] : [illegible]
[illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Years 1 - 6 Total Units	Years 1 - 6 Total Cost	Inflation Factor	Inflation Cost
• CAPITAL COST																
(a) Construction 1/																
Office Building - Mogitoko	lump sum			--		--		[illegible]		--		--		[illegible]	[illegible]	[illegible]
Regional Facilities	lump sum			--		--		[illegible]		--		--		[illegible]	[illegible]	[illegible]
District Facilities	lump sum			--	(4)	[illegible]		[illegible]		--		--	(4)	[illegible]	[illegible]	[illegible]
Staff Houses - Mogitoko, Class A	each	[illegible]		--	(2)	[illegible]		--		--		--	(2)	[illegible]	[illegible]	[illegible]
Staff Houses - District Center, Small Type	each	1.0		--	(7)	[illegible]	(7)	[illegible]		--		--	(14)	[illegible]		--
Sub-total (a)				--		[illegible]		[illegible]		--		--		[illegible]	[illegible]	[illegible]
(b) Vehicles and Machinery																
Four-wheel drive Station Wagon	each	[illegible]	(1)	[illegible]	(5)	[illegible]		--		--	(1)	[illegible]		--		--
" " " Pick-up	each	77.0		--	(12)	[illegible]		--		--		--	(12)	[illegible]	[illegible]	[illegible]
Tractor	each	7.0	(1)	7.0	(1)	7.0		--		--		--	(2)	[illegible]	[illegible]	[illegible]
Bulldozer	each	3.0	(1)	3.0	(3)	15.0		--		--		--	(4)	[illegible]	[illegible]	[illegible]
Spare Parts (3% of vehicle cost)	lump sum			[illegible]		[illegible]		--		--		[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (b)				[illegible]		[illegible]		--		--		[illegible]		[illegible]	[illegible]	[illegible]
(c) Equipment and Furniture																
For Mogitoko Office Building	lump sum			--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
For Mogitoko Staff Houses	lump sum			--	(2)	[illegible]		--		--		--	(2)	[illegible]	[illegible]	[illegible]
For Regional Offices and Stores	lump sum			--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
For Regional Staff Houses	lump sum			--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
For District Offices and Stores	lump sum			--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
For District Staff Houses	lump sum			--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
Training Equipment:																
Electronic Stencil Cutter	each	[illegible]		--	(2)	[illegible]		--		--		--	(2)	[illegible]	[illegible]	[illegible]
Automatic Voltage Stabilizer, [illegible] watt	each	[illegible]		--	(4)	[illegible]		--		--		--	(4)	[illegible]	[illegible]	[illegible]
[illegible] glicator	each	[illegible]		--	(5)	[illegible]		--		--		--	(5)	[illegible]	[illegible]	[illegible]
Typewriter, long carriage	each	[illegible]		--	(1)	[illegible]		--		--		--	(1)	[illegible]	[illegible]	[illegible]
Typewriter, normal carriage	each	[illegible]		--	(4)	[illegible]		--		--		--	(4)	[illegible]	[illegible]	[illegible]
Splicer	each	[illegible]		--	(1)	[illegible]		--		--		--	(1)	[illegible]	[illegible]	[illegible]
Film Projector, 16 mm with screen	each	[illegible]		--	(4)	[illegible]		--		--		--	(4)	[illegible]	[illegible]	[illegible]
Strip/Slide Projector, 35 mm	each	[illegible]		--	(4)	[illegible]		--		--		--	(4)	[illegible]	[illegible]	[illegible]
Camera, 35 mm including 8x8 mm, 50 mm, and 28 mm lenses	each	[illegible]		--	(1)	[illegible]		--		--		--	(1)	[illegible]	[illegible]	[illegible]
Tape Recorder, Cassette, portable	each	[illegible]		--	(4)	[illegible]		--		--		--	(4)	[illegible]	[illegible]	[illegible]
Camp Equipment, Class A	set	[illegible]	(8)	[illegible]		--		--		--		--	(8)	[illegible]	[illegible]	[illegible]
" " Class B	set	[illegible]	(30)	[illegible]		--		--		--		--	(30)	[illegible]	[illegible]	[illegible]
[illegible] KW Motor Generator (portable)	each	[illegible]		--	(4)	[illegible]		--		--		--	(4)	[illegible]	[illegible]	[illegible]
Bearing Board	each	[illegible]		--	(2)	[illegible]		--		--		--	(2)	[illegible]	[illegible]	[illegible]
Training Stationery, Stencils	lump sum			--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
Sub-total (c)				[illegible]		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
(d) Professional Services																
Construction and Tender Fees (14%)				[illegible]		--		--		--		--		[illegible]		--
Procurement Fees (2.5%)				[illegible]		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
Production of Educational Film				--		--		[illegible]		--		--		[illegible]	[illegible]	[illegible]
Visiting Consultants (Supervision)	man months	[illegible]		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Sub-total (d)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COST (A)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]

1/ Details see Annex 16. Total construction and construction related costs in the districts and regions have been split up between Range Development (Table 6) and Training (Table 7) in the ratio of 2/3 to 1/3

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Years 1 - 5 Total Units	Years 1 - 5 Total Cost	Interest Income	Balance End
A. [illegible]																
(a) Staff Salaries (Including Allowances)																
(i) Headquarters Staff:																
Adult Education Officer (Livestock & Range)	man year	[illegible]		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(5)	[illegible]	(100%)	[illegible]
Range Training Officer	man year	[illegible]	(0.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]	(100%)	[illegible]
Range Training Officer (Counterpart)	man year	[illegible]	(0.5)	[illegible]	(1)	[illegible]	(2)	[illegible]	(2)	[illegible]	(2)	[illegible]	(9.5)	[illegible]		--
Pastoral Training Advisor	man year	[illegible]	(0.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(5.5)	[illegible]		--
Audio-visual Technician	man year	[illegible]		--		--		--	(2)	[illegible]	(2)	[illegible]	(4)	[illegible]		--
Production Typist	man year	[illegible]		--		--		--	(2)	[illegible]	(2)	[illegible]	(4)	[illegible]		--
Translator	man year	[illegible]		--		--		--	(1)	[illegible]	(1)	[illegible]	(3)	[illegible]		--
Driver	man year	[illegible]	(0.5)	[illegible]	(0)	[illegible]	(3)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
Storekeeper (Audio-visual Dept.)	man year	[illegible]		--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Assistant Storekeeper	man year	[illegible]		--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Cleaner	man year	[illegible]		--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
(ii) Regional R.D. Staff:																
Range Education Officer	man year	[illegible]		--		--	(1.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
Production Typist	man year	[illegible]		--		--	(1.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
Driver	man year	[illegible]		--		--	(1.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
Assistant Storekeeper	man year	[illegible]		--		--	(1.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
Cleaner	man year	[illegible]		--		--	(1.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
Audio-visual Technician	man year	[illegible]		--		--	(1.5)	[illegible]	(1)	[illegible]	(1)	[illegible]	(4.5)	[illegible]		--
(iii) District Staff:																
Range Director	man year	[illegible]		--		--	(6)	[illegible]	(12)	[illegible]	(12)	[illegible]	(42)	[illegible]		--
Driver	man year	[illegible]		--		--	(6)	[illegible]	(12)	[illegible]	(12)	[illegible]	(42)	[illegible]		--
Cleaner	man year	[illegible]		--		--	(6)	[illegible]	(12)	[illegible]	(12)	[illegible]	(42)	[illegible]		--
Per diem	lump sum			[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		--
Uniforms	lump sum			[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	(100%)	[illegible]
Sub-total (a)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
(b) Vehicle Operation																
Four-wheel-drive Vehicles	per veh'mth	[illegible]	([illegible])	[illegible]	([illegible])	[illegible]	([illegible])	[illegible]	(10[illegible])	[illegible]	(10[illegible])	[illegible]	([illegible])	[illegible]	(100%)	[illegible]
Sub-total (b)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	(100%)	[illegible]
(c) Maintenance and Utilities																
Buildings (5% of capital cost)	lump sum			--		--		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
Furniture and Equipment (10% of capital cost)	lump sum			--		--		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (c)				--		--		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
(d) Miscellaneous Operating Costs																
Rent of Staff Houses		[illegible]	(0.5)	[illegible]	(1)	[illegible]		--		--		--	(1.5)	[illegible]		--
Educational Production Materials and Stationery	lump sum			--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	(100%)	[illegible]
Educational Tours and Visits	lump sum			--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		--
Per diem for Seminars and Short Courses	lump sum			--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		--
Sub-total (d)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
TOTAL OPERATING COST (B)				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
GRAND TOTAL (A & B) NET OF TAXES				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
INCOME TAXES				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	--	--
GRAND TOTAL				[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]

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[illegible]

	Unit	Unit Cost	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A. CAPITAL COST														
(a) Construction														
Staff House - Nigeria, Class A	each	[illegible]	--	(1)	[illegible]	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
Sub-total (a)			--		[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
(b) Vehicles and Machinery														
Four-wheel-drive Lorry, 3 ton, for Afgoi School	each	[illegible]		(1)	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
Four-wheel-drive Station Wagon, 1ton	each	[illegible]	[illegible]	(1)	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Trailer	each	[illegible]	[illegible]	(1)	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Bulldozer	each	[illegible]	[illegible]	(1)	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Spare Parts (10% of vehicle cost)	lump sum		[illegible]		[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (b)			[illegible]		[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
(c) Equipment and Furniture														
For Class A Staff House	lump sum	[illegible]	[illegible]	(1)	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
★ Tools, Equipment & Books for Range Extension & Instructors	lump sum		--		--	50.0	--	--	--		[illegible]	[illegible]	[illegible]
Books for Animal and Forestry Courses	lump sum		--		--	50.0	--	--	--		[illegible]	[illegible]	[illegible]
★ Camp Equipment, Class A													
★ Class C	lump sum	[illegible]	[illegible]	(1)	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (c)			[illegible]		[illegible]	[illegible]	--	--	--		[illegible]	[illegible]	[illegible]
(d) Professional Services and Fellowships													
Identification and Tender Fees (10%)	lump sum		[illegible]		--	--	--	--	--		[illegible]	[illegible]	[illegible]
★ Procurement Fees (0.5%)	lump sum		[illegible]		--	--	--	--	--		[illegible]	[illegible]	[illegible]
★ Postgraduate Training in Range Management	man year	[illegible]	[illegible] 1/	(1)	[illegible]	--	--	--	--	(20)	[illegible]	[illegible]	[illegible]
★ Pre-Field Training	man year	[illegible]	--	(1.5)	[illegible]	--	--	--	--	(1.5)	[illegible]	[illegible]	[illegible]
Sub-total (d)			[illegible]		[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COST (A)			[illegible]		[illegible]	[illegible]	--	--	--		[illegible]	[illegible]	[illegible]
B. RECURRENT COST													
(a) Staff Salaries (Including Allowances)													
(i) Faculty of Agriculture:													
★ Range Instructor	man year	[illegible]	[illegible]	(1)	[illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(2.5)	[illegible]	[illegible]	[illegible]
Driver	man year	[illegible]	[illegible]	(1)	[illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(2.5)	[illegible]	[illegible]	--
(ii) Afgoi School:													
★ Lecturer (Range Management)	man year	[illegible]	--		--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
" (Animal Husbandry)	man year	[illegible]	--		--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
" (Forestry)	man year	[illegible]	--		--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Driver	man year	[illegible]	--		--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	--
Per diem	lump sum		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	--	--
Uniforms	lump sum		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (b)			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
(c) Vehicle Operating													
Lorry (1)	per km/mo	[illegible]	--		--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Four-wheel-drive Bulldozer (1)	per km/mo	[illegible]	[illegible]	(1)	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(45)	[illegible]	[illegible]	[illegible]
Sub-total (c)			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
(d) Maintenance and Utilities													
Buildings (3% of capital cost)	lump sum		--		--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Furniture (10% of capital cost)	lump sum		--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Equipment (10% of capital cost)	lump sum		--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (d)			--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
(e) Miscellaneous Operating Costs													
★ Books, Textbooks, Periodicals for Faculty of Agriculture	lump sum		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Per diem for Students' Field Trips	lump sum	[illegible]	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Rent of Staff House	each	[illegible]	[illegible]	(0.5)	[illegible]	--	--	--	--	(1.5)	[illegible]		--
Sub-total (e)			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
TOTAL OPERATION COST (B)			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
GRAND TOTAL (A & B)[illegible] OF [illegible]			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
GRAND TOTAL			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible] TOTAL			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		
			[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]

1/ The fellowships start already in the project preparation period and are financed under Project Preparation Facility.

March 25, 1970

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CENTRAL BANGLADESH DEVELOPMENT PROJECT

SUMMARY AND DETAIL - [illegible] BANGLADESH INVESTIGATIONS

[illegible] 1979 [illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Foreign Exchange	Local Cost
A. CAPITAL COST														
Professional Services														
Resource Inventory	Lump sum			1,[illegible]	--	--	--	--	--	--		1,[illegible]	(Local)	1,[illegible]
Landsat Frames	Lump sum			[illegible]	--	--	--	--	--	--		[illegible]	(Local)	[illegible]
TOTAL CAPITAL COST (A)				1,[illegible]	--	--	--	--	--	--		1,[illegible]	(Local)	1,[illegible]
B. OPERATING COST				--	--	--	--	--	--	--		--		--
GRAND TOTAL (A & B) 1/				1,[illegible]	--	--	--	--	--	--		1,[illegible]	(Local)	1,[illegible]

1/ Other related costs are borne by the Northern Bangladesh Development Project (NBDP)/Kuwait Fund.

March 23, 1979

[illegible]

[illegible]

[illegible]

			Year 1		Year 2		Year 3		Years 1 - 6			
	Units	Unit Cost	Units	Cost	Units	Cost	Units	Cost	Total Units	Total Cost	Foreign Exchange	Exchange Cost
A. CAPITAL COST												
(a) Construction			--	--	--	--	--	--		-		--
(b) Vehicles and Machinery												
Four-wheel-drive Station Wagon	each	[illegible]	--	(1) [illegible]	--	--	--	--	(1)	[illegible]	(50%)	[illegible]
Bulldozer (140 H.P.) with hydraulic ripper	each	[illegible]	--	(1) [illegible]	--	--	--	--	(1)	[illegible]	(85%)	[illegible]
Spare Parts (10% of vehicle & machinery cost)	lump sum		--	[illegible]	--	--	--	--		[illegible]	(50%)	[illegible]
Sub-total (b)			--	[illegible]	--	--	--	--		[illegible]	(50%)	[illegible]
(c) Equipment and Furniture												
Furniture for Senior Staff House, Class A	lump sum	[illegible]	--	(1) [illegible]	--	--	--	--	(1)	[illegible]	(50%)	[illegible]
Secretariat	each	[illegible]	--	(1) [illegible]	--	--	--	--	(1)	[illegible]	(50%)	[illegible]
Nursery Equipment	lump sum		--	[illegible]	--	--	--	--	(1)	[illegible]	(50%)	[illegible]
Seeding Material	sacks	[illegible]	--	(1) [illegible]	--	--	--	--	(1)	[illegible]	(50%)	[illegible]
Sundry Tools	set	[illegible]	--	(1) [illegible]	--	--	--	--	(1)	[illegible]	(50%)	[illegible]
Sub-total (c)			--	[illegible]	--	--	--	--		[illegible]	(50%)	[illegible]
(d) Professional Services												
Pavement Fee (2.5%)	lump sum		--	[illegible]	--	--	--	--		[illegible]	(100%)	[illegible]
Sub-total (d)			--	[illegible]	--	--	--	--		[illegible]	(100%)	[illegible]
TOTAL CAPITAL COST (A)			--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
B. OPERATING COST			--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
(a) Staff Salaries (including Allowances)												
Nursery Specialist	man year	[illegible]	--	--	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1)	[illegible]	(100%)	[illegible]
Range Officer (Secretin)	man year	[illegible]	--	--	(3) [illegible]	(3) [illegible]	(3) [illegible]	(3) [illegible]	(3)	[illegible]		--
Driver	man year	[illegible]	--	--	(3) [illegible]	(3) [illegible]	(3) [illegible]	(3) [illegible]	(3)	[illegible]		--
[illegible] Worker (Cash Wage)	man year	[illegible]	--	--	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1)	[illegible]		--
Per diem	lump sum		--	--	(150) [illegible]	(150) [illegible]	(150) [illegible]	(150) [illegible]	(600)	[illegible]		
Uniforms	lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		--
Sub-total (a)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(100%)	[illegible]
(b) Vehicle and Machinery Operation												
Four-wheel-drive Vehicle (1)	per km*year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]
Bulldozer	per hour*year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(50%)	[illegible]
Sub-total (b)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
(c) Maintenance and Insurance												
Furniture (10% of capital cost)	lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(100%)	[illegible]
Equipment (10% of capital cost)	lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
Sub-total (c)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
(d) Miscellaneous Operating Costs												
Rent of Staff House, Class A	rent year	[illegible]	--	--	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1)	[illegible]		--
M & R - Buildings	rent year	[illegible]	--	--	(150) [illegible]	(150) [illegible]	(150) [illegible]	(150) [illegible]	(600)	[illegible]	(50%)	[illegible]
Sub-total (d)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
TOTAL OPERATING COST (B)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
GRAND TOTAL (A & B) MK OF TAXES			--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
[illegible] TAXES			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	(50%)	[illegible]
GRAND TOTAL			--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	--	[illegible]

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[illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Inflation Factor	Inflation Cost
A. CAPITAL COST												
(a) Construction												
Staff House, Class A 1/	each		--	--	--	--	--	--		--		--
(b) Vehicles												
Four-wheel-drive Jeep, 3 ton	each	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
Four-wheel-drive Station Wagon, AWD	each	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
Fitting of Truck	set	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
Spare Parts (5% of vehicle cost)	lump sum		--	--		[illegible]	--	--	--	[illegible]	(7.8)	[illegible]
Sub-total (b)			--	--		[illegible]	--	--	--	[illegible]	(7.8)	[illegible]
(c) Equipment and Furniture												
Furniture for Senior Staff House (Tanamalat)	lump sum	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
Refrigerator, portable	each	[illegible]	--	--	(2)	[illegible]	--	--	--	(2) [illegible]	(7.8)	[illegible]
★ Camp Equipment, Class A	set	[illegible]	--	--	(4)	[illegible]	--	--	--	(4) [illegible]	(7.8)	[illegible]
★ " " Class C	set	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
★ Miscellaneous Scientific Equipment	lump sum	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
★ Drums, 200 litres	each	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
★ Analysis Laboratory Equipment	lump sum	[illegible]	--	--	(3)	[illegible]	--	--	--	(3) [illegible]	(7.8)	[illegible]
★ Agricultural Machinery	lump sum	[illegible]	--	--		--	(1) [illegible]	--	--	(1) [illegible]	(7.8)	[illegible]
★ Fitting of Herbarium	lump sum	[illegible]	--	--	(1)	[illegible]	--	--	--	(1) [illegible]	(7.8)	[illegible]
Sub-total (c)			--	--		[illegible]	(1) [illegible]	--	--	(1) [illegible]	(7.8)	[illegible]
(d) Professional Services												
★ Procurement Fee (2.5%)	lump sum		--	--		[illegible]	--	--	--	[illegible]	(10.0)	[illegible]
Preparation and Supervision Fee	man months	[illegible]	--	--		--	(1.5) [illegible]	--	(1.5) [illegible]	(1.5) [illegible]	(10.0)	[illegible]
Sub-total (d)			--	--		[illegible]	[illegible]	--	[illegible]	[illegible]	(10.0)	[illegible]
TOTAL CAPITAL COST (A)			--	--		[illegible]	[illegible]	--	[illegible]	[illegible]	(10.0)	[illegible]
B. OPERATING COSTS												
(a) Staff Salaries (including Allowances)												
★ Range Ecologist (1)	man year	[illegible]	--	--		--	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(10.0)	[illegible]
Range Ecologist (Counterpart)	man year	[illegible]	--	--		--	(0.5) [illegible]	(1) [illegible]	(1) [illegible]	(1.5) [illegible]		--
★ Tanamalat	man year	[illegible]	--	--	(0.5)	[illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(3.5) [illegible]	(10.0)	[illegible]
Tanamalat (Counterpart)	man year	[illegible]	--	--		--	(1) [illegible]	(1) [illegible]	(1) [illegible]	(3) [illegible]		--
Driver	man year	[illegible]	--	--		--	(1) [illegible]	(2) [illegible]	(2) [illegible]	(3) [illegible]		--
Per diem	lump sum		--	--		--	[illegible]	[illegible]	[illegible]	[illegible]		--
Uniforms	lump sum		--	--		--	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
Sub-total (a)			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
★ (b) Vehicle operating												
Jeep (1)	per km'000	[illegible]	--	--		--	(10) [illegible]	(20) [illegible]	(20) [illegible]	(50) [illegible]	(10.0)	[illegible]
Four-wheel-drive Vehicle (1)	per km'000	[illegible]	--	--		--	(10) [illegible]	(20) [illegible]	(20) [illegible]	(50) [illegible]	(10.0)	[illegible]
Sub-total (b)			--	--		--	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
★ (c) Maintenance and Utilities												
Staff House (5% of capital cost)	lump sum	[illegible]	--	--	(0.5)	[illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(3.5) [illegible]	(7.8)	[illegible]
Furniture (10% of capital cost)	lump sum	[illegible]	--	--	(0.5)	[illegible]	(1.5) [illegible]	(3) [illegible]	(3) [illegible]	(8) [illegible]	(10.0)	[illegible]
Equipment (10% of capital cost)	lump sum		--	--		--	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
Sub-total (c)			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
★ (d) Miscellaneous Operating Cost												
Rent of Staff House (Tanamalat)	each	[illegible]	--	--	(0.5)	[illegible]	(1) [illegible]	(1) [illegible]	(1) [illegible]	(1.5) [illegible]		--
Sub-total (d)			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
TOTAL OPERATING COST (B)			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
GRAND TOTAL (A & B) BEF OF TAXES			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
[illegible]			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]
GRAND TOTAL			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		--
			--	--		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	(10.0)	[illegible]

1/ Expatriate Range Ecologists will use the houses and furniture of the leaving Range Ecologists of the Range Monitoring Team. The expatriate Tanamalat will use a rented house.

[illegible]

CENTRAL [illegible] DEVELOPMENT PROJECT

[illegible] - [illegible], [illegible] AND [illegible]
[illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Years 1 - 6 Total Units	Years 1 - 6 Total Cost	Foreign Exchange Percent	Foreign Exchange Cost
A. CAPITAL COST																
(a) Construction																
Staff House, Class A	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
Sub-total (a)				--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
(b) Vehicles and Machinery																
Four-wheel-drive Station Wagon	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
Spare Parts (15% of vehicle cost)	lump sum		--	--		[illegible]	--	--	--	--	--	--		[illegible]	[illegible]	[illegible]
Tractor, 65 H.P.	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Spare Parts (15% of tractor cost)	lump sum		--	--		[illegible]	--	--	--	--	--	--		[illegible]	[illegible]	[illegible]
* Plow Plough	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Land Levelier	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Four-wheeled Tractor Trailer	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
Sub-total (b)				--		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
(c) Equipment and Furniture																
Furniture for Staff House (incl)	lump sum	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Sprayhand	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* 10 m³ Silo	each	[illegible]	--	--		--	--	--	(1)	[illegible]	--	--	(1)	[illegible]	[illegible]	[illegible]
* Camp Equipment, Class A	set	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Class B	set	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Drum, 200 liters	each	[illegible]	--	--	(10)	[illegible]	--	--	--	--	--	--	(10)	[illegible]	[illegible]	[illegible]
* Hand Tools	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
* Weatherstrip	each	[illegible]	--	--	(20)	[illegible]	--	--	--	--	--	--	(20)	[illegible]	[illegible]	[illegible]
* Surveyor's Level	each	[illegible]	--	--	(1)	[illegible]	--	--	--	--	--	--	(1)	[illegible]	[illegible]	[illegible]
Sub-total (c)				--		[illegible]		--		[illegible]		--		[illegible]	[illegible]	[illegible]
(d) Professional Services																
Construction and Tender Fees (10%)	lump sum		[illegible]	--		--		--		--		--		[illegible]		--
* Procurement Fees (2.5%)	lump sum		--	[illegible]		--		--		--		--		[illegible]	[illegible]	[illegible]
Sub-total (d)				[illegible]		[illegible]		--		--		--		[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COSTS (A)				[illegible]		[illegible]		--		[illegible]		--		[illegible]	[illegible]	[illegible]

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Investment Recovered	Salvage Value
* Operating Cost														
(a) Staff Salaries (Including Allowances)														
* Soil and Water Conservation Specialist	man year	6[illegible].0	--	--	(1)	6[illegible].0	(1)	6[illegible].0		--	(4)	1,[illegible].0	([illegible])	1,[illegible].0
* Grazing Cooperative Advisor	man year	6[illegible].0	--	--		--		--	(1)	6[illegible].0	(3)	1,[illegible].0	(1[illegible])	1,[illegible].0
Range Ecologist	man year	1[illegible].5	--	--	(4)	3[illegible].0	(4)	3[illegible].0	(4)	3[illegible].0	(16)	[illegible]		--
Driver	man year	7.0	--	--	(1)	7.0	(1)	7.0	(1)	7.0	(4)	[illegible]		--
M F 9-Seater (Cash Wage)	man year	6.4	--	--	(30)	[illegible]	(80)	[illegible]	(30)	[illegible]	(30)	[illegible]		--
Per diem	lump sum		--	--		8.0		8.0		8.0		[illegible]		--
Uniforms	lump sum		--	--		0.8		0.8		0.8		3.2	(1[illegible])	[illegible]
Sub-total (a)			--	--		[illegible]		[illegible]		[illegible]		[illegible]	(8[illegible])	[illegible]
* (b) Vehicle and Tractor Operations														
Four-wheel-drive Vehicle (1)	per vehicle	1.4	--	--	(20)	28.0	(20)	28.0	(20)	28.0	(80)	[illegible]	(3[illegible])	[illegible]
Tractor and Equipment	per hours'[illegible]	18.0	--	--	(1.5)	27.0	(1.5)	27.0	(1.5)	27.0	(6)	108.0	(5[illegible])	[illegible]
Sub-total (b)			--	--		55.0		55.0		55.0		[illegible]	(9[illegible])	[illegible]
* (c) Maintenance and Utilities														
Staff House (5% of capital cost)	lump sum	7.5	--	--	(1)	7.5	(1)	7.5	(1)	7.5	(1)	30.0	(1[illegible])	[illegible]
Furniture (10% of capital cost)	lump sum	3.6	--	--	(1)	3.6	(1)	3.6	(1)	3.6	(1)	1[illegible].0	(1[illegible])	[illegible]
Equipment (10% of capital cost)	lump sum		--	--		11.5		11.5		11.5		46.0	(1[illegible])	[illegible]
Machinery (excluding tractor) (10% of capital cost)	lump sum		--	--		20.5		20.5		20.5		81.7	(1[illegible])	[illegible]
Sub-total (c)			--	--		44.4		44.4		44.4		[illegible]	(8[illegible])	[illegible]
(d) Miscellaneous Operating Costs														
M F 9-Seaters	man year	4.0	--	--	(30)	[illegible]	(100)	[illegible]	(100)	[illegible]	(300)	[illegible]	(1[illegible])	[illegible]
* Fertilizer and Seed	lump sum per site	4.5	--	--		--		--	(3)	13.5	(6)	27.0	(5[illegible])	[illegible]
Sub-total (d)			--	--		[illegible]		[illegible]		[illegible]		[illegible]	(2[illegible])	[illegible]
TOTAL OPERATING COST (a)			--	--		[illegible]		[illegible]		[illegible]		[illegible]	(8[illegible])	[illegible]
GRAND TOTAL (A & B) 50% OF TAXES			[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	(1[illegible])	[illegible]
INCOME TAXES			--	--		11.8		11.8		11.8		11.8	--	--
GRAND TOTAL			[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	(1[illegible])	[illegible]

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[illegible]

[illegible]

[illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Inflation Percent	Inflation Cost
A. CAPITAL COSTS														
(a) Construction 1/														
Diagnostic Laboratory and Extension on Existing House - Mirna	lump sum		--	--		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
House - Malaga	lump sum		--	--		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
Extension of Existing House in Quelgrand	lump sum		--	--		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
Staff House, Class A, Nogales	each	[illegible]	--	(1) [illegible]		--	--	--	--	(1)		[illegible]	[illegible]	[illegible]
Sub-total (a)			--	[illegible]		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
(b) Vehicles														
Four-wheel-drive Jeep, 3 ton	each	[illegible]	--	(1) [illegible]		--	--	--	--	(1)		[illegible]	[illegible]	[illegible]
Four-wheel-drive Pick-up	each	[illegible]	--	(24) [illegible]		--	--	--	--	(24)	[illegible]	[illegible]	[illegible]	[illegible]
Spare Parts (30% of vehicle cost)	lump sum		--	--		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
Sub-total (b)			--	[illegible]		--	--	--	--			[illegible]	[illegible]	[illegible]
(c) Equipment and Furniture														
Furniture for Staff Houses (1) 2/	lump sum	[illegible]	--	(1) [illegible]		--	--	--	--	(1)		[illegible]	[illegible]	[illegible]
Laboratory Equipment (diagnostic units)	set	[illegible]	--	(2) [illegible]		--	--	--	--	(2)		[illegible]	[illegible]	[illegible]
Refrigerator for Laboratories and Malaria Centers	each	[illegible]	--	(33) [illegible]		--	--	--	--	(33)		[illegible]	[illegible]	[illegible]
Pump Pressure for Laboratories	each	[illegible]	--	(1) [illegible]		--	--	--	--	(1)		[illegible]	[illegible]	[illegible]
Ice Boxes	each	[illegible]	--	(40) [illegible]		--	--	--	--	(40)		[illegible]	[illegible]	[illegible]
Veterinary Equipment for 6 Mobile Teams and 20 Mounted Clinics	set	[illegible]	--	(26) [illegible]		--	--	--	--	(26)		[illegible]	[illegible]	[illegible]
Camp Equipment, Class A	set	[illegible]	--	(1) [illegible]		--	--	--	--	(1)		[illegible]	[illegible]	[illegible]
" " Class C	set	[illegible]	--	(26) [illegible]		--	--	--	--	(26)		[illegible]	[illegible]	[illegible]
Additional Surgeons (2 per vehicle)	set	[illegible]	--	(47) [illegible]		--	--	--	--	(47)		[illegible]	[illegible]	[illegible]
Radio Transceiver	set	[illegible]	--	(12) [illegible]		--	--	--	--	(12)		[illegible]	[illegible]	[illegible]
Mobile Bips	each	[illegible]	--	--	(50)	[illegible]	--	--	--	(50)		[illegible]	[illegible]	[illegible]
Sub-total (c)			--	[illegible]		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
(d) Professional Services and Relationships														
Construction and Tender Fees (10%)	lump sum	[illegible]	[illegible]	--		--	--	--	--			[illegible]		--
Supervisory Fees (2.5%)	lump sum		--	[illegible]		--	--	--	--			[illegible]	[illegible]	[illegible]
Post-graduate Courses	lump sum	[illegible]	--	--		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
Sub-total (d)			[illegible]	[illegible]		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COST (A)			[illegible]	[illegible]		[illegible]	--	--	--			[illegible]	[illegible]	[illegible]

1/ Details see Annex 6, Appendix B1.

2/ One of the Staff houses will be rented.

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 4 Total Units	Years 1 - 4 Total Cost	Location Percent	Location Cost
b. Operations Cost														
(a) Staff Salaries (Including Allowances)														
Technical Director, Veterinary Services	man year	303.0	--	--	(1)	303.0	(1)	303.0	(1)	303.0	(4)	1,200.0	(100%)	1,200.0
Disease Investigation Officer	man year	303.0	--	--	(1)	303.0	(1)	303.0	(1)	303.0	(4)	1,200.0	(100%)	1,200.0
Pathologist	man year	303.0	--	--	(1)	303.0	(1)	303.0	(1)	303.0	(4)	1,200.0	(100%)	1,200.0
Senior Laboratory Technician	man year	303.0	--	--	(1)	303.0	(1)	303.0	(1)	303.0	(4)	1,200.0	(100%)	1,200.0
Laboratory Technician	man year	38.6	--	--	(1)	37.8	(1)	37.8	(1)	37.8	(1)	151.2		--
Driver	man year	7.0	--	--	(27)	189.0	(27)	189.0	(27)	189.0	(108)	756.0		--
Vaccinator	man year	5.4	--	--	(25)	135.0	(25)	135.0	(25)	135.0	(100)	540.0		--
Temporary Clinic Dispenser	man year	5.1	--	--	(25)	127.5	(25)	127.5	(25)	127.5	(100)	510.0		--
Per diem			--	--		110.7		110.7		110.7		442.8		--
Welfare			--	--		27.8		27.8		27.8		111.2	(100)	111.2
Sub-total (a)			--	--		1,812.0		1,812.0		1,812.0		7,248.2	(100)	7,248.2
(b) Vehicle Operating														
Four-wheel-drive Lorry (1)	per km'age	1.7	--	--	(72) (600)	1,224.0	(72) (600)	1,224.0	(72) (600)	1,224.0	(288) (2400)	4,896.0	(75%)	3,672.0
Four-wheel-drive Pick-up (24)	per km'age	1.4	--	--		840.0		840.0		840.0		3,360.0	(75%)	2,520.0
Sub-total (b)			--	--		2,064.0		2,064.0		2,064.0		8,256.0	(75%)	6,192.0
(c) Maintenance and Utilities														
Buildings (3% of capital cost)	lump sum		--	--		32.0		32.0		32.0		128.0	(50%)	64.0
Furniture (10% of capital cost)	lump sum		--	--		9.0		9.0		9.0		36.0	(50%)	18.0
Equipment (10% of capital cost)			--	--		23.6		23.6		23.6		94.4	(50%)	47.2
Sub-total (c)			--	--		64.0		64.0		64.0		256.0	(50%)	128.0
(d) Miscellaneous Operating Costs														
Operating Costs of Deep Freezers and Refrigerators	lump sum	15.0	--	--		15.0		15.0		15.0		60.0	(60%)	36.0
Office Running Cost	lump sum	15.0	--	--		15.0		15.0		15.0		60.0	(60%)	36.0
Vaccines and Instrumental Drugs	lump sum	500.0	--	--		500.0		500.0		500.0		2,000.0	(50%)	1,000.0
Sub-total (d)			--	--		530.0		530.0		530.0		2,120.0		1,072.0
TOTAL OPERATION COST (b)			--	--		3,370.0		3,370.0		3,370.0		13,480.2	(77%)	10,392.2
GRAND TOTAL (a & b) NET OF TAXES			184.0	4,608.3		5,182.0		5,182.0		5,182.0		20,728.2	(75%)	15,541.2
INLAND TAXES			--	--		32.2		32.2		32.2		128.8	--	--
GRAND TOTAL			184.0	4,608.3		5,214.2		5,214.2		5,214.2		20,856.4	(75%)	15,641.4

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[illegible]

[illegible]

[illegible] — Administration and Management
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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Years 1 - 6 Total Units	Years 1 - 6 Total Cost	Contingency Percent	Contingency Cost
A. Capital Costs														
(a) Construction														
Headquarters Office Building 1/	lump sum			--		--								
Staff Houses, Class A - Hughsiton 2/	each	149.5		--	(4)	598.0		1,344.5		1,344.5				
Sub-total (a)				--		598.0		1,344.5		1,344.5				
(b) Vehicles														
Four-wheel-drive Station Wagon	each	[illegible]	(4)	[illegible]	(1)	[illegible]		--		--				
Four-wheel-drive Pick-up	each	77.0		--		--		--	(4)	154.0				
Passenger Car	each	45.0	(1)	45.0		--		--		--				
Spare Parts (20% of vehicle cost)	lump sum			48.7		17.6		--		56.4				
Sub-total (b)				298.7		119.6		--		200.4				
(c) Equipment and Furniture														
Office Equipment	lump sum			--		--								
Furniture for New and Rented Staff Houses	set	29.9	(3)	89.7	(4)	59.8		300.4		--				
Camp Equipment, Class A	set	4.0	(4)	8.0	(1)	4.0		--		--				
" Class B	set	3.0	(2)	6.0	(1)	3.0		--		--				
Radio Equipment	set	15.0		--		--	(1)	12.0		--				
Forest Management Equipment	lump sum			--		--		--		--				
Sub-total (c)				103.7		66.8		305.4		--				
(d) Professional Services														
Construction and Tender Fees (10%)	lump sum			84.7		--		--		--				
Consultant Architect/Planner	man months	36.0		432.0		216.0		--		--				
Procurement Fees (2.5%)	lump sum			14.7		--		--		--				
Project Preparation	lump sum			--		--		21.1		--				
Sub-total (d)				511.4		216.0		21.1		1,050.0				
TOTAL CAPITAL COSTS (A)				[illegible]		[illegible]		[illegible]		[illegible]				

1/ Details see Annex 1, Appendix II

2/ Construction of Staff Houses for Project Coordinator, Technical Director - Range and Environment, Technical Director - Administration, and Financial Controller.

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Years 1 - 5 Total Units	Years 1 - 5 Total Cost	Foreign Exchange	Local Cost
B. OPERATION: STAFF																
(a) Staff Salaries (Including Allowances)																
Project Coordinator	man year	500.0	(0.5)	250.0	(1)	500.0	(1)	500.0	(1)	500.0	(1)	500.0	(1)	500.0	(5.5)	2,250.0	(100%)	2,250.0
* Technical Director - Range and Instrument	man year	650.0		--		--	(0.5)	325.0	(1)	650.0	(1)	650.0	(0.5)	325.0	(3)	1,950.0	(100%)	1,950.0
Technical Director - Forestry	man year	315.0		--		--	(1)	315.0	(1)	315.0	(1)	315.0	(1)	315.0		1,260.0	(100%)	1,260.0
Technical Director - Administration	man year	500.0	(0.5)	250.0	(1)	500.0	(1)	500.0	(1)	500.0	(0.5)	250.0		--	(4)	2,000.0	(100%)	2,000.0
Financial Controller	man year	500.0		--		--	(0.5)	250.0	(1)	500.0	(1)	500.0	(0.5)	250.0	(3)	1,500.0	(100%)	1,500.0
Agricultural Economist (Project Monitoring & Eval.)	man year	35.5		--		--		--	(1)	35.5	(1)	35.5	(1)	35.5	(4)	85.2		--
Driver	man year	7.0	(1)	7.0	(2.5)	17.5	(4)	28.0	(4)	28.0	(4)	28.0	(4)	28.0	(4)	136.5		--
Per diem	lump sum			1.6		4.0		6.4		9.6		9.6		9.6		40.8		--
Uniforms	lump sum			0.8		1.0		1.0		1.0		1.0		1.0		4.8	(100%)	0.0
Sub-total (a)				308.4		1,022.4		1,022.4		2,303.3		2,303.3		1,634.3		9,601.2	(92%)	
(b) Vehicle Operating																
Four-wheel-drive Vehicle	per km'000	1.4	(20)	28.0	(30)	42.0	(30)	70.0	(50)	70.0	(50)	70.0	(50)	70.0	(230)	322.0	(100%)	322.0
Passenger Car	per km'000	1.0	(10)	10.0	(20)	20.0	(20)	20.0	(20)	20.0	(20)	20.0	(20)	20.0	(110)	110.0	(100%)	110.0
Sub-total (b)				38.0		62.0		90.0		90.0		90.0		90.0		432.0	(100%)	432.0
(c) Maintenance and Utilities																
Buildings (5% of capital cost)	lump sum			--		--		30.9		104.1		102.4		102.4		339.8	(92%)	315.4
Furniture & Equipment (10% of capital cost)	lump sum			--		10.4		17.1		20.4		20.4		20.4		88.7	(92%)	81.2
Sub-total (c)				--		10.4		47.0		124.5		122.8		122.8		427.5	(92%)	396.6
(d) Miscellaneous Operating Costs																
Cost of Staff Houses	cost year	40.0	(1)	40.0	(1.5)	60.0	(1)	40.0	(1)	40.0	(1)	40.0	(1)	40.0	(6.5)	260.0		--
Sub-total (d)				40.0		60.0		40.0		40.0		40.0		40.0		260.0		--
TOTAL OPERATION COST (b)				387.4		1,122.8		1,096.4		2,561.3		2,557.3		1,837.3		11,338.8	(92%)	10,414.3
GRAND TOTAL (A & b) NET OF TAXES				1,000.3		2,036.3		4,369.4		3,613.9		3,711.3		3,711.3		18,322.4	(94%)	17,297.4
INCOME TAXES				1.5		3.3		2.8		11.8		11.8		11.8		51.2	--	--
GRAND TOTAL				1,001.8		2,039.3		4,372.0		3,625.3		3,723.1		3,723.1		18,373.6	(94%)	17,297.4

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[illegible]

[illegible]

[illegible]

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Years 1-5 Total Units	Years 1-5 Total Cost	Interior Reimbursement	Reimbursement Cost
A. CAPITAL COST																
(a) Construction																
Staff Bunkhouse, Class A	each	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (a)			--			--	--	--	--	--	--	--		[illegible]	[illegible]	[illegible]
(b) Vehicles																
Four-wheel-drive lorry, 5 ton	each	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Four-wheel-drive station wagon, [illegible]	each	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Four-wheel-drive pick-up	each	[illegible]	--	--	--	--	[illegible]	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Fitting of truck	lump sum	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Spare parts (1% of vehicle cost)	lump sum		--	[illegible]	--	--	--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
Sub-total (b)			--		--	[illegible]	--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
★ (c) Equipment and furniture 1/																
Camp Equipment Class A	set	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Class B	set	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Geological Equipment	set	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Cartographic Equipment	lump sum	[illegible]	--	[illegible]	[illegible]	--	[illegible]	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Spotting Pointer and Paper	each	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Detonators	each	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Photographic and Darkroom Equipment	lump sum	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Concrete Posts and Plaques	per hundred	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Refrigerator, portable	each	[illegible]	--	[illegible]	[illegible]	--	--	--	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (c)			--			--		[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
(d) Professional services																
Consultants and Senior Fees (10%)	lump sum		[illegible]	--	--	--	--	--	--	--	--	--		[illegible]		--
Retainement Fees (8.5%)	lump sum		--	[illegible]	--	--	--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
Sub-total (d)			[illegible]	[illegible]	--	--	--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COST (A)			[illegible]	[illegible]	--	[illegible]	--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
B. OPERATING COST																
(a) Staff Salaries (including allowances)																
★ Range Ecologist (Monitoring)	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Range Monitoring Officer (Counterpart)	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	--
Photo and Laboratory Technician	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	--
Drivers	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	--
Cook	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	--
Range Assistant	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--	--
Per diem	lump sum		--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	--	--
Subsums	lump sum		--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	--	--
Sub-total (a)			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
★ (b) Vehicle operating																
Lorry	per km/day	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Four-wheel-drive vehicle	per km/day	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (b)			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
★ (c) Maintenance and Utilities 1/																
Buildings (5% of Capital Cost)			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
Equipment and Furniture (10% of Capital Cost)			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (c)			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
TOTAL OPERATING COST (B)			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
GRAND TOTAL (A & B) NET OF TAXES			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Taxes			--	--		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]	[illegible]
GRAND TOTAL			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

1/ Functions of the Range Survey Team will be used from Table 3.

1/ Lorry and 4 station wagon taken over from Range Survey Team (see Table 3).

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[illegible]

** FROM PROJECT (649-0104)

	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Year 6 Units	Year 6 Cost	Years 1 - 6 Total Units	Years 1 - 6 Total Cost	Foreign Exchange Estimated	Foreign Exchange Cost
A CAPITAL COSTS																		
(a) Construction																		
Staff House, Class A	each	449.5	--	--	(1)	449.5	--	--	--	--	--	--	(1)	449.5		(449.5)		67.4
Sub-total (a)				--		449.5		--		--		--		449.5		(449.5)		67.4
(b) Vehicles and Machinery																		
(i) Drilling Section																		
** High Pressure Drill Rig	each	2,[illegible]	--	--	(1)	2,[illegible]	--	--	--	--	--	--	(1)	2,[illegible]		(2,[illegible])		[illegible]
** Drillhouse with Equipment	each	1,[illegible]	--	--	(1)	1,[illegible]	--	--	--	--	--	--	(1)	1,[illegible]		(1,[illegible])		1,[illegible]
** Mixer/Agitator	each	440.0	--	--	(1)	440.0	--	--	--	--	--	--	(1)	440.0		(440.0)		[illegible]
** Trailer with Roller	each	383.0	--	--	(1)	383.0	--	--	--	--	--	--	(1)	383.0		(383.0)		266.0
** Water Tanker	each	199.0	--	--	(1)	199.0	--	--	--	--	--	--	(1)	199.0		(199.0)		109.0
** Four-wheel-drive Lorry, 7 ton	each	143.0	--	--	(1)	143.0	--	--	--	--	--	--	(1)	143.0		(143.0)		130.0
** Four-wheel-drive Pick-up, 1/2 ton	each	77.0	--	--	(1)	154.0	--	--	--	--	--	--	(2)	154.0		(154.0)		[illegible]
** Spare Parts (5% of vehicles and machinery)	lump sum		--	--		1,310.7	--	--	--	--	--	--		1,310.7		(1,310.7)		1,[illegible]
Sub-total (i)			--	--		6,310.7	--	--	--	--	--	--		6,310.7		(6,310.7)		6,[illegible]
(ii) Maintenance Section																		
* Maintenance Truck with Cable Rig	each	85.0	--	--	--	--	--	85.0	--	--	(1)	85.0		85.0		(85.0)		[illegible]
* Parts Van	each	220.0	--	--	--	--	(2)	440.0	--	--	(2)	440.0		440.0		(440.0)		418.0
* Lump Truck	each	155.0	--	--	--	--	(1)	155.0	--	--	(1)	155.0		155.0		(155.0)		147.3
Four-wheel-drive Pick-up, 1/2 ton	each	77.0	--	--	--	--	(3)	231.0	--	--	(3)	231.0		231.0		(231.0)		219.4
* Machinery Trailer	each	60.0	--	--	--	--	(1)	60.0	--	--	(1)	60.0		60.0		(60.0)		57.0
* Concrete Mixer	each	93.5	--	--	--	--	(2)	187.0	--	--	(2)	187.0		187.0		(187.0)		177.6
* Spare Parts (5% of vehicles and machinery)	lump sum		--	--	--	--		265.4	--	--		265.4		265.4		(265.4)		240.9
Sub-total (ii)			--	--	--	--		2,467.4	--	--		2,467.4		2,467.4		(2,467.4)		2,[illegible]
(iii) Operations Section: Will use initially the vehicles of the Drilling Section.			--	--	--	--	--	--	--	--		--		--		--		--
Sub-total (b)			--	6,310.7	--	2,467.4	--	--	--	--		8,[illegible]		8,[illegible]		(8,[illegible])		8,[illegible]
(c) Equipment and Furniture																		
(i) Drilling Section																		
** House Furniture 1/	set	39.0	--	--	(1)	39.0	--	--	--	--	--	--	(1)	39.0		(39.0)		33.0
** Camp Equipment, Class A	set	8.0	--	--	(1)	8.0	--	--	--	--	--	--	(1)	8.0		(8.0)		7.6
** " " Class C	set	6.0	--	--	(1)	6.0	--	--	--	--	--	--	(1)	6.0		(6.0)		2.7
Sub-total (i)			--	--		53.0	--	--	--	--		--		53.0		(53.0)		43.3
(ii) Maintenance Section																		
* Camp Equipment, Class A	set	4.0	--	--	--	--	(1)	4.0	--	--	(1)	4.0		4.0		(4.0)		3.8
* " " Class C	set	6.0	--	--	--	--	(4)	24.0	--	--	(4)	24.0		24.0		(24.0)		22.8
* Small Tools	lump sum		--	--	--	--		65.0	--	--		65.0		65.0		(65.0)		61.8
* Fuel Drums	each	0.3	--	--	--	--	(4)	1.2	--	--	(4)	1.2		1.2		(1.2)		0.9
* Jerrycans	each	0.1	--	--	--	--	(4)	0.4	--	--	(4)	0.4		0.4		(0.4)		0.3
* Hand Fire Extinguisher	each	1.8	--	--	--	--	(1)	1.8	--	--	(1)	1.8		1.8		(1.8)		1.1
Sub-total (ii)			--	--	--	--		95.6	--	--		95.6		95.6		(95.6)		90.0
Sub-total (c)			--	53.0	--	95.6	--	--	--	--		148.6		148.6		(148.6)		133.3
(d) Professional Services																		
Construction and Tender Fees (10%)	lump sum		15.0	--	--	--	--	--	--	--		15.0						
* Procurement Fees (25%)	lump sum		--	100.8	--	55.4	--	--	--	--		172.2		172.2		(172.2)		172.2
Sub-total (d)			15.0	100.8	--	55.4	--	--	--	--		187.2		172.2		(172.2)		172.2
TOTAL CAPITAL COST (A)			15.0	7,[illegible]	--	3,[illegible]	--	--	--	--		9,[illegible]		9,[illegible]		(9,[illegible])		9,[illegible]

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	Unit	Unit cost	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]														
(a) Staff Salaries (Including Allowances)														
(i) Base Office														
* Chief of Water Service	man year	[illegible]	--	--	--	--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	(1[illegible])	
Technical Officer	man year	[illegible]	--	--	--	--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Administrative Officer	man year	[illegible]	--	--	--	--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Clerk/Typist	man year	[illegible]	--	--	--	--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Driver	man year	[illegible]	--	--	--	--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]		--
Per diem	lump sum		--	--	--	--		[illegible]		[illegible]		[illegible]		
Uniforms	lump sum		--	--	--	--		[illegible]		[illegible]		[illegible]	(1[illegible])	[illegible]
(ii) Drilling Section [1]														
** Hydrogeologist	man year	[illegible]	--	--	[illegible]	[illegible]		--		--	(1)	[illegible]	(1[illegible])	[illegible]
Hydrogeologist (Counterpart)	man year	[illegible]	--	--	--	(1)	[illegible]	[illegible]		--	(0.5)	[illegible]		--
** Drilling Foreman	man year	[illegible]	--	--	[illegible]	(1)	[illegible]	(0.5)		--	(0.5)	[illegible]	(1[illegible])	[illegible]
Driver	man year	[illegible]	--	--	(1) [illegible]	(1)	[illegible]	(0.5)		--	(0.5)	[illegible]		--
Per diem	lump sum		--	--	[illegible]		[illegible]			--		[illegible]		--
Uniforms	lump sum		--	--	[illegible]		[illegible]			--		[illegible]	(1[illegible])	[illegible]
(iii) Maintenance Section														
Chief of Maintenance	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Mechanic	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Driver	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Plumber	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Assistant Plumber	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Heavy Equipment Operator	man year	[illegible]	--	--	--		--		[illegible]	(1)	[illegible]	(1)	[illegible]	--
Driver	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Laborer	man year	[illegible]	--	--	--		--	(1[illegible])	[illegible]	(1[illegible])	[illegible]	(1[illegible])	[illegible]	--
Per diem	lump sum		--	--	--		--		[illegible]		[illegible]		[illegible]	--
Uniforms	lump sum		--	--	--		--		[illegible]		[illegible]		[illegible]	(1[illegible])	[illegible]
(iv) Operations Section														
Chief of Operations	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Assistant	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Clerk/Typist	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Driver	man year	[illegible]	--	--	--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	--
Pump Operator	man year	[illegible]	--	--	--		--	(1[illegible])	[illegible]	(1[illegible])	[illegible]	(1[illegible])	[illegible]	--
Dam Collector	man year	[illegible]	--	--	--		--	(1[illegible])	[illegible]	(1[illegible])	[illegible]	(1[illegible])	[illegible]	--
Per diem	lump sum		--	--	--		--		[illegible]		[illegible]		[illegible]	--
Uniforms	lump sum		--	--	--		--		[illegible]		[illegible]		[illegible]	(1[illegible])	[illegible]
Sub-Total (a)			--	--	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]	(1[illegible])	[illegible]
* (b) Vehicle and Machinery Operation														
(i) Base Office														
Four-wheel-drive Pick-up (1)	per ha'[illegible]	[illegible]	--	--	--	--	(20)	[illegible]	(20)	[illegible]	(20)	[illegible]	(2[illegible])	[illegible]
(ii) Drilling Section														
Four-wheel-drive Pick-up (1)	per ha'[illegible]	[illegible]	--	--	(30)	[illegible]	(30)	[illegible]		--		--	(60)	[illegible]	(2[illegible])	[illegible]
(iii) Maintenance Section														
Bulldozer (1) [1]	per hours '000	[illegible]	--	--		--		--		--	(1.5)	[illegible]	(1.5)	[illegible]	[illegible]	[illegible]
Four-wheel-drive Lorry, 7 ton (1) [1]	per ha'[illegible]	[illegible]	--	--		--		--		--	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Maintenance Truck (1)	per hours '000	[illegible]	--	--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Water Van (1)	per ha'[illegible]	[illegible]	--	--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Dump Truck (1)	per ha'[illegible]	[illegible]	--	--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Four-wheel-drive Pick-up (1)	per ha'[illegible]	[illegible]	--	--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Generator welder (1)	per hours '000	[illegible]	--	--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Concrete mixer (1)	per hours '000	[illegible]	--	--		--		--	(0.5)	[illegible]	(1)	[illegible]	(1.5)	[illegible]	[illegible]	[illegible]
(iv) Operations Section														
Four-wheel-drive Pick-up (1) [1]	per ha'[illegible]	[illegible]	--	--		--		--	(1)	[illegible]	(1)	[illegible]	(1)	[illegible]	[illegible]	[illegible]
Pump Operation (10) [1]	per '000 pump hours	[illegible]	--	--		--		--	(0.4)	[illegible]	(0.4)	[illegible]	(0.4)	[illegible]	[illegible]	[illegible]
Sub-total (b)			--	--	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]

[1] Non permanent staff for the drilling works in the [illegible] is listed additionally in Table 3 (Water Development Chief).
[2] Bulldozer and one four-wheel-drive Lorry from Construction Zone of Range Reserves (see Table 4).
* Dam Drilling Section
** Ten pumps in [illegible] and 8 pumps other areas outside CZ[illegible] -- 1,[illegible] hours operation per pump and per year.

March 15, 1[illegible]

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	Unit	Unit Cost	Year 1 Units	Year 1 Cost	Year 2 Units	Year 2 Cost	Year 3 Units	Year 3 Cost	Year 4 Units	Year 4 Cost	Year 5 Units	Year 5 Cost	Total Units	Total Cost	Inventory Increase	Inventory Increase Cost
* (a) Maintenance and Utilities																
Staff Houses (1% of capital cost)	Long term		--		--		1.5		2.5		2.5		[illegible]		[illegible]	[illegible]
Furniture and Equipment (10% of depreciated cost)	Long term		--		--		1.5		2.5		16.5		[illegible]		[illegible]	[illegible]
Sub-total			--		--		65.0		24.0		24.0		[illegible]		[illegible]	[illegible]
* (b) Miscellaneous Operating Costs																
Rent of Staff Houses	rent year	50.0	--		--	(1)	50.0	(1)	50.0	60.35	50.0	--	60.35	[illegible]		
Sub-total (b)			--		--		60.0		60.0		50.0	--		500.0		--
Total Operations Cost (b)			--		--		[illegible]		[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Grand Total (a & b) Net of Taxes			10.0		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Grand Taxes			--		--		1.5		3.5		100.5	107.1		215.2		--
Grand Total			10.0		[illegible]		[illegible]		[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]

March 25, 1970

[illegible]

[illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
A. CAPITAL COST													
(a) Construction 1/													
Central Warehouse - Nightstown	Lump sum		--	--	--	[illegible]	--	--		[illegible]	[illegible]	[illegible]
Sub-total (a)			--	--	--	[illegible]	--	--		[illegible]	[illegible]	[illegible]
(b) Vehicles and Machinery													
Four-wheel-drive Pickup, 1000	each	[illegible]	--	[illegible] [illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
15 KW Generator Welder	each	[illegible]	--	[illegible] [illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Spotgrotto (1/8 of vehicle and welder cost)	Lump sum		--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
Sub-total (b)			--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
(c) Equipment and Furniture													
Workshop Equipment	Lump sum		--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
Camp Equipment, Class A	set	[illegible]	--	[illegible] [illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Class B	set	[illegible]	--	[illegible] [illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Furniture for Seated Staff House	set	[illegible]	--	[illegible] [illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (c)			--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
(d) Contractual Services													
Construction and Tender Fees (10%)	Lump sum		--	--	[illegible]	--	--	--		[illegible]	[illegible]	--
Procurement Fees (2.5%)	Lump sum		--	[illegible]	--	--	--	--		[illegible]	[illegible]	[illegible]
Sub-total (d)			--	[illegible]	[illegible]	--	--	--		[illegible]	[illegible]	[illegible]
TOTAL CAPITAL COST (A)			--	[illegible]	[illegible]	[illegible]	--	--		[illegible]	[illegible]	[illegible]
B. OPERATING COST													
(a) Staff Salaries (Including Allowances)													
Senior Mechanic	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Senior Mechanic (Counterpart)	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Mechanic	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Assistant Mechanic	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Welder	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Assistant Welder	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Duty Worker	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Painter	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Blacksmith	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Storekeeper/Clerk	man year	[illegible]	--	--	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Storeman	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Cleaner/Cooks	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Driver	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Labourer	man year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Per diem	Lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	--
Bonuses	Lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (a)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
(b) Vehicle and Machinery Operating													
Four-wheel-drive Pickup (1)	per km/year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Generator Welder (1)	per hours *Max	[illegible]	--	--	[illegible] [illegible]	[illegible] [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total (b)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
(c) Maintenance and Utilities													
Buildings	Lump sum		--	--	--	--	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Furniture and Equipment (10% of Capital Cost)	Lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (c)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
(d) Miscellaneous Operating Costs													
Cost of Staff House	Cost year	[illegible]	--	--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	--
Holding Cost	Lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	--
Mobile Post, Bags, miscellaneous materials	Lump sum		--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
Sub-total (d)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
TOTAL OPERATING COST (B)			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
GRAND TOTAL (A & B) NET OF TAXES			--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
SAVING TAXES			--	--	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		
GRAND TOTAL			--	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]

1/ Details see Annex 6, Appendix II. Assignment Strategies are included in Table 6.

[illegible]

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TABLE 18

[illegible]

[illegible]

Investment Cash Flow Due to Contract
Sa.Sh. Million

	Year 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16-20	21-30	31-40
A. INFLOW																		
(a) Internal Financing																		
FAO Credit	4.3	9.3	15.4	11.3	3.3	4.3	4.5	--	--	--	--	--	--	--	--	--		
IFAD Loan	3.0	10.3	17.0	12.3	4.0	5.5	3.3	--	--	--	--	--	--	--	--	--	--	--
Shote Grant	13.3	16.3	11.7	33.0	15.0	13.4	--	--	--	--	--	--	--	--	--	--	--	--
[illegible] Grant	--	4.4	5.0	4.0	3.3	3.4	--	--	--	--	--	--	--	--	--	--	--	--
MOF Grant	--	3.4	5.3	7.0	10.3	1.3	--	--	--	--	--	--	--	--	--	--	--	--
Sub-total (a)	17.0	42.9	53.3	30.5	43.3	32.3	4.4	--	--	--	--	--	--	--	--	--	--	--
(b) Investment Revenue 1/																		
Income Taxes	...	0.3	0.9	1.4	1.6	2.0	2.2	2.2	2.3	2.3	2.3	2.3	4.4	2.3	4.3	11.0	22.0	--
Distributor Charges 2/	--	--	--	--	2.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	17.0	34.0	--
Sale of Potentially Drugs 2/	--	--	--	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.0	6.0	--
Export Charges 3/	--	--	--	--	--	0.3	0.4	0.4	0.5	1.3	1.3	1.3	1.3	1.3	1.4	13.0	26.0	--
Sub-total (b)	...	0.3	0.9	1.4	4.3	6.3	6.4	6.4	9.1	9.3	10.1	10.3	10.4	10.3	10.0	54.0	100.0	--
TOTAL INFLOW (A)	17.0	43.2	55.9	61.1	47.5	50.3	11.9	9.9	9.1	9.3	10.1	10.3	10.4	10.3	10.0	54.0	100.0	--
B. OUTFLOW																		
(a) Debt Service																		
FAO Credit 4/ Service Charge	...	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	1.3	2.0	2.3
Repayment	--	--	--	--	--	--	--	--	--	--	0.3	0.3	0.3	0.3	0.3	1.3	13.0	10.0
IFAD Loan 4/ Commitment Charge	0.3	0.4	0.1	0.4	...	...	--	--	--	--	--	--	--	--	--	--	--	--
Service Charge	...	0.1	0.3	0.4	0.5	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	1.3	2.3	2.0
Repayment	--	--	--	--	--	--	--	--	--	--	1.3	1.3	1.3	1.3	1.3	7.0	13.0	10.0
Sub-total (a)	0.3	0.4	0.6	0.3	0.8	0.8	1.0	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.2	11.3	31.3	44.0
(b) Project Costs	22.2	22.2	22.0	22.0	22.4	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	112.0	225.0	--
Sub-total (b)	22.0	22.9	22.0	22.0	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	22.4	112.0	224.0	--
TOTAL OUTFLOW (B)	22.2	23.2	22.6	22.3	23.2	23.2	23.5	23.5	23.5	23.5	24.3	24.3	24.3	24.3	24.3	123.3	247.3	44.0
C. NET INCREMENTAL LIQUIDITY (A minus B)	(5.5)	(19.1)	(5.0)	2.4	(0.9)	(1.7)	(11.6)	(13.6)	12.3	(13.7)	(14.2)	(13.7)	(13.6)	(13.3)	(13.3)	(69.3)	(147.3)	--
D. CUMULATIVE INCREMENTAL CASH FLOW	(5.5)	(12.3)	(20.3)	(17.9)	(17.9)	(27.5)	(51.0)	(87.0)	(81.7)	(100.0)	(114.2)	(127.9)	(141.5)	(154.8)	(168.1)	(237.4)	(384.7)	--

Notes: Year 1 - 6. Current prices. Price Contingencies - see Annex 14 for local costs.
Year 7 and onwards: Constant 1983 prices.

1/ Investment revenues include Revenue to cost savings as suggested in Para. 4.14 of main report with the exception of operation and maintenance of all range grazing reserves.
2/ See Annex 9. Distributed to sold at prices charged currently by the Water Development Agency: Sa.Sh. 1.50 per dose of 200 litres, Sa.Sh. 3.00 per watering of 100 sheep and goats, Sa.Sh. 0.50 per watering of 1 cattle, Sa.Sh. 0.50 per watering of 1 camel (1979 prices). These prices would allow the WDA to recover its administration operations and maintenance costs for the Water Service (including taxes, duties and 10% physical contingency)
3/ 30% of the sale of drugs and vaccines are vaccines which are dispensed free of charge. The balance is sold at procurement cost with no markup for staff and other costs. A 10% physical contingency is included
4/ Export charges include taxes, customs and fees paid for non-service related procedures to the Veterinary Service, Municipalities, Ministry of Finance and Chamber of Commerce (Annex 22, Appendix 2). It has been assumed that 30% of the incremental offtake of sheep and goats would be exported. Export charges amount to Sa.Sh. 20 per sheep or goat (in 1979 prices).
5/ Service charge: 3/4 of 1% on the principal amount of the credit withdrawn and outstanding
Repayment: Years 1 thr grace period
Years 11-20: 11 per annum
Years 21-30: 12 per annum
6/ Commitment charge: 0.75 on the principal amount of the loan committed and not withdrawn.
Service charge: 1% on the principal amount of the loan withdrawn and outstanding.
Repayment Years 1 to: grace period
Years 11 to 30 3.33 per annum.

March 26 1979

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ANNEX 13

SOMALIA

CENTRAL RANGELANDS DEVELOPMENT PROJECT

MEETING OF COFINANCIERS

MUQDISHO MAY 1 - 2, 1979

AIDE MEMOIRE

The views expressed in this aide memoire are those of the mission and not necessarily those of the World Bank.

MUQDISHO MAY 3, 1979

On May 1 - 2, 1979 a meeting was convened by the government of Somalia at the Al Uruba Hotel Mogadishu under the chairmanship of Mr. Ahmed Mohamed Mohamoud, Chairman of the Economic Committee. The agenda of the meeting and a list of those present are attached as Appendix 1 and 2, to this aide memoire.

1. Item 1 of the Agenda. The cofinanciers confirmed that their agencies were in agreement with the concept of the Project. Regarding the design of the Project the following two points were raised and discussed:

(a) USAID wished to have four TA staff residing in the Project area to have them closer to their work.

(b) USAID suggested that demarcation of Range grazing areas might in places be done in a more cost saving manner than proposed in the staff appraisal report (SAR). Both questions were referred for decision by NRA management as they did not constitute any significant deviation from project description or objectives.

2. Item 2 of the Agenda:

(a) the IFAD representative confirmed that co-financing by that agency had been approved by its Board on March 26 1979 and that IFAD had appointed IDA as cooperating agency for disbursement and supervision of the credit.

(b) the USAID representative reiterated the Agency's commitment to financing up to US$ 15 million of the project cost. was hoped that the grant would get final approval in August and that agreement with government of Somalia could be signed in September.

(c) the ODM representative confirmed that the ODM had agreed in principle to financing up to US$ 4 million of project cost. It was hoped to put the project to the ODM project committee by July.

It was pointed out, however, that after the approval of the committee, the grant agreement would be attached to the Technical Cooperation Agreement between the two governments and that the signing of both documents would be a condition of grant effectiveness, which could hopefully be achieved by September.

(d) the ODM further stated that financing of vaccines to be purchased in a third country was not possible and suggested that if the need arose it might finance other British procurement under the project in exchange for the vaccines being purchased with IFAD/IDA funds.

(e) the WFP representative confirmed that the agreement between Government and the WFP had been signed January 10, 1979 for three years. He visualized that the supplies of WFP rations thereafter would be available under an extension of the present agreement or a new agreement. The mission reminded the meeting that under the IDA credit agreement any shortfall in WFP rations would be made up by Government in the form of cash wages.

3. Item 3 of the Agenda: The mission went through the list of project actions to be taken between May and December of 1979 (attached as Appendix 3). The issues raised/for this work program as a result of possible delay in project effectiveness because of likely delayed signing of the grant agreement with ODM (See item 4) were the financing of:

(a) the project coordinator

(b) the technical director of Administration

(c) the architect/planner consultant

(d) the northern rangeland survey

The meeting agreed with NRA's concern to have those expenditures financed if possible starting in July.

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The mission proposed that government of Somalia make US$ 300,000 available to the NRA as an advance to cover these expenditures until project effectiveness at which time they would be reimbursed from the IFAD/IDA credits. The chairman felt that such an advance would be difficult for the government to make but promised to investigate with the Minister of Finance and to inform IDA of the outcome.

4. Item 4 of the Agenda: The mission reiterated the condition of credit effectiveness as stated in the IDA credit agreement. Government expressed as its opinion that all conditions except the cross effectiveness condition could be fulfilled by July and the chairman appealed to the ODM and the USAID to expedite as much as possible the processing of their respective grants. A tentative target date for approval of the grants was agreed by ODM and USAID as August 15, 1979 with an additional month estimated for the signing of the relevant agreements.

5. Item 5 of the Agenda: The mission read out the draft memorandum of understanding between IDA and ODM and USAID respectively and referred to the letter of agreement of cooperation between IFAD and IDA (copies of both were attached to the agenda). The mission further explained the procedure for declaration of project effectiveness as well as the standard procedures of IDA regarding supervision. Government strongly supported the concept of joint supervision by the cofinancing agencies.

6. Item 6 of the Agenda:

(a) the mission briefly outlined IDA procurement procedures and distributed copies of these.USAID explained that procurement could either be done by NRA through an appointed US. procurement agent or directly through USAID itself and that the procedure to be chosen would be discussed with NRA.

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ODM explained that all procurement would be by IDA and the Veterinary Department of the Ministry of Livestock through Crown Agents.

(b) the mission then explained briefly the IDA recruitment procedures. USAID stated that recruitment would be on contract with a consultantfirm, university or other agency which would be able to provide the number of T A staff required. ODM stated that ODM would select candidates and following government approval would recruit them.

7. Item 7 of the Agenda: After a brief outline of IDA disbursement procedures, the ODM stated that its disbursement could be directly to staff and to the Crown Agents. USAID stated that it would disburse directly to staff and to agent or supplier depending on the mode of procurement chosen.

8. Item 8 of the Agenda: The mission explained IDA procedures for establishing a project reporting system during the first supervision mission and it was agreed at that time to include any special requirements of the other agencies.

9. Item 9 of the Agenda:

(a) the meeting agreed that the proposed date for the first joint supervision mission to the project would be early October 1979. USAID informed the meeting that due to constraints of technical staff it might not be able to participate in all missions, but would be represented by the IDA mission. The following provisional items were identified for the first supervision mission:

(a) status of effectiveness of the project

(b) status of commitment, procurement and planning of construction

...6

(c) status of range inventory

(d) establishment of a monitoring system

(e) a familiarization field excursion to the NRDP and GRDP project areas.

(ii) The meeting expressed agreement on the urgency of recruiting before effectiveness the following PMA staff:

(a) the project coordinator

(b) the technical director of administration

(c) the architect/planner consultant

iii) Government requested IDA through the RMEA office in Nairobi to:

(a) pursue the recruitment of of Mr. Yousef R.M. Bahaeldin of Cairo, Egypt for the post of project coordinator.

(b) select three candidates for the post of technical director of administration including Mr. Hesham, British national who would be requested by NRA to submit his CV to RMEA.

(c) to explore the availability of Mr. Eric Hall, British national presently with the ODM in the Yemen Arab Republic and if he could be released from his ODM contract to recruit him for EOD as project effectiveness.

(iv) the USAID representative offered to explore the availability of candidates in the US for the post of project coordinator as a fall back position in case the recruitment of the candidate selected by government would not materialize.

(v) the USAID representative confirmed that funds for the part of the post-graduate training program not already included in the IDA PPF had been included in full in the USAID contribution/to the project.

(vi) the mission outlined a proposal to establish a project monitoring and evaluation unit in the NRA for which technical assistance had been offered by the International Livestock Center for Africa (ILCA) (SAR para 5.11). The local cost of of the Somali evaluation officer (agriculture economist) and the pastoral sociologist as well as three data collection teams would amount to So. Shs. 350,000 per year

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during the implementation period. The foreign exchange cost of 4 vehicles, camping equipment and the operation of vehicles would amount to US$ 150,000 which would be covered from existing project financing. The unit had been discussed with NRA who had shown great interest in it. The government of Somalia stated its interest in establishing this in the NRA and offered to provide the annual local cost of So. Shs. 350 through NRA normal budget.

10. With this, the business of the meeting was completed and was declared closed by the chairman.

11. Action Arising From the Meeting

(i) Government of Somalia:

(i) establishment of US$ 300,000 facility for NRA at the Central Bank;

(ii) budgetary allocation for NRA to start recruitment of evaluation officer and pastoral sociologist;

(iii) fulfilling conditions of credit effectiveness.

(a) signing of subsidiary agreement between Government and NRA.

(b) establish an advance of So. Shs. 5.0 million for local operating costs.

(ii) NRA

(a) prepare construction program select site for HQ and field installations.

(b) recruit architect/planner consultant

(c) establish list of equipment and supplies needed during first round of procurement

(d) start tendering for vehicles

(e) follow-up action to be taken to reach credit effectiveness.

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(iv) USAID

process USAID grant

Technical Assistance Scopes of Work

This annex contains scopes of work for each of the A.I.D.-financed Technical Assistants.

It is the expectations that 2 range scientists will undertake the task of surveys (1) monitoring; (2) and investigations (3&4) as consecutive tasks.

Range Ecologists - Surveys

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland area of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Range Ecologist - Surveys

2. Duration of appointment: 1-1/2 years

3. Number of vacancies: Two

4. Duty station: Dusa Mareb, Somalia

5. Job Description: The incumbent would:

   (a) Be responsible to the Director, Range and Environment, NRA, Ministry of Livestock, Forestry and Range.

   (b) Compile a report on vegetation and pastures in the project area using acceptable rangeland survey techniques.

   (c) Compile a set of range condition guides for pasture lands in the project area.

   (d) Delineate areas of erosion and erosion hazard in the project area.

   (e) Select areas for grazing reserves and stockwater development in cooperation with non-formal training and community survey teams.

   (f) The surveyors would be provided with a current resource inventory of plant, animal and human resources in the form of vegetation maps at 1:100,000 scale and an associated text.

6. Qualifications:

   (a) Experience in rangeland survey techniques in semi-arid and arid areas.

   (b) Familiar with rangeland management strategies appropriate to semi-arid and arid environments.

   (c) Appropriate professional qualifications.

Continued

(d) Willingness and ability to spend extended periods on field work in Somalia.

Range Ecologists - Monitoring

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1.	Title of post:	Range Ecologist - Range Monitoring Unit
2.	Duration of appointment:	1-1/2 years and 1/2 years
3.	Number of vacancies:	Two
4.	Duty station:	Dusa Mareb, Somalia

5. Job description:

   (a) Be responsible to the Director of Range and Environment, NRA, Ministry of Livestock, Forestry and Range.

   (b) Set up a monitoring (surveillance) network for the determination of trends in rangeland condition in the project area.

   (c) Develop techniques for monitoring appropriate to the needs of the grazing lands in the project area.

   (d) Develop a storage and retrieval system for trend information and plan communication channels within the NRA to facilitate action following trend evaluations.

   (e) Prepare plans which will enable the NRA to establish a national rangeland monitoring program.

   (f) Train counterparts in rangeland monitoring techniques.

6. Qualifications:

   (a) Proven experience in the application of ecological techniques for range evaluation in semi-arid and arid areas.

   (b) Appropriate professional qualifications.

   (c) Willingness and ability to live in the field.

Range Ecologist - Investigations

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Range Ecologist (Range Investigations)

2. Duration of appointment: 2-1/2 years

3. Number of vacancies: One

4. Duty station: Dusa Mareb, Somalia

5. Job Description:

   (a) Responsible to the Director of Research, Training and Planning, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Carry out a program of range ecological studies in the Project area in consultation with the technical director of Range and Environment.

   (c) Train the Director of Research, Training and Planning and his counterpart officer in techniques of range ecology observations.

   (d) Prepare a range research program for Somalia.

   (e) Establish and supervise a forage analysis laboratory.

6. Qualifications:

   (a) Experience in the conduct of range ecological investigations in semi-arid and arid regions.

   (b) Proven ability to plan and execute range research programs.

   (c) Appropriate professional qualifications.

   (d) Willingness and ability to live in the Project area.

Senior Range Technician
Investigations

Central Rangelands Development Project, Somalia

The project is concerned with the developmand and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Senior Range Technician

2. Duration of appointment: 2-1/2 years

3. Number of vacancies: One

4. Duty station: Dusa Mareb, Somalia

5. Job Description:

   (a) Responsible to the Range Ecologist (Range Investigations).

   (b) Responsible for undertaking field work in range ecology studies.

   (c) Supervise erection of fences and other field structures.

   (d) Supervise counterpart technicians, assistants and laborers.

   (e) Prepare reports on experimental results.

   (f) Generally assist the Range Ecologist in carrying out the program of range investigations.

6. Qualifications:

   (a) Wide experience in field and laboratory procedures in semi-arid and arid lands.

   (b) Appropriate technical qualifications.

   (c) Willingness and ability to live in the field.

Taxonomist

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Taxonomist

2. Duration of appointment: 3-1/2 years

3. Number of vacancies: One

4. Duty station: Muqdisho, Somalia

5. Job description: The incumbent would:

   (a) Be responsible to the Director of Research, Training and Planning, NRA.

   (b) Continue the work carried out under the NRDP of:

      (1) identifying and classifying range plants;

      (2) establish a national herbarium;

      (3) train a Somali taxonomist.

   (c) Write a guide to the rangeland flora of Somalia.

6. Qualifications:

   (a) A degree in botany.

   (b) A minimum of 6 years of professional experience, part of which should have been spent in East Africa.

   (c) Ability to train.

   (d) Willingness and ability to travel extensively under rugged conditions.

Soil and Water Conservation Expert

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Soil and Water Conservation Expert

2. Duration of appointment: 2 years

3. Number of vacancies: One

4. Duty station: Dusa Mareb, Somalia

5. Job description:

   (a) Responsible to the Director of Range and Environment, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Assess the needs for soil erosion control in the Project area and advise on methods of erosion control.

   (c) Establish demonstration areas for soil erosion control.

   (d) Plan and supervise water harvesting programs on three grazing cooperatives.

   (e) Implement a water spreading scheme on at least one experimental cooperative.

   (f) Advise on the potential for water spreading and water harvesting at other locations in the Project area.

   (g) Advise on sand dune control techniques and implement a pilot sand dune control program.

   (h) Train the Head of Service as well as field staff.

continued

6. <u>Qualifications</u>:

(a) Experience in soil conservation control methods, particularly in sand dune stabilization and in rangeland water erosion control.

(b) Experience in the surveying of land and in the production of contour maps.

(c) Experience with water harvesting and water spreading projects.

(d) An appropriate professional qualification.

(e) Willingness and ability to live in the field.

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Cooperative Advisor

2. Duration of appointment: 2 years

3. Number of vacancies: One

4. Duty Station: Dusa Mareb, Somalia

5. Job description:

   (a) Responsible to the Director of Range and Environment, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Assess the sociological, economic and environmental viability of cooperative development in the rangeland areas of Somalia and submit his findings and recommendations in a report to the General Manager, NRA.

   (c) Evaluate the results of water spreading in terms of fodder production and crops grown in terms of the viability of the cooperatives.

   (d) Advise and guide the cooperatives in buying, marketing, financial matters and in obtaining education, health and social services.

   (e) Train the Head of Service and counterpart officers in cooperative supervision and counselling.

6. Qualifications:

   (a) Wide experience in the formation and operation of grazing societies.

   (b) Experience with pastoral (nomadic) societies.

   (c) Ability to organize a crop production program and to evaluate the results.

continued

(d) An appropriate professional qualification, desirably related to agriculture.

(e) Willingness and ability to live in the field.

Technical Director
Range and Environment

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Technical Director, Range and Environment

2. Duration of appointment: 6 years

3. Number of vacancies: One

4. Duty station: Muqdisho, Somalia

5. Job Description:

   (a) Responsible to the General Manager, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Supervise all aspects of the rangeland and stockwater development carried out by the Agency.

   (c) Develop the field service organization of the NRA.

   (d) Advise the General Manager in respect of the technical inputs required in range science and environmental management in Somalia.

   (e) Pay close attention at all times to the effective training of his counterpart.

6. Qualifications

   (a) Experience in the administration of rangeland grazing areas.

   (b) Wide experience in range management techniques.

   (c) Suitable professional qualifications.

Technical Director
Stockwater Service

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of reference:

1. Title of post: Technical Director, Stockwater Service

2. Duration of appointment: 4 1/2 years

3. Number of vacancies: One

4. Duty station: Muqdisho, Somalia

5. Job description:

   (a) Responsible to the Director of Range and Environment, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Direct a newly formed Stockwater Service within the NRA which would be responsible for borehold drilling, maintenance and operation of water points.

   (c) He would assist the General Manager, NRA and his staff in the planning and administration of the NRA water program.

   (d) He would pay close attention at all times to the effective training of his counterpart.

6. Qualifications:

   (a) Professional qualifications in management.

   (b) Demonstrated successful experience in the management of water organizations dealing with the development, maintenance and operation of water facilities.

Instructor in Range Management
University of Somalia

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Instructor in Range Management, (University of Somalia)

2. Duration of appointment: 5-1/2 years

3. Number of vacancies: One

4. Duty Station: Afgoi, Somalia

5. Job description:

   (a) The Instructor in Range Management will be appointed to the Faculty of Agriculture of the National University of Somalia.

   (b) He would work at Afgoi but would live in Muqdisho.

   (c) He would plan and develop a course in range management which would essentially be for the final two year part of the 4-year Faculty course. In the construction of the course full account would be taken of the need to provide field experience for students, and of the overall need to relate the course to the Somalia field situation.

   (d) He would pay close attention to the effective training of the counterparts in order that a Department of Range Management may be soundly established during his tenure.

   (e) He would advise the Dean of the Faculty in regard to the correct number of students who may take the range option during the planning and development stage of the course. In the first years this number should probably not exceed 6 p.a. Later intakes would be realistically related to potential post availability and at a rate which should allow the new department to function.

Lecturers in Range Management

Central Rangelands Develoomen Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Lecturer in Range Management

2. Duration of appointment: 4 years

3. Number of vacancies: Two

4. Duty Station: Afgoi, Somalia

5. Job Description:

   (a) Reponsible to the Head of the Livestock and Range School.

   (b) Both lecturers would work at the Afgoi School near Muqdisho. The senior person would be given overall responsibility for planning and productng a full course in Range Management being the second two years of a 4 year secondary level course. (Note: Secondary Schooling in Somalia starts after 8 years of primary education.) The course would be written fully and would include detailed lecture notes. Both lecturers would contribute to this. Field training and practical work would be given suitable priority and time would be taken in the field in order to study relevant field requirements for incorporation into the training plan. A fully documented and printed course would be left behind at the end of the assignment designed for the available facilities. In addition to lecturing themselves, the officers would pay close attention at all times to the effective training of their counterpart lecturers.

6. Qualifications:

   Degree in Agriculture with emphasis on ecology and range or livestock. Practical experience of development work in a semi-arid area. Teaching or extension-training experience.

Range Trials Consultants

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are to be recruited internationally for the project.

Job Description:

These consultants (2) would:

1. Conduct a survey of existing grazing reserves and demonstration ranches in the Central and Northern area.

2. Based on preliminary vegetative mapping prepared by the survey team identify 4-5 sites for grazing reserve trials.

3. Prepare a plan for laying out the trials utilizing variable stocking rates.

4. Train local staff to set up and collect animal and vegetation data from the trials.

5. On a regular basis, monitor the program and data collection.

6. Conduct plant species composition surveys as required.

7. Process the data using the Bement curve to define the proper amounts of forage to be left after grazing.

8. Periodically advise resident range scientists in maintaining proper balance of livestock with vegetation.

Timing:

1. It is estimated that tasks 1-4 will require 6 months of work.

2. Following that initial period, one to two month stays twice a year will accomplish tasks 5-7 during years 2 and 3.

3. After year 3, a month each year will probably be sufficient.

Qualfications:

1. Training in and experience with the use of grazing trials to form the basis for balancing vegetation and animal use.

continued

2. Masters Degree in range science or related field.

3. Ability to travel widely under rough conditions.

ANNEX 15

CERTIFICATION PURSUANT TO

Section 611(e) of the

FOREIGN ASSISTANCE ACT

As Amended

I, Charles P. Campbell, the principal officer of the Agency for International Development in Somalia, do herewith certify that in my judgment, Somalia has both the financial capability and human resources to maintain and utilize effectively goods and services procured under this project entitled Central Rangeland Development Project.

This judgment is based upon the record of implementation of earlier AID-financed projects in Somalia and the results of the extensive consultations undertaken during the project preparation of this new project.

Charles P. Campbell

Charles P. Campbell
Director, USAID/Somalia

Date

(d) Willingness and ability to spend extended periods on field work in Somalia.

Range Ecologists - Monitoring

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1.	Title of post:	Range Ecologist - Range Monitoring Unit
2.	Duration of appointment:	1-1/2 years and 1/2 years
3.	Number of vacancies:	Two
4.	Duty station:	Dusa Mareb, Somalia

5. Job description:

   (a) Be responsible to the Director of Range and Environment, NRA, Ministry of Livestock, Forestry and Range.

   (b) Set up a monitoring (surveillance) network for the determination of trends in rangeland condition in the project area.

   (c) Develop techniques for monitoring appropriate to the needs of the grazing lands in the project area.

   (d) Develop a storage and retrieval system for trend information and plan communication channels within the NRA to facilitate action following trend evaluations.

   (e) Prepare plans which will enable the NRA to establish a national rangeland monitoring program.

   (f) Train counterparts in rangeland monitoring techniques.

6. Qualifications:

   (a) Proven experience in the application of ecological techniques for range evaluation in semi-arid and arid areas.

   (b) Appropriate professional qualifications.

   (c) Willingness and ability to live in the field.

Range Ecologist - Investigations

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Range Ecologist (Range Investigations)

2. Duration of appointment: 2-1/2 years

3. Number of vacancies: One

4. Duty station: Dusa Mareb, Somalia

5. Job Description:

   (a) Responsible to the Director of Research, Training and Planning, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Carry out a program of range ecological studies in the Project area in consultation with the technical director of Range and Environment.

   (c) Train the Director of Research, Training and Planning and his counterpart officer in techniques of range ecology observations.

   (d) Prepare a range research program for Somalia.

   (e) Establish and supervise a forage analysis laboratory.

6. Qualifications:

   (a) Experience in the conduct of range ecological investigations in semi-arid and arid regions.

   (b) Proven ability to plan and execute range research programs.

   (c) Appropriate professional qualifications.

   (d) Willingness and ability to live in the Project area.

Senior Range Technician
Investigations

Central Rangelands Development Project, Somalia

The project is concerned with the developmand and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Senior Range Technician

2. Duration of appointment: 2-1/2 years

3. Number of vacancies: One

4. Duty station: Dusa Mareb, Somalia

5. Job Description:

   (a) Responsible to the Range Ecologist (Range Investigations).

   (b) Responsible for undertaking field work in range ecology studies.

   (c) Supervise erection of fences and other field structures.

   (d) Supervise counterpart technicians, assistants and laborers.

   (e) Prepare reports on experimental results.

   (f) Generally assist the Range Ecologist in carrying out the program of range investigations.

6. Qualifications:

   (a) Wide experience in field and laboratory procedures in semi-arid and arid lands.

   (b) Appropriate technical qualifications.

   (c) Willingness and ability to live in the field.

Taxonomist

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Taxonomist

2. Duration of appointment: 3-1/2 years

3. Number of vacancies: One

4. Duty station: Muqdisho, Somalia

5. Job description: The incumbent would:

   (a) Be responsible to the Director of Research, Training and Planning, NRA.

   (b) Continue the work carried out under the NRDP of:

      (1) identifying and classifying range plants;

      (2) establish a national herbarium;

      (3) train a Somali taxonomist.

   (c) Write a guide to the rangeland flora of Somalia.

6. Qualifications:

   (a) A degree in botany.

   (b) A minimum of 6 years of professional experience, part of which should have been spent in East Africa.

   (c) Ability to train.

   (d) Willingness and ability to travel extensively under rugged conditions.

Soil and Water Conservation Expert

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Soil and Water Conservation Expert

2. Duration of appointment: 2 years

3. Number of vacancies: One

4. Duty station: Dusa Mareb, Somalia

5. Job description:

   (a) Responsible to the Director of Range and Environment, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Assess the needs for soil erosion control in the Project area and advise on methods of erosion control.

   (c) Establish demonstration areas for soil erosion control.

   (d) Plan and supervise water harvesting programs on three grazing cooperatives.

   (e) Implement a water spreading scheme on at least one experimental cooperative.

   (f) Advise on the potential for water spreading and water harvesting at other locations in the Project area.

   (g) Advise on sand dune control techniques and implement a pilot sand dune control program.

   (h) Train the Head of Service as well as field staff.

continued

6. Qualifications:

(a) Experience in soil conservation control methods, particularly in sand dune stabilization and in rangeland water erosion control.

(b) Experience in the surveying of land and in the production of contour maps.

(c) Experience with water harvesting and water spreading projects.

(d) An appropriate professional qualification.

(e) Willingness and ability to live in the field.

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Cooperative Advisor

2. Duration of appointment: 2 years

3. Number of vacancies: One

4. Duty Station: Dusa Mareb, Somalia

5. Job description:

   (a) Responsible to the Director of Range and Environment, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Assess the sociological, economic and environmental viability of cooperative development in the rangeland areas of Somalia and submit his findings and recommendations in a report to the General Manager, NRA.

   (c) Evaluate the results of water spreading in terms of fodder production and crops grown in terms of the viability of the cooperatives.

   (d) Advise and guide the cooperatives in buying, marketing, financial matters and in obtaining education, health and social services.

   (e) Train the Head of Service and counterpart officers in cooperative supervision and counselling.

6. Qualifications:

   (a) Wide experience in the formation and operation of grazing societies.

   (b) Experience with pastoral (nomadic) societies.

   (c) Ability to organize a crop production program and to evaluate the results.

continued

(d) An appropriate professional qualification, desirably related to agriculture.

(e) Willingness and ability to live in the field.

Technical Director
Range and Environment

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Technical Director, Range and Environment

2. Duration of appointment: 6 years

3. Number of vacancies: One

4. Duty station: Muqdisho, Somalia

5. Job Description:

   (a) Responsible to the General Manager, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Supervise all aspects of the rangeland and stockwater development carried out by the Agency.

   (c) Develop the field service organization of the NRA.

   (d) Advise the General Manager in respect of the technical inputs required in range science and environmental management in Somalia.

   (e) Pay close attention at all times to the effective training of his counterpart.

6. Qualifications

   (a) Experience in the administration of rangeland grazing areas.

   (b) Wide experience in range management techniques.

   (c) Suitable professional qualifications.

Technical Director
Stockwater Service

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of reference:

1. Title of post: Technical Director, Stockwater Service

2. Duration of appointment: 4 1/2 years

3. Number of vacancies: One

4. Duty station: Muqdisho, Somalia

5. Job description:

   (a) Responsible to the Director of Range and Environment, National Range Agency, Ministry of Livestock, Forestry and Range.

   (b) Direct a newly formed Stockwater Service within the NRA which would be responsible for borehold drilling, maintenance and operation of water points.

   (c) He would assist the General Manager, NRA and his staff in the planning and administration of the NRA water program.

   (d) He would pay close attention at all times to the effective training of his counterpart.

6. Qualifications:

   (a) Professional qualifications in management.

   (b) Demonstrated successful experience in the management of water organizations dealing with the development, maintenance and operation of water facilities.

Instructor in Range Management
University of Somalia

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Instructor in Range Management, (University of Somalia)

2. Duration of appointment: 5-1/2 years

3. Number of vacancies: One

4. Duty Station: Afgoi, Somalia

5. Job description:

   (a) The Instructor in Range Management will be appointed to the Faculty of Agriculture of the National University of Somalia.

   (b) He would work at Afgoi but would live in Muqdisho.

   (c) He would plan and develop a course in range management which would essentially be for the final two year part of the 4-year Faculty course. In the construction of the course full account would be taken of the need to provide field experience for students, and of the overall need to relate the course to the Somalia field situation.

   (d) He would pay close attention to the effective training of the counterparts in order that a Department of Range Management may be soundly established during his tenure.

   (e) He would advise the Dean of the Faculty in regard to the correct number of students who may take the range option during the planning and development stage of the course. In the first years this number should probably not exceed 6 p.a. Later intakes would be realistically related to potential post availability and at a rate which should allow the new department to function.

Lecturers in Range Management

Central Rangelands Develoomment Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs Thirty specialists from various disciplines are expected to be recruited internationally for the project.

The project will be implemented over 6 years.

Terms of Reference:

1. Title of post: Lecturer in Range Management

2. Duration of appointment: 4 years

3. Number of vacancies: Two

4. Duty Station: Afgoi, Somalia

5. Job Description:

   (a) Reponsible to the Head of the Livestock and Range School.

   (b) Both lecturers would work at the Afgoi School near Muqdisho. The senior person would be given overall responsibility for planning and productng a full course in Range Management being the second two years of a 4 year secondary level course. (Note: Secondary Schooling in Somalia starts after 8 years of primary education.) The course would be written fully and would include detailed lecture notes. Both lecturers would contribute to this. Field training and practical work would be given suitable priority and time would be taken in the field in order to study relevant field requirements for incorporation into the training plan. A fully documented and printed course would be left behind at the end of the assignment designed for the available facilities. In addition to lecturing themselves, the officers would pay close attention at all times to the effective training of their counterpart lecturers.

6. Qualifications:

   Degree in Agriculture with emphasis on ecology and range or livestock. Practical experience of development work in a semi-arid area. Teaching or extension-training experience.

Range Trials Consultants

Central Rangelands Development Project, Somalia

The project is concerned with the development and management of the 149,000 km2 of the central rangeland areas of Somalia. It has rangeland management, water development, educational, training and veterinary inputs. Thirty specialists from various disciplines are to be recruited internationally for the project.

Job Description:

These consultants (2) would:

1. Conduct a survey of existing grazing reserves and demonstration ranches in the Central and Northern area.

2. Based on preliminary vegetative mapping prepared by the survey team identify 4-5 sites for grazing reserve trials.

3. Prepare a plan for laying out the trials utilizing variable stocking rates.

4. Train local staff to set up and collect animal and vegetation data from the trials.

5. On a regular basis, monitor the program and data collection.

6. Conduct plant species composition surveys as required.

7. Process the data using the Bement curve to define the proper amounts of forage to be left after grazing.

8. Periodically advise resident range scientists in maintaining proper balance of livestock with vegetation.

Timing:

1. It is estimated that tasks 1-4 will require 6 months of work.

2. Following that initial period, one to two month stays twice a year will accomplish tasks 5-7 during years 2 and 3.

3. After year 3, a month each year will probably be sufficient.

Qualfications:

1. Training in and experience with the use of grazing trials to form the basis for balancing vegetation and animal use.

continued

2. Masters Degree in range science or related field.

3. Ability to travel widely under rough conditions.

ANNEX 15

CERTIFICATION PURSUANT TO

Section 611(e) of the

FOREIGN ASSISTANCE ACT

As Amended

I, Charles P. Campbell, the principal officer of the Agency for International Development in Somalia, do herewith certify that in my judgment, Somalia has both the financial capability and human resources to maintain and utilize effectively goods and services procured under this project entitled Central Rangeland Development Project.

This judgment is based upon the record of implementation of earlier AID-financed projects in Somalia and the results of the extensive consultations undertaken during the project preparation of this new project.

Charles P. Campbell

Charles P. Campbell
Director, USAID/Somalia

Date