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PD-AAC-706-B
265

# KENYA

# ARID AND SEMI-ARID LANDS DEVELOPMENT PROJECT

*Project Paper*
*615-0172*

**August 1979**

Agency for International Development
Washington, D.C. 20523

AUG 22 1979

ACTION MEMORANDUM FOR THE ADMINISTRATOR

THRU : ES

THRU : AA/PPC, Mr. Alexander Shakow

FROM : AA/AFR, Goler T. Butcher

SUBJECT: Kenya Arid and Semi-Arid Lands Development Project (615-0172)

Problem: Your approval is required to execute a grant of $4,178,000 of FAA Section 103 funds (Agriculture, Rural Development and Nutrition) to the Government of Kenya (GOK) for the Arid and Semi-Arid Lands Development Project and to authorize a life-of-project funding of $13,000,000.

Discussion:

A. Project Description:

This project is the initial endeavor in a comprehensive and coordinated program of development of the eighty percent of Kenyan land classified as arid or semi-arid. These lands are characterized by growing population pressure, increasing resource degradation, and a dependence upon famine relief measures. In view of the worsening ecological and socio-economic situation, the Kenyan government has decided to undertake a major program to reverse these trends. The program is accorded a high priority in Kenya's recently published Fourth Development Plan. The Government of Kenya considers that the United States is a major source of expertise in the field of dryland agriculture and, thus, the U.S. has been requested to play the leading role in the long term evolution of the program.

The strategy for providing such assistance to Kenya's arid and semi-arid lands is presented in the Mission's CDSS of January 1979. The strategy is based upon the conclusions and recommendations of the AID-financed Marginal/Semi-Arid Lands Pre-Investment Inventory undertaken by the Consortium for International Development in 1978.

Because of the high risk associated with this type of development effort, the strategy follows a dual path which includes both research-oriented and action-oriented programs, with the initial emphasis placed upon the former course of action. Phase II of this

program, to begin in FY 1981, will endeavor to expand and replicate activities found to be viable under the project. Both Phase I (this project) and Phase II of the Arid and Semi-Arid Lands Development Project will utilize the results of the Drylands Cropping Systems Research Project which is also being funded initially this fiscal year. The Drylands Research project will carry out basic and applied research on appropriate technological packages of agricultural practices suitable to smallholders in Kenya's semi-arid areas.

Since the success of this program depends upon the commitment of substantial resources over an extended period of time, a major planning effort is required to ensure that these resources are allocated efficiently. Thus, the project will consist of three principal components: (1) Planning; (2) Data Collection and Analysis; and (3) Soil and Water Conservation.

1. Planning for ASAL Development

The GOK has accorded a clear emphasis to the development of its arid and semi-arid lands. Because the success of the program depends upon the commitment of substantial resources over an extended period of time, a major ASAL planning effort is required to ensure that those resources are allocated efficiently. Technical assistance will include three ASAL planning advisors. Two will provide ASAL planning assistance at the national level for the development of all ASALs, and the third will work at the district level, specifically focusing on planning for Kitui District.

2. Data Collection and Analysis for ASAL Development

This project component is designed to assist the GOK gather and analyze data essential to carrying out its ASAL Development Program. The component incorporates three different tools or methodologies to provide the basic data and information needed for effective planning in the ASALs: (a) Pre-investment resource inventories; (b) aerial photography, remote sensing imagery, and other mapping aids; and (c) feasibility and project design studies.

a. To assist the ASAL Branch of the Ministry of Agriculture with Pre-Investment Resource Inventories, this project will provide 17 person-years of long-term technical assistance; 6 person-months of short-term consultants; and 5 person-years of training.

b. To assist the Survey of Kenya with Aerial Photography, Remote Sensing Imagery, and other Mapping Aids, this project will provide one long-term advisor for two years, finance a contract to provide aerial photographs for all of Kitui District and the 400,000 hectare pilot soil and water conservation area, and finance the purchase of Landsat imagery and its interpretation for all of Kitui District for two consecutive years.

c. Implementation of the GOK's ASAL Development Program will require substantial capital investment in a multitude of activities, especially those designed to provide physical infrastructure and to develop the area's water potential. To determine whether or not these investments are technically and economically sound, this project provides funds to finance selected reconnaissance level or full-scale Feasibility Studies and Project Design activities.

3. Soil and Water Conservation

This component is designed to test an array of soil and water conservation techniques in a pilot area of Kitui District including the testing of moisture conserving tillage implements. The component will provide 25 person-years of technical assistance, establish a 350 acre soil and water conservation demonstration farm, and train 60 Kenya technicians per year to orient farmers to improved conservation measures.

B. Financial Summary:

Project grant funding requirements are summarized in the following table:

| | (in thousands $) | |
|---|---|---|
| | 1st year | Life-of-Project |
| Technical assistance | 692 | 7,650 |
| Commodities | 870 | 1,275 |
| Training | 580 | 1,000 |
| Other | 2,036 | 3,075 |
| TOTAL | $4,178 | $13,000 |

The total cost of the project is $18,645,000. The GOK's share of the cost amounts to $5,645,000 or 30% of the total cost and, thus, the requirements of Section 110(a) of the FAA are met. The GOK contribution will finance Kenyan personnel costs, transportation, office and clerical support, part of the costs associated with participant training, and a major portion of the daily wages for soil conservation activities.

C. Socio-Economic, Technical and Environmental Description

This project will directly benefit an estimated 21,000 farm families in Kitui District; 170 secondary school graduates through training in soil and water conservation methods; and approximately 40 persons through training received outside of Kenya. The indirect beneficiaries will be other Kitui families and residents in similar

ASAL areas. The benefits derived by the approximately 21,000 farm families will be in the form of improved oxen-drawn tillage equipment and hand tools, training in soil and water conservation techniques, access to employment opportunities, and, in the long run, improved nutrition and income earning prospects as a result of higher crop yields.

The project has also been judged to be socially sound: the project is designed to ensure that project outputs have a positive impact on the smallholder farmers who are the ultimate target beneficiaries.

As a result of the AID/W review of project documentation submitted by the USAID Mission, the technical activities proposed within the project are considered technically sound. The Project Committee engineer has confirmed that the construction costs of the various types of soil conservation structures as well as of the housing are reasonable. Thus, the project is determined to have met the requirements of Section 611(a) and 611(b) of the FAA.

This project consists of technical assistance, participant training and natural resource-improving conservation activities. A negative determination has been made with regard to the Initial Environmental Examination. The project was designed specifically to protect and improve the physical environment. The housing construction element will have only the usual temporary nuisance effects of noise and dust. No pesticides will be financed under this project. The Project Review met on July 26, 1979, and agreed that, based on the Project Paper, environmental considerations have been adequately addressed.

D. Committee Action and Congressional Notification

The Africa Bureau Project Review Meeting held on July 26, 1979, agreed that the project should proceed to authorization. An Executive Committee for Project Review (ECPR), chaired by the Acting Assistant Administrator for Africa, was held on August 8, 1979, for the purposes of informing the Executive Committee of the substance of the project and to seek their approval to proceed. The ECPR has recommended the following modification to the project: Given the heavy burden for subcontracting, ordering of commodities, participant training, etc., which the USAID Mission intends to place upon the prime contractor, the ECPR feels these administrative/managerial responsibilities might best be handled through the addition of 24 person-months for the services in Nairobi of a full time executive officer on the prime contractor's staff. The Executive Committee recommends that the project, including the modification, be approved.

This project, set forth on page 319 of the FY 1979 annual Congressional Presentation, indicates a FY 1979 obligation in the amount of $800,000 (Grant) and $11,600,000 (Loan). A Congressional Notification

advising the proposed increased FY 1979 grant obligation was submitted on August 10, 1979, and the fifteen day waiting period will expire on August 24, 1979.

Under the human rights project review procedures for FY 1979, all ongoing and new projects for Kenya have been approved.

Prior to any disbursement, and in addition to the standard conditions precedent, the USAID will require seven special conditions precedent. These conditions are set forth in the attached PAF II.

The USAID also intends to include nine special covenants in the Project Agreement. These convenants are also set forth in the PAF II.

Two waivers are also being requested to permit the purchase in Kenya of eight project vehicles from countries included in AID Geographic Code 935 and to allow the procurement of aerial photography services from firms of Code 935 nationality.

Justification for these waivers are set forth in Annex Q of the Project Paper. These waivers have been incorporated into the PAF II attached for your signature.

The Africa Bureau Project Officer responsible for the Project is Cameron Pippitt, AFR/DR/EAP. The USAID/Nairobi Project Manager is Dr. Donald McClelland.

Recommendation: That you sign the attached PAF II, and thereby authorize the proposed project, and the requested procurement source/origin waivers.

Attachments:
1. PAF II
2. Environmental Examination and Determination
3. Project Paper

AFR/DR/EAP:CPippitt:mj:8/21/79

Clearances: GC:MBall
PPC/PDPR:BSidman
DAA/AFR:WHNorth
AFR/DR:JWKoehring
AFR/DR/EAP:MMcDaniel

GC/AFR:EDragon (draft).

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

NAME OF COUNTRY: Kenya

NAME OF PROJECT: Arid and Semi-Arid Lands Development

NUMBER OF PROJECT: 615-0172

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to Kenya (the "Cooperating Country") of not to exceed Four Million One Hundred and Seventy Eight Thousand United States Dollars ($4,178,000) (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 will assist Kenya in its efforts to establish a basis for a national accelerated development program in arid and semi-arid lands (ASAL) through (a) enhanced administrative, planning and technical capabilities, and (b) testing and proving an array of activities in soil and water conservation and tillage methods. Additionally, the project will assist Kenya to improve and preserve the agricultural production base in portions of Kitui District. Assistance will be provided for three basic project components: (1) planning for ASAL development, (2) data collection, including feasibility and reconnaissance studies and mapping of certain ASALs, and (3) activities in soil and water conservation and development of hand tools and improved tillage implements. The project, generally, will finance technical assistance, participant training, commodities, construction and certain other costs.

I approve the total level of A.I.D. appropriated funding planned for the project of not to exceed Thirteen Million United States Dollars ($13,000,000), 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.

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 as stated in paragraph d. below, goods and services, except for ocean shipping, financed by A.I.D. under the project will have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Grant will be procured in the U.S., except as A.I.D. may otherwise agree in writing.

b. Conditions Precedent.

1. Prior to any disbursement, or the issuance of any commitment document under the Project Agreement, for the purpose of financing assistance for ASAL and Kitui District Planning, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that there are qualified counterparts in place for the project-financed long-term technical advisors provided under the Planning component for the project. This condition will apply separately to the Ministry of Economic Planning and Community Affairs and to the Ministry of Agriculture.

2. Prior to any disbursement, or the issuance of any commitment document, for the purpose of financing under the Project Agreement any contract for technical, construction or other services to be entered into by the Grantee, or for any contract for commodity procurement, where such procurement of goods or services exceeds $50,000, A.I.D. will approve each such contract and/or designs and specifications in writing. This requirement may be satisfied separately for each such contract action.

3. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing any soil conservation sub-project, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., a report describing the sub-project including a detailed description of the sub-project area, method of carrying out the work, cost estimates, accounting system, including copies of forms to be used

to account for cash disbursements through the District level, and environmental examination. Details of such report will be described more fully in Project Implementation Letters (PILs).

4. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing studies not identified in the project agreement's amplified description, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., study proposals describing, inter-alia, cost estimates for the study, manpower requirements, proposed course of action, and relationship between the particular study and the Grantee's ASAL Development Program. Specific content and form for these proposals will be addressed in PILs. This condition may be satisfied separately for each study.

5. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing construction at the Better Living Institute, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., final plans, specifications and cost estimates for such construction. This condition may be satisfied separately for each unit of construction.

6. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing procurement of animal drawn implements resulting from the project's first phase design and testing program, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., a plan describing the procedures for distribution of such implements including, inter-alia, marketing mechanisms to be utilized, credit facilities to be made available, criteria for farmer eligibility in the program, and, where applicable, extent of Grantee subsidies.

7. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing physical activities under the soil and water conservation component of the project, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that it has set aside, at its Better Living Institute, land and facilities adequate to serve as the project's water and soil conservation demonstration and training center.

c. Covenants.

1. The Grantee will covenant to continue the existing structure, or provide other adequate mechanisms, for administering ASAL development. The Grantee will keep A.I.D. advised in the event that the existing administrative structure, including the Inter-Ministerial Committee on ASALs, the ASAL Central Coordinating Committee, and the ASAL Core Technical Committee is altered.

2. The Grantee will covenant to provide, in addition to the counterparts mentioned in the initial condition precedent, qualified counterparts for project-financed technical advisors in accordance with the schedule included as part of the project agreement's amplified description, which may be subsequently modified by the parties in Project Implementation Letters (PILs). Additionally, the Grantee will, unless the parties otherwise agree in writing, take such steps as may be necessary to establish the positions of forester and cartographer within the ASAL Branch of the Ministry of Agriculture.

3. The Grantee will covenant to take all necessary steps to assure that the Survey of Kenya deploys the resources necessary for aerial photography and mapping of Kitui District so that photography and mapping are completed by June 1981, or such later date as A.I.D. may agree in writing.

4. The Grantee will covenant to provide, on a timely basis, approximately 20-30 certificate level graduates to receive basic training in soil and water conservation principles and practices at the project's facility at the Better Living Institute. Timing for these institutional courses will be generally described in the project agreement's amplified project description and will be more specifically defined in subsequent PILs.

5. The Grantee will covenant to make available, upon completion of training, means of transportation, motorized or other, to persons successfully completing project training at the Better Living Institute. This covenant applies only to those technicians posted to a position of responsibility for soil and water conservation in Kitui District.

6. The Grantee will covenant to make available on a timely basis qualified individuals to undertake participant training funded under the project. Such participants will be made available in accordance with the general time frame indicated in the project agreement's amplified project description, and which will be described in greater detail in subsequent PILs. Except as A.I.D. otherwise agrees in writing, the participants will be returned to such positions within the Government, commensurate with the nature and level of training received, as may be agreed to by the parties.

7. The Grantee will covenant to have an independent Chartered Accounting firm undertake annual audits for the soil and water conservation component, particularly the accounting and use of project commodities and the cash disbursement system for labor.

8. The Grantee will covenant to prepare in form and substance satisfactory to A.I.D., periodic training plans for participant training financed under the project. The content of these plans and their timing will be the subject of subsequent PILs.

9. The Grantee (subject to the approval of annual budgets) will covenant to finance a significant portion of the recurrent costs associated with the project, including the soil and water conservation activities in Kitui District. Details of such financing will be described more fully in the PILs.

d. Waivers.

As justified in Annex Q of the Project Paper, the following waivers to A.I.D. regulations are hereby approved.

1. The requirement set forth in Handbook 1, Supplement B limiting procurement of services under grant-financed projects to firms of U.S. and Cooperating Country nationality is waived to permit procurement of aerial photography services from firms of A.I.D. Geographic Code 935 nationality. It is hereby determined that the interests of the United States are best served by permitting the procurement of services from Free World countries other than the Cooperating Country and countries included in Code 941.

2. The requirement under Handbook 1, Supplement B that commodities procured with grant funds have their source and origin in the U.S. and the Cooperating Country is waived to permit the procurement of eight project vehicles, at an approximate cost of $150,000, which have as their source and origin countries included in A.I.D. Geographic Code 935. It is hereby determined that exclusion of procurement of the project vehicles from free world countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program, and that special circumstances exist which justify waiver of the requirement of Section 636(i) of the Act.

Date: Aug 27, 79

Douglas J. Bennet, Jr.
Administrator

E. **Initial Environmental Examination**

Project Location..... Kitui, Kenya

Project Title..... Arid and Semi-Arid Lands Development

Funding..... $13,000,000

Life of Project ..... Five years

IEE Prepared by ..... Pacific Consultants

Environmental Action Recommended Negative Determination

Mission Director's Concurrence

Glenwood P. Roane

Date..... Jan 29, 1979

Assistant Administrator's Decision..... (Concurrence/non-concurrence)

Date August 22, 1979.....

## I. Examination of Nature, Scope, and Magnitude of Environmental Impacts

### A. Description of the Project

This project is structured to address many of the immediate concerns regarding Kenya's Arid and Semi-Arid Lands (ASAL) as identified by the ASAL Central Coordination Committee. It includes three components, one of which focuses on Kitui District. The components are:

1. Planning for ASAL Development. Assistance under this component will strengthen the capacity and capability of Kenya's ASAL planning organizations to carry out sound planning for the development of 82% of the country's land area, the arid and semi-arid zones.

2. Data Collection and Analysis for ASAL Development. Assistance under this component will help establish the base for collection of basic data and will develop procedures for interpreting, evaluating, storing, and using the data for planning purposes. It also provides for the production of aerial photographs and orthophoto maps for the project area where action-oriented programs will be launched. These maps will significantly accelerate the planning and design of soil and water conservation activities. It also assists in strengthening the capability to use and interpret aerial photographs, satellite imagery, multispectral photos, and remote sensing. The component provides funding for carrying out feasibility studies and subsequent design of new activities to support the ASAL Development Program.

3. Soil and Water Conservation. This component provides assistance for (a) manpower development through training and demonstration; (b) improved organization and work procedures through revision of the delivery system for technical services; (c) land development through measures to protect against erosion and improve soil management; and (d) improvement of applied technology through development of standards. The purpose of this project component is to test the effects of soil and water conservation practices in arresting the present high rate of resource degradation in a moisture deficient ecozone of Kenya. Conservation practices, most of which are already known and accepted, will be applied according to their effectiveness in reversing the degradation of the physical environment.

Assistance is also provided under this component for supplying through local fabricators and distributors an improved set of soil working implements which can be powered by animal-draft. These implements are designed to permit crop residues to remain on the soil surface to protect against erosion and at the same time provide the

minimum soil tillage necessary for planting and culturing field crops. Emphasis will be given to the design and adaptation of implements which conserve moisture in the soil, retard topsoil loss from the farm due to erosion, minimize draft power, and reduce weeding time for culturing crops. The effectiveness of these new implements will be tested under controlled field conditions.

B. Location of the Project

The area where activities affecting land form or existing physical features of natural resources will be carried out is Kitui District in Kenya. This area is characterized as rolling, undulating terrain with a well defined drainage pattern. Soil capability has been ajudged good based on reconnaissance level soil investigation. However, most of the area lies in a climatic zone unfavorable to high production/low risk farming activities. Rainfall is deficient and spread between two separate periods each year. Evaporation rates are high and except for a few springline seeps along one geologic faultline in the center of the District, there are no perennial water flows within the District boundaries. (The Athi River is a riparian stream along the western border.) The land is predominantly bushland with scattered enclaves where cultivation of crops is practiced. The human population is concentrated in the West-Central part of the District. This is the area selected for applying the soil and water conservation project component on a pilot basis.

C. Identification and Evaluation of Environmental Impacts

Component 1 of the project consists primarily of technical assistance and therefore does not raise environmental concerns.

Component 2 also consists of technical assistance. The social impact of carrying out aerial photography is discussed in the social soundness analysis. Although this project does not provide funds for implementing any activity based on the feasibility studies, each study will incorporate an environmental review to identify potential environmental issues.

Component 3, Soil and Water Conservation and Hand Tools and Tillage Implements, by their nature, will have an impact. As indicated above, this component is a pilot effort for testing the effectiveness of project interventions. As a pilot project, one of the tests of project impact will be its effects on the physical and human environment. The project team members will be required under their scope of work to perform assessments of the environmental impacts of their activities.

Soil conservation works consist of modifications in natural land form and of protective land treatment measures. The project area, lying within the arid and semi-arid zone of Kenya, is representative of 82% of the country's arable land that is already affected

by serious erosion and desertification. The conservation practices to be applied will provide interrruption of runoff water and reduction of sheet and gully erosion of soil materials. These practices include digging terraces, cutoff drains, small water detention facilities such as farm ponds, water harvesting from rock catchments, subsurface dams in streambeds, and water spreading facilities. Other practices which provide vegetal protection are contour strips, grassed waterways, and tree or grass plantings on terraced ridges, pond embankments, and other earthen structures. Crop residue and soil management practices such as minimum tillage and mulch farming using improved tillage methods provide further protection to cropped areas with concomitant effects through increased production.

Funds provided under this project will be used to apply these improved methods of conserving the soil and water resources. They will be beneficial both in terms of increased agricultural production and reduced soil erosion. Moreover, the conservation measures will ameliorate the rate of siltation affecting dams, reservoirs, and streams and the disruption of transportation caused by soil deposits on the roads. Funds are also provided to improve the capability of Kenyans to plan additional projects in the ASAL zone to arrest the environmental degradation presently occuring as a result of soil erosion. No funds are provided under this project for the procurement, distribution, or use of agricultural chemicals. Small bodies of standing water may be created by the construction of small ponds or water harvesting facilities. This may imply the creation of a potential for the spread of malarial and bilharzia vectors. However, these structures will be very small, averaging no more than 5 acre feet (or approximately ½ hectare surface area) of storage, and given the high evaporation rate extant in this area, it is considered that this potential adverse effect will be non-existent. Still, project management will arrange a protocol agreement between the Ministries of Agriculture and Health to provide a monitoring program for detection of malarial or bilharzia incidence and subsequently to provide for appropriate control measures.

The only building construction associated with this project is staff housing. Since these will be located within the environs of Kitui town, there will be no impact on the physical resources area where the project activities will be implemented. The houses will be of standard GOK Public Works design. They will be constructed on-campus, nearly doubling the number of staff houses that already exist. The site for the facilities is considered suitable by the USAID engineer. A potable water supply is available at the site from Kitui town's water supply which is drawn from boreholes. Electricity is available and reliable. Septic tanks for disposing of sewage wastes will be installed for every house. Plans will be approved by the USAID engineer. The houses will be constructed of concrete blocks with PVC flooring, asbestos roof sheeting on timber trusses, and soft board sheeting. Approximately 5 acres of vacant space is available

for new housing, so the seven new structures will not cause any undue crowding of existing staff houses. Based on the design team's inspection, review and consultation with the USAID/Kenya engineer, the house construction element of the project should be classified as environmentally neutral.

## II. Recommendation for Environmental Action

The project will fund primarily technical assistance, training, and natural resource improving conservation activities.

Physical activities will primarily be of a pilot nature (see Section 216.2b and c of AID Handbook 3, App. 4B.) and will be expanded only after taking into account, under the auspices of the project team, environmental considerations addressed in Section 216. Thus, the initial stages of the project will serve to perform the functions of an EA.

Therefore, a negative determination is recommended.

(Note: The PID for this project indicates that "A public works program of small dam construction on Government-owned land will be carried out to lay the basis for water supply and irrigation programs. Actual construction will be carried out by the Ministry of Water Development operating through the District Development Committee and the PCU. One USAID advisor (an irrigation engineer) will be provided to assist in planning and implementing this program." (p. 6) The PID budgeted $5,000,000 for dam construction, almost 25% of the total project cost of $21,000,000. Issue E. of the PID states that "Some of the project elements (dam construction) may have of themselves possible negative environmental impacts which will have to be considered during the PRP-PP process." (p. 12) Accordingly, the PID Approval Message stated that the "PP will require an environmental assessment per A.I.D. Regulation 16." (p. 4) Because the ASAL Development Project does not include any dam construction as had been anticipated in the PID (see, for example, p. 20, footnote 14 of the PP), the PP does not include an environmental assessment.)

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: Kenya

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 615-0172

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

7. PROJECT TITLE (Maximum 40 characters): Arid and Semi-Arid Lands Development

8. ESTIMATED FY OF PROJECT COMPLETION: FY 84

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 - K.Sh. 7.5

| 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 | 3,581 | 597 | 4,178 | 11,086 | 1,914 | 13,000 |
| (GRANT) | 3,581 | 597 | 4,178 | 11,086 | 1,914 | 13,000 |
| (LOAN) | ( 0) | ( 0) | ( 0) | ( 0) | ( 0) | ( 0) |
| OTHER U.S. 1. | | | | | | |
| OTHER U.S. 2. | | | | | | |
| HOST COUNTRY | 0 | 5,645 | 5,645 | 0 | 5,645 | 5,645 |
| OTHER DONOR(S) | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS | 3,581 | 6,242 | 9,823 | 11,086 | 7,559 | 18,645 |

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 ___ L. GRANT | K. 3RD FY ___ M. LOAN |
|---|---|---|---|---|---|---|---|---|---|
| (1) FN | 120 | 066 | | 4,178 | 0 | 8,822 | 0 | | |
| (2) | | | | | | | | | |
| (3) | | | | | | | | | |
| (4) | | | | | | | | | |
| TOTALS | | | | 4,178 | 0 | 8,822 | 0 | | |

| A. APPROPRIATION | N. 4TH FY ___ O. GRANT | N. 4TH FY ___ P. LOAN | Q. 5TH FY ___ R. GRANT | Q. 5TH FY ___ S. LOAN | LIFE OF PROJECT T. GRANT | LIFE OF PROJECT U. LOAN |
|---|---|---|---|---|---|---|
| (1) FN | | | | | 13,000 | 0 |
| (2) | | | | | | |
| (3) | | | | | | |
| (4) | | | | | | |
| TOTALS | | | | | 13,000 | 0 |

12. IN-DEPTH EVALUATION SCHEDULED: MM 03 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.

2 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Glenwood P. Roane

TITLE: Director, USAID/Kenya

DATE SIGNED: MM 06 DD 29 YY 79

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-78)

UNITED STATES OF AMERICA
AGENCY FOR INTERNATIONAL DEVELOPMENT
U.S.A.I.D. MISSION TO KENYA

June 29, 1979

Office of the Director,
P. O. Box 30261,
Nairobi, Kenya.

Mr. John Koehring
Director, Office of Development Resources
Bureau for Africa
Agency for International Development
Washington, D.C. 20523

Dear Mr. Koehring:

Transmitted herewith is USAID/Kenya's Project Paper for Arid and Semi-Arid Lands Development. Dr. Hesser, leader of the Pacific Consultants team which assisted the Mission prepare the paper, is hand-carrying it to reach you by Monday, July 2, 1979.

I want to point out two corrections concerning the Project Paper.

First, the Mission has determined that a single contract, rather than several separate contracts, is needed to facilitate implementation of the project. Therefore, references in the PP to more than one contractor are inaccurate. (There will be, however, separate contractors for aerial photography, evaluation, and audit.)

Second, a brief analysis of how the labor costs for the soil and water conservation component were derived will be hand-carried to you by Dr. Hesser. This should be included in the PP as part of Annex E following page 6. (This analysis was prepared earlier by Pacific Consultants but was inadvertantly not left with the Mission when the consultant departed.)

This project represents a major United States development assistance effort to help the Government of Kenya implement its Arid and Semi-Arid Development Program. It has the full support and commitment of the Government. I hope you will arrange to schedule a review of the paper toward the last week of July, if possible. I have asked Dr. Donald G. McClelland, who played a major role in preparing the paper, to assist you in this process and to represent the Mission at the review. He expects to arrive in Washington on or about July 24, 1979. I also anticipate that Dr. Hesser will participate in the review.

We look forward to quick approval and authorization of the Project Paper, leading to obligation in August, 1979.

Sincerely yours,

Glenwood P. Roane

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# RECOMMENDATIONS AND SUMMARY

## A. Recommendations

1. Grant — $13,000,000
2. Grantee — Government of Kenya
3. Term of Project — Five (5) Years
4. Waivers

   a. A waiver of the requirement of AID HB 1, Sup. B and Section 636(i) of the FAA to allow procurement of 8 project vehicles (approximate cost $150,000) from countries included in AID Geographic Code 935.

   b. A waiver of the requirement of AID HB 1, Sup. B to allow procurement of aerial photography services (approximate cost $600,000) from firms of Code 935 nationality.

## B. Summary of Project

The Arid and Semi-Arid Lands (ASAL) Development Project addresses problems at both the national level (primarily through ASAL planning and data collection) and the district level (primarily through soil and water conservation activities in a pilot area in Kitui District.) The specific components included in this project support the GOK's strategy for arid and semi-arid lands as discussed in the Five Year Plan (1979-1983) and in the ASAL Framework Document.

The project consists of three components: (1) Planning; (2) Data Collection and Analysis; and (3) Soil and Water Conservation.

### 1. Planning for ASAL Development

The GOK has accorded a clear emphasis to the development of its arid and semi-arid lands. Because the success of the program depends upon the commitment of substantial resources over an extended period of time, a major ASAL planning effort is required to ensure that those resources are allocated efficiently.

Technical assistance will include three ASAL planning advisors. Two will provide ASAL planning assistance at the national level for the development of all ASALs, and the third will work at the district level, specifically focussing on planning for Kitui District.

| Grant Financing ($000) | AID | GOK | Total |
|---|---|---|---|
| Long-Term Personnel | $1,106 | $226 | $1,872 |
| Short-Term Consultants | 120 | 60 | 180 |
| Participant Training | 135 | 58 | 193 |
| Commodities | 29 | 6 | 35 |
| Evaluation | 120 | 0 | 120 |
| Total | $2,010 | $390 | $2,400 |

2. Data Collection and Analysis for ASAL Development

This project component is designed to assist the GOK gather and analyze data essential to carrying out its ASAL Development Program. It has two principal objectives: (a) provide the information needed for effective ASAL planning; and (b) provide the information needed for program and project monitoring and evaluation.

This project component incorporates three different tools or methodologies to provide the basic data and information needed for effective planning in the ASALs: (a) pre-investment resource inventories; (b) aerial photography, remote sensing imagery, and other mapping aids; and (c) feasibility and project design studies.

To assist the ASAL Branch of the Ministry of Agriculture with Pre-Investment Resource Inventories, this project will provide 17 person years of long-term technical assistance; 6 person months of short-term consultants; and 5 person years of training.

To assist the Survey of Kenya with Aerial Photography, Remote Sensing Imagery, and Other Mapping Aids, this project will provide one long-term advisor for two years; finance a contract to provide black and white aerial photographs and multispectral aerial photographs for all of Kitui District and orthophoto maps for the 400,000 hectare area where the pilot soil and water conservation activities will be; and finance the purchase of Landsat imagery and its interpretation for all of Kitui District for two consecutive years.

Implementation of the GOK's ASAL Development Program will require substantial capital investment in a multitude of activities, especially those designed to provide physical infrastructure and to develop the area's water potential. To determine whether or not these investments are technically and economically sound, this project provides funds to finance selected reconnaissance level or full-scale Feasibility Studies and Project Design activities.

| Grant Financing ($000) | AID | GOK | Total |
|---|---|---|---|
| Long-Term Personnel | $2,327 | $ 801 | $3,128 |
| Short-Term Consultants | 60 | 30 | 90 |
| Local Hire Consultants | 50 | 0 | 50 |
| Training | 75 | 32 | 107 |
| Commodities | 648 | 12 | 660 |
| Feasibility Studies | 600 | 300 | 900 |
| Evaluation | 120 | 0 | 120 |
| Total | $3,880 | $1,175 | $5,055 |

3. Soil and Water Conservation

Erosion in ASALs is a growing problem. Relative to the severity of the problem, very little conservation is being practiced in the ASALs. Little engineering skill is incorporated into the design of the few conservation structures that are installed; because virtually none exists in Kenya except for a small number of persons in the central Government. Hence, erosion problems are often exacerbated rather than corrected.

This component is designed to test an array of activities, particularly soil and water conservation techniques, in a pilot area of Kitui District. To complement this program, moisture conserving tillage implements will be designed and tested and conservation oriented afforestation activities will be supported.

This project will provide 25 person years of technical assistance to develop the pilot soil and water conservation program in Kitui District; establish a 350 acre soil and water conservation demonstration farm and training program at the Better Living Institute near Kitui town; train 60 soil and water conservation technicians per year to orient farmers to improved conservation measures; and provide training abroad in modern conservation techniques for selected officers.

| Grant Financing ($000) | AID | GOK | Total |
|---|---|---|---|
| Long-Term Personnel | $3,398 | $ 195 | $3,593 |
| Short-Term Consultants | 140 | 70 | 210 |
| Local Hire Consultants | 208 | 0 | 208 |
| Training | 790 | 340 | 1,130 |
| Commodities | 598 | 426 | 1,024 |
| Field Labor Costs | 762 | 3,049 | 3,811 |
| Management Services | 200 | 0 | 200 |
| Evaluation | 360 | 0 | 360 |
| Total | $6,456 | $4,080 | $10,536 |

## ISSUES

1. Funding Level. The level of grant funding for the ASAL Development Project is higher than had been estimated in the FY 1979 Congressional Presentation. If no additional grant funds are allocated to USAID/Kenya the obligation of funds for this project at the recommended level means that (a) the funding level for other activities planned for FY 1980 and FY 1981 must be reduced, or (b) these activities must be eliminated. The Government of Kenya has been informed of this possibility.

2. Local Currency Financing. The recommended level of AID funding for the ASAL Development Project includes a higher proportion of local currency financing than is usual in AID-supported projects. The GOK has made a strong case to the Mission that this level of currency financing is necessary: (a) the activity has high priority in the GOK's overall strategy for developing the ASALs, and (b) funds are not now available from GOK budgetary resources. While the recommended level of AID financing of local currency costs is justifiable, it raises the question of whether or not the GOK will be able to cover the recurrent costs necessary to continue the soil and water conservation activities after this project terminates.

3. USAID and GOK Management Capability. The Project Paper indicates that one officer in the Mission's Agriculture Division will devote his full time to managing this project; in addition, assistance from the USAID Engineer and support from REDSO will be provided. Still, it will be a difficult and time consuming project to manage. Moreover, in view of the Mission's currently projected staffing levels and projected level of activities, the officer who is assigned full time to this project is likely to be asked to assume non-ASAL project activities in order to fulfill what appear to be more urgent duties.

On the GOK side, the staff capability for managing donor-financed activities in the ASALs is already spread thinly. This project constitutes yet another responsibility. In recognition of the potential problems resulting from lack of adequate management of the ASAL Development Project, the Mission has requested the GOK to appoint a full-time coordinator with authority to make decisions to manage the project.

## GLOSSARY

A & E - Architectural and Engineering

ASALB - Arid and Semi-arid Lands Branch of the Department of Agriculture

ASALs - Arid and Semi-arid Lands

ATAC - American Technical Assistance Corporation (which completed a study of professional and subprofessional agricultural manpower in Kenya in March 1978)

BLI - Better Living Institute

CBS - Central Bureau of Statistics

CDA - Catchment Development Authorities

CDSS - Country Development Strategy Statement

CDO - Community Development Office

CID - Consortium for International Development

DC - District Commissioner

DDC - District Development Committee

DDO - District Development Officer

DOF - Department of Forestry

DOS - Directorate of Overseas Survey (a U.K. government organization)

DPD - Development Planning Division of the Ministry of Agriculture

EEC - European Economic Community

ERIM - Environmental Remote Sensing Institute of Michigan

EROS - Earth Resources Observatory Systems

FAO - Food and Agriculture Organization of the United Nations

GBC - Graveling, Bridging and Culverting

GOK - Government of Kenya

ICRISAT - International Crops Research Institute for the Semi-arid Tropics (Hyderabad, India)

IITA - International Institute for Tropical Agricultural (Ibadan, Nigeria)

LFMD - Land and Farm Management Division of the Department of Agriculture

MEPCA - Ministry of Economic Planning and Community Affairs

MOA - Ministry of Agriculture

MOW - Ministry of Works

MSS - Multi-spectral Scanner

MWD - Ministry of Water Development

NASA - National Aeronautics and Space Administration

NORAD - Norwegian Agency for International Development

PFPP - Protective Forest Plantation Program

RPS - Rural Planning Section of the Ministry of Economic Planning and Community Affairs

SIDA - Swedish International Development Agency

SK - Survey of Kenya

SS - Soil Survey

TA - Technical Assistance

USDA - United States Department of Agriculture

USGS - United States Geophysical Survey

## II. DESCRIPTION OF THE PROJECT

### A. Summary and Overview

The Arid and Semi-Arid Lands. Kenya is divided into six ecological zones based on rainfall and moisture indices; Zone I is the wettest and Zone VI is the driest. The Arid and Semi-Arid Lands (ASALs) include zones IV, V, and VI where the average rainfall ranges from 200 to 800 millimeters. Together, these three zones cover 82 percent of Kenya's land area and support nearly 20 percent of the population (2.6 million people) and about 50 percent of the livestock. (See Map 1.) Arising from what may be the world's highest population growth, increased migration from the overcrowded high and medium potential areas of the country to the less densely populated but lower potential ASALs is taxing the already limited carrying capacity of the land. Thus, Kenya's ASALs are characterized by severe natural resource limitations, rising population pressure, and inadequate management of the existing resource base,[1] which combined constitute the basic problem confronting the area and its people.

GOK Policy. The Third Development Plan (1974-1978) was cognizant of the problems of the ASALs, but few programs were implemented during that period to rectify them. In contrast, the Fourth Development Plan (1979-1983), which establishes poverty alleviation as its central objective, sets forth a clearly articulated statement of the need to accord substantially greater emphasis to the development of the ASALs and recommends a set of action programs designed to achieve results.[2]

In the fall of 1978, an inter-ministerial Task Force began preparing a policy paper which would set forth the GOK's objectives, strategy, general plans, and organization for implementing its ASAL Development Program as called for in the Fourth Development Plan. This document, Arid and Semi-Arid Lands Development in Kenya: The Framework for Implementation, Program Planning, and Evaluation (hereafter referred to as the ASAL Framework Document), was published in May 1979. It sets forth four principle objectives: (a) Development of Human Resources, recognizing that the people of the ASALs

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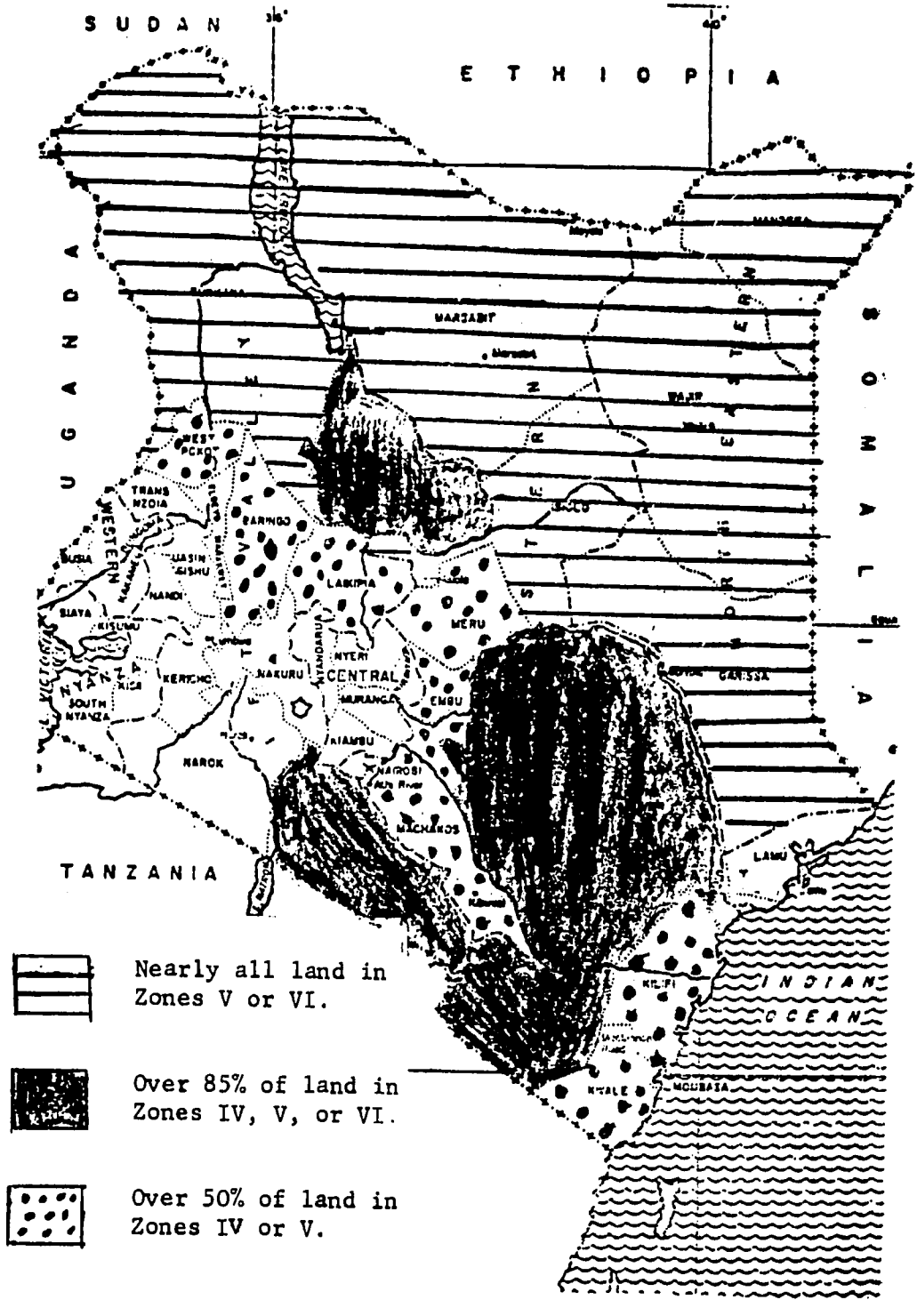
1/ The result of inadequate management is the destruction of the natural vegetative protection of the land, followed by severe erosion of the hillsides and siltation of streams and existing dam reservoirs. Thus, while the demand for increased agricultural production is rising, the capability of the land to yield food and fiber is declining.

2/ Government of Kenya, Development Plan, 1979-1983, Part I, pp. 253-55.

MAP 1. Proportion of Land in Districts Classified as Arid or Semi-Arid, Kenya, 1969



are among the country's most disadvantaged; (b) Exploitation of Productive Potential, recognizing that the output realized in ASAL areas of other countries (the Middle East and North America) is far greater than that of Kenya's ASALs; (c) Conservation of Resources, recognized as a "fundamental objective of the program" and probably a pre-condition to realizing the production potential of the land; and (d) Integration with the National Economy to redress the imbalance associated with past development investments which were concentrated in the higher potential areas.

In early May, the GOK convened a seminar to which most ministries and many international donor organizations were invited. The wide array of participants indicated that the kinds of investment activities that would be required in the ASALs would come under the administrative jurisdiction of virtually all ministries, and that substantial donor support would be required to implement the Program. The seminar served to reinforce two views important to AID:[3/] (a) ASAL development is a long-term effort which will require a long-term commitment on the part of the Government to ensure its success; and (b) because this constitutes a new type of investment activity, it requires that Government and donors (especially the latter) move forward cautiously to avoid upsetting the fragile ecosystem. The GOK stressed that the ASAL Development Program would be organized in terms of a people-based approach, and that the management and implementation of ASAL activities -- including technical assistance -- should focus on the district level.

The Role of the United States. In 1974, the GOK requested AID to finance a comprehensive study of the resources, problems, and potential investment opportunities in parts of Eastern and Rift Valley Provinces. The Government commissioned this study in recognition of the dangers associated with unchecked population pressure on the fragile ASAL environment. From April 1977 through August 1978, a group of eight Kenyans (under the Marginal Lands Unit) and eight Americans (under the Consortium for International Development) carried out the study. The final report, Kenya: Marginal/Semi-Arid Lands Pre-Investment Inventory (hereafter referred to as the Pre-Investment Study), consists of 10 volumes which record the current status of and future prospects for the development of the people and the lands studied.[4/]

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3/ These two views are set forth in the Mission's CDSS, January 1979, pp. 3, 37-38.

4/ These volumes include: (1) Analysis and Project Identification; (2) Agronomy; (3) Economics; (4) Soil and Water Conservation; (5) Forestry; (6) Human Resources and Social Characteristics; (7) Institutions; (8) Livestock and Range Management; (9) Seeds; and (10) Soils.

In November 1978, a seminar was organized to review this report. All key ministries, AID, and representatives from the Consortium for International Development participated. The seminar concluded, inter alia, that soil and water conservation was, without question, the activity requiring most urgent attention; indeed, investments designed to increase crop and livestock production without first ensuring a stable natural resource base would be largely ineffective. Participants also noted that some investment activities were extremely complex with highly integrated components, while others were relatively free standing and could be implemented with little additional survey work. In addition, there seemed to be a built-in sequence among some activities, suggesting a logical order of priority for investment and implementation. The activities supported under this ASAL Development Project were selected largely on the basis of the conclusions of that seminar. Additional criteria included recognition of the kinds of activities in which the U.S. has considerable expertise and experience, and the limited time available to design a project for funding in FY 1979.

During this same period, discussions were initiated by the GOK, at the highest levels, concerning the role that the U.S. might play in assisting the Government to implement its ASAL Development Program. In a meeting with the Ambassador, the GOK made two suggestions: first, that the United States play a leading role by providing forward planning assistance for the long-run development of the ASALs within the overall context of the ASAL Framework Document; and, second that the United States provide capital assistance in support of those activities that warranted rapid implementation without further study or assessment.[5/] The Ambassador responded positively to both suggestions, thereby endorsing AID's involvement in what was anticipated to become a major development effort during the next Plan period and beyond.

The strategy for providing such assistance to Kenya's ASALs is set forth in the Mission's CDSS (January 1979). Because of the high risk associated with ASAL development, the strategy follows a dual path which includes both research-oriented and action-oriented programs. Initially, the balance favors investments where the risk of serious error is low: research, expansion of the data base, and support of pilot scale projects and other activities which are "free standing"; that is, their success is not dependent upon a complex set of other interventions. Later, the balance shifts to favor larger, action-oriented investments. The anticipated shift is manifest in the Mission's FY 1981 Annual Budget Submission (ASAL Development Project -- Phase II) as well as in the Feasibility Study and Project Design element of this project.

5/ These activities were expected to focus on Kitui District, parts of which were included in the Pre-Investment Study.

Although the first step toward implementing the CDSS's ASAL strategy, this project is not the first AID-supported activity in Kenya's ASALs. ASAL districts within Northeastern, Coast, and Rift Valley Provinces have been the focus of the National Range and Ranch Development Project (615-0157) since 1973 and the Livestock Development Loan (615-0160) since 1974. These projects are designed to improve range management through a system of grazing blocks and to stabilize water availability through a systematic program of drilling boreholes and constructing reservoirs. AID plans to begin implementing the Dryland Cropping Systems Research Project (615-0180) in FY 1979. This project supports basic and applied research designed to develop and deliver an appropriate technological package of agricultural practices for smallholders in the semi-arid regions of Eastern Province.

This ASAL Development Project stems directly from the above antecedents and has been structured to assist the GOK achieve specific objectives of its overall program, especially its resource conservation objective. The GOK considers the U.S. one of the few countries in the world with substantial relevant experience in dryland agriculture (others include Australia and Israel) and with a reservoir of talent able to assist Kenya meet its needs.

The Role of Other Donors. In view of the magnitude of the ASAL Development Program, Kenya welcomes assistance from other donors. Generally, donors will focus their activities at the district level, the administrative unit designated to identify and assess alternative investment activities, thereby reinforcing the Government's strong emphasis on decentralized rural planning. Among the donors who are involved, or will become involved, in assisting the GOK's program, the European Economic Community (EEC) is at the forefront. The EEC has agreed to finance an integrated development project in Machakos District (adjacent to Kitui District, and one of the districts included in the Pre-Investment Study) for four years beginning in 1978-79. The project has two principle objectives: (a) to increase productivity and employment with a special emphasis on soil and water conservation; and (b) to improve the social infrastructure through expenditures in health, social services, and communication. Total expenditure under the project is approximately $29 million allocated as follows: water development (39%); agricultural development (38%); forestry development (7%); road and bridge construction (6%); cooperative development (4%); rural industries development (2%); social services (2%); and health (2%). The project is managed at the district level.

The IBRD plans to focus attention in Baringo District, parts of which were also included in the Pre-Investment Study. The project includes ten components (and many more sub-components), all of which will be implemented on a pilot basis. Those activities which prove successful will be replicated on a larger scale within the district. The U.K. plans to concentrate its assistance

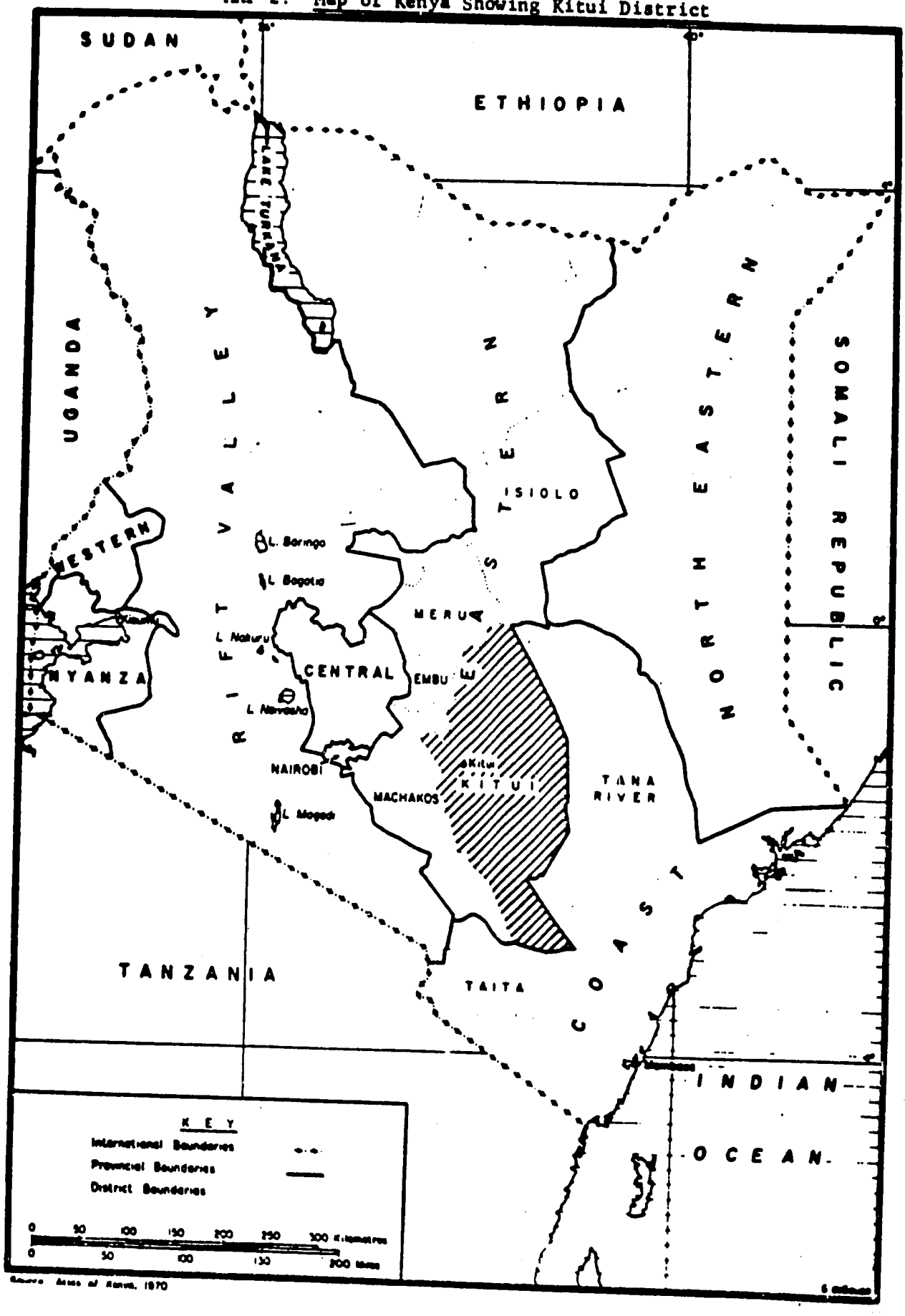
activities in the Isiolo/Meru/Embu Districts (the last of which was included in the Pre-Investment Study). The project has not yet been designed, but it is likely to follow the model of the EEC-funded Machakos project, which is somewhat more structured than the IBRD-funded Baringo project. NORAD has been providing assistance to parts of Marsabit and Turkana Districts, much of which is classified as arid (in contrast to semi-arid). NORAD-supported activities focus on improving access to social services, especially health.

Project Strategy. The ASAL Development Project (the components of which are discussed in greater depth in Section II.B. and Annexes A - F) addresses problems at both the national level (primarily through ASAL planning and data collection) and the district level (primarily through pilot activities in Kitui District). (See Map 2.) The strategy underpinning this dual thrust (research- and action-oriented activities) is elaborated upon in the Mission's CDSS as indicated above.

The specific components included under this project support the GOK's strategy discussed in the ASAL Framework Document which identifies national, regional, and district level activities. National level activities include: (a) land use and catchment planning to define appropriate land uses for each area; (b) land adjudication policies to ascertain rights over land; (c) research concerning ASAL conditions and opportunities; (d) organizational and management systems to maximize labor use in production and conservation works; (e) energy requirements of ASALs; (f) review (and if necessary, modification) of existing ASAL-related legislation, statutes, and policies; (g) major infrastructure; and (h) analysis of economic policy and social change. This project supports key elements of the GOK's national strategy including land use planning and adjudication, organization of labor-intensive conservation works, analysis of economic and social policy issues, and (through feasibility studies) research programs and energy requirements of ASALs.

At the regional level, the GOK strategy includes four activities: (a) major soil and water conservation measures; (b) infrastructure development; (c) development of non-agricultural economic activities; and (d) mapping. This project while supporting none of these activities at the regional level supports all of them, on a pilot basis, in Kitui District. Finally, the GOK strategy identifies district level activities including: (a) cost-effective delivery of social services; (b) small scale irrigation schemes; (c) afforestation; (d) food production; (e) infrastructure such as rural roads; (f) local security; (g) access to inputs, markets, extension, and training; (h) district information centers; and (i) improved district level planning and implementation capacity. This project supports several of these activities including

MAP 2. Map of Kenya Showing Kitui District



assistance to improve district level planning capability and (through feasibility studies) small scale irrigation schemes, afforestation, food production, and rural roads construction.

In short, this project will establish the basis for launching an accelerated development program in the ASALs and will improve and preserve the agricultural production base in portions of Kitui District. The various project components support key elements of the GOK's national/regional/district level strategy outlined in the ASAL Framework Document. With respect to soil and water conservation (the major action-oriented activity), the strategy incorporates sound quality standards in the planning and engineering design of conservation structures and vegetative practices; incorporates training a cadre of Kenyans who will be capable of maintaining those standards; and strengthens the institutional base to ensure a continuing and expanded program in the future.[6/]

B. Project Components

The project consists of three principal components: (1) Planning; (2) Data Collection and Analysis; and (3) Soil and Water Conservation. This section discusses each in turn; individual annexes provide more detailed information.

1. Planning for ASAL Development

The GOK has accorded a clear emphasis to the development of its arid and semi-arid lands. Because the success of the program depends upon the commitment of substantial resources over an extended period of time, a major ASAL planning effort is required to ensure that those resources are allocated efficiently. Two ministries will have major planning responsibilities: (a) the Ministry of Economic Planning and Community Affairs will monitor the integration and coordination of the activities administered by the operating ministries; and (b) the Ministry of Agriculture will identify and assign priorities among a large proportion of these activities, since agriculture is crucial to the successful development of the ASALs. The Permanent Secretaries of both ministries recognize the importance of systematic forward planning to help guide efficient resource allocation. Accordingly, both will expand their respective planning staffs to accommodate the new demands

6/ The EEC-sponsored project also emphasizes soil and water conservation, but without applying the quality standards and institution building aspects of this project. Soil and water conservation is also one of the ten components of the IBRD-sponsored project, but it is not accorded heavy emphasis, at least initially.

created by the Government's commitment to ASAL development. At the same time, both have requested ASAL planning assistance to complement this expansion. This project component is designed to help meet the GOK's ASAL planning needs in such a way as to complement both on-going and proposed AID-supported planning assistance to the GOK.

GOK Organization for ASAL Planning. The ASAL Framework Document establishes the organizational structure for planning and coordinating the ASAL Development Program. For the most part, existing organizations will be augmented with additional staff with particular expertise in and responsibilities for the ASALs. Within the Ministry of Economic Planning, the Rural Planning Section (which carries out the day to day analytical work on which planning and policy decisions are based) will serve as a Secretariat to the ASAL Central Coordinating Committee.7/ To enable the Rural Planning Section to carry out its new ASAL-related work, the Permanent Secretary will add one planning officer to the staff. Through an AID-financed contract between the Government and Harvard Institute for International Development, three advisors have been working in this section since 1976 to help improve the Government's capability to implement a system of decentralized rural planning. Although this Rural Planning Project (615-0162) is scheduled to terminate in December 1980, the Mission has recommended that planning assistance be continued for an additional four years. If such assistance were provided the additional (fourth) advisor would not only constitute a key input needed to assist the overall planning of Kenya's ASAL Development Program, but also would serve to strengthen and complement the existing economic planning activities supported by AID.

The Development Planning Division in the Ministry of Agriculture plans and analyzes agriculture-related projects and, in a sense, will serve as the Secretariat to the ASAL Core Technical Committee.8/ The Permanent Secretary will add two planning officers to the Project Preparation Section of this Division to work specifically on agricultural planning in the ASALs. AID is currently

7/ This committee is the main instrument for coordinating all ASAL planning activities. It consists of senior planning and technical officers from the ministries of Agriculture, Water Development, Naural Resources, Cooperative Development, Works, Housing and Social Services, Health, Lands and Settlement, and Tourism and Wildlife.

8/ This committee, chaired by the Director of Agriculture, includes officers from the four ministries expected to administer most ASAL development resources: Agriculture, Water Development, Natural Resources, and Works.

providing technical assistance under the Rural Planning Project to the Development Planning Division. (This is provided under a multi-donor financed contract between the GOK and the Harvard Institute for International Development to which AID contributes 37%.) Provision of an ASAL advisor to work solely on agricultural planning in the ASALs would serve to complement this on-going AID-supported planning activity.

AID Assistance for ASAL Planning. Working within the existing organizational structure for ASAL planning, and taking into consideration AID's on-going and proposed planning assistance to the GOK, AID will provide under this component of the project 12 person years of long-term advisors, 12 person months of short-term consultants, and 9 person years of degree training.

The technical assistance will include three ASAL planning advisors. Two advisors will provide ASAL planning assistance at the national level for the development of all ASALs, and the third advisor will work at the district level, specifically focussing on planning for Kitui District. One national level advisor will work in the Rural Planning Section of the Ministry of Economic Planning. He/she will require a background in economic planning and must have the ability to integrate plans horizontally (across various ministries) and vertically (from the district to the national level). The second national level advisor will work in the Project Preparation Section (Development Planning Division) of the Ministry of Agriculture. This advisor will require a background in agriculture, planning, and economics, and must have previous experience working in arid and semi-arid lands. Each advisor will work with a Kenyan economist/planner who has been specifically assigned to carry out planning and related analyses for the ASALs. Each will work for a period of four years commencing in July 1980. The third advisor will be an economic planner, bureaucratically under the Rural Planning Section of the Ministry of Economic Planning, but posted in Kitui District where the bulk of AID-supported investment activities will be implemented. Pending the training of a District Planning Officer, this advisor's counterpart will be the District Development Officer who is currently responsible for preparing the District Development Plan. (The Mission has proposed that approximately 20 District Planning Officers be trained under the Rural Planning II Project.) He will commence work in July 1980, for a period of four years.

Providing a full time planning advisor at the district level has several objectives: (a) it facilitates a close linkage between district planning and national planning, thereby encouraging greater feedback and a more participatory planning process, which helps ensure that the needs of the local people are recognized; (b) it creates an opportunity to monitor various AID-supported ASAL development activities in Kitui District; (c) it improves the quality of

decentralized rural planning, thereby reinforcing on-going AID-assisted efforts under the Rural Planning Project; and most importantly (d) it fulfills a GOK request that ASAL-related donor assistance be provided at the district level. This component provides 12 person months of short-term consultants to complement the work of the long-term advisors. It also provides nine person years of participant training at the master's level. It is closely related to the second project component, Data Collection and Analysis, since data collected under that component will be needed for planning both at the national level and in Kitui District. The budget for this project component is summarized below:

| Grant Financing ($000) | AID | GOK | Total |
|---|---|---|---|
| Long-Term Personnel | $1,106 | $226 | $1,872 |
| Short-Term Consultants | 120 | 60 | 180 |
| Participant Training | 135 | 58 | 193 |
| Commodities | 29 | 6 | 35 |
| Evaluation | 120 | 0 | 120 |
| Total | $2,010 | $390 | $2,400 |

2. Data Collection and Analysis for ASAL Development

This project component is designed to assist the GOK gather and analyze data essential to carrying out its ASAL Development Program. It has two principal objectives: (a) provide the information needed for effective ASAL planning; and (b) provide the information needed for program and project monitoring and evaluation. Initially, data will be used primarily for planning purposes. Later, they will provide the baseline for evaluation. Certain planning data for some ASAL areas are already available. For example, the ASAL Branch of the Department of Agriculture (formerly the Marginal Lands Unit) gathered data for the Pre-Investment Study, which has proved useful not only in the design of this Kitui-focused project, but also for the ASAL development activities supported by the EEC, IBRD, and U.K. in Machakos, Baringo, and Embu-Meru-Isiolo Districts, respectively. The Central Bureau of Statistics gathers data on a regular basis; however, its Integrated Rural Survey, which provides detailed data, has generally not included ASALs. Similarly, meteorological and hydrological data are available, but they also are inadequate for ASAL areas. Thus, there remains a data collection and analysis task of major proportions if effective ASAL planning and follow-on investment are to take place.

Planning for certain activities, especially those concerning optimal land utilization, requires an analysis of maps produced from aerial photographs. The Pre-Investment Study listed these activities

as follows: (a) hydrology; (b) rangeland renovation; (c) rural roads; (d) small scale irrigation; and (e) accelerated land adjudication. 9/ Aerial photographs are also needed to monitor ecological changes, which is particularly important under ASAL environmental conditions. Planning for other activities often requires a full-scale economic and technical feasibility study to indicate whether or not investment is warranted. For many of the feasibility studies proposed for funding under this project, such as rural roads, the analysis of data and maps produced from the aerial photographs will constitute a key input.

This project component incorporates three different tools or methodologies to provide the basic data and information needed for effective planning in the ASALs: (a) pre-investment resource inventories; (b) aerial photography, remote sensing imagery, and other mapping aids; and (c) feasibility and project design studies. Each is discussed in turn.

Pre-Investment Resources Inventories. The ASAL Branch of the Department of Agriculture has the major responsibility for ASAL data collection and analysis. It includes eight professionals 10/ who are competent and experienced. But this staff is too small to produce the quantity and quality of data needed by the GOK to carry out its commitment to ASAL development. (The ASAL Framework Document lists the data requirements for ASAL areas, but recognizes that particular emphasis will be given to the analysis of data which are immediately available.) The Branch will ultimately assume a greater share of ASAL implementation responsibilities for agriculture-related projects in the ASALs, which places a premium on the time available for data gathering and analysis.

Thus, the basic problem that confronts the ASAL Branch is a shortage of trained personnel in relation to the job to be done. The most appropriate solution to this problem is to provide foreign professional staff to cover the immediate needs in critical areas, and at the same time, to train Kenyan staff to be more effective

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9/ Land adjudication (in Kitui District) constitutes an intermediate activity which makes investment in other activities possible. For example, land adjudication creates greater access to production credit, which in turn, enables more widespread application of intermediate technology (which requires purchased inputs).

10/ These include two soil surveyors (out of five in the entire GOK service), an agricultural economist, a soil and water conservation officer, a geologist, a livestock specialist, an agronomist, and the Head who has training in livestock development and agricultural economics.

through both on-the-job and formal training. As described below, this project element provides 17 person years of long-term technical assistance; 6 person months of short-term consultants; and 5 person years of training. The technical assistance will be provided through an AID-financed contract between the Government of Kenya and a consulting firm, university, or other U.S. entity. The professionals hired under this contract (including third country nations, providing their technical competence is assured) will work as individuals (not as a team in the usual sense) under the leadership of the ASAL Branch Head. When they bring new skills to the branch, they will provide a training resource for the Kenyans.

The long-term technical assistance will include: (a) two soil surveyors for four years each to work directly with the two experienced soil surveyors of the ASAL Branch (in the field the majority of the time); (b)

one soil and water engineer for four years to work with the hydrogeologist of the ASAL Branch (primarily in the field;

(c) one agronomist for three months per year for two years, knowledgeable about crop varieties and practices suitable for dryland agriculture, to supplement the skills of the soils members of the ASAL Branch; and (d) one range ecologist for four years to supplement the skills of the livestock specialist of the ASAL Branch.[11/]

In addition to retaining the present ASAL Branch personnel, the GOK will: (a) fill the vacancies for hydrogeologist and rural sociologist; and (b) establish and fill the posts of forester, cartographer, secretary, copy typist and telephone operator.

Only five person years of training will be provided because most of the staff are already trained to the professional level and their prolonged absence would jeopardize the success of the data collection and analysis effort. Minimum equipment (including a photocopier and photocopy supplies and office and field equipment) and services (enumerators, data coders and processors, and computer programming) will be provided.

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11/ Deleted.

Aerial Photography, Remote Sensing Imagery, and Other Mapping Aids. The ASAL Framework Document attributes the delay in the implementation of development projects in the ASAL areas, in part, to the lack of detailed land use planning. It also points out that land adjudication and registration (which certifies communal or individual rights to land holdings) need to be expanded and accelerated, especially in the ASALs where the program is least advanced. Alleviation of these problems requires the compilation of certain physical data in the form of maps, which are produced from aerial photographs. Thus, aerial photography must play a major role in the initial stages of Kenya's ASAL Development Program.

For certain geographic areas, aerial photographs already exist, but they are either out of date (taken in 1967) or of inferior quality. Therefore, they are of limited value because the information they provide is inconsistent with present land use patterns. Moreover, the Pre-Investment Study concluded that if up-to-date, rectified aerial photographs for Kitui District were available, they would serve to accelerate the land adjudication process because their accuracy would result in fewer disputes and less litigation.

This project element seeks to alleviate these problems for Kitui District through several processes. The provision of black and white aerial photographs will accelerate the production of thematic maps which are a prerequisite for land use planning; they will also accelerate the up-dating of topographic maps which are required for group ranch adjudication in the eastern part of Kitui District. The production of orthophoto maps from the black and white aerial photographs will accelerate individual land adjudication in the western part of Kitui District. Multispectral aerial photographs are needed for detailed range management planning, including estimates of the carrying capacity of the land and for monitoring changes in vegetative cover and other environmental impacts. Landsat imagery will be provided to monitor land use changes. These individual processes (or tools) are summarized below in relation to the various kinds of information each will provide.

Maps based on recent black and white aerial photographs will provide data needed for:

-- group ranch adjudication;
-- rural road mapping and planning;
-- water point selection;
-- drainage pattern analysis;
-- detailed soil surveys;
-- mapping vegetation associations for rangeland inventories;
-- landscape analysis;
-- slope analysis;
-- mapping geomorphological units.

Orthophoto maps will be produced from the black and white aerial photographs to provide data needed for:

-- individual land adjudication;
-- planning rural roads construction;
-- designing small scale irrigation;
-- designing soil and water conservation activities.

Maps based on recent multispectral aerial photographs will provide data needed for:

-- managing rangelands;
-- estimating the carrying capacity of the land;
-- developing environmental indicators;
-- monitoring environmental changes;
-- evaluating specific environmental impacts.

Finally an interpretation of Landsat imagery will provide information needed to:

-- map land units categorized as arid or semi-arid;
-- monitor land use changes.

The Survey of Kenya is responsible for providing topographic maps and aerial photographs to all government agencies. AID will finance a contract between the Survey of Kenya and a private firm to provide black and white aerial photographs and multispectral aerial photographs for all of Kitui District. Orthophoto maps will be produced for 400,000 hectares in Kitui District where the soil and water conservation activities will be implemented on a pilot basis. (See following section.) The Chairman of the ASAL Central Coordinating Committee has indicated his intention to assign high priority to Kitui District to ensure that the personnel resources of the Ministry of Lands and Settlement will be deployed to accelerate land use planning and land adjudication. AID will provide one long-term advisor to assist the Director of the Survey of Kenya to monitor the contractor's performance. The advisor will also design training courses concerning the production and use of orthophoto maps for students at the Polytechnic who are preparing to join the Survey of Kenya; and will design a modern data bank system for the Survey of Kenya.

Finally, AID will finance the purchase of Landsat imagery (and its interpretation) for all of Kitui District for two consecutive years from a U.S. supplier. Based upon an evaluation of its utility, it may be desirable, under a subsequent project, to purchase imagery for other ASALs and to train Kenyans to interpret it.

Feasibility and Project Design Studies. Implementation of the GOK's ASAL Development Program will require substantial capital investment in a multitude of activities, especially those designed

to provide physical infrastructure and to develop the area's water potential. To determine whether or not these investments are technically and economically sound, this project element provides funds to finance selected reconnaissance level or full-scale feasibility studies and project design activities. This will provide the threshold information needed for large scale capital investment in the ASALs, and in particular, in Kitui District under the Arid and Semi-Arid Lands Development Project -- Phase II, for which funds will be requested in FY 1981.

The specific studies likely to be financed under this element are listed below under two categories. Category A includes activities that are of high priority (as determined by estimating the gestation periods and logical sequencing of a wide range of investment needs) and for which preliminary scopes of work have been prepared. (See Annex D) Category B activities are perceived to be important, but the degree of priority that should be accorded them is, at best, uncertain. The studies included in the two categories are not exhaustive, but rather illustrative; for example, the Pre-Investment Study identifies approximately 20 other activities that may warrant further examination. It is possible that some studies for which scopes of work have been prepared (Category A) will not be funded and that proposals for studies not appearing on the Category B list will be approved for AID financing. However, it is apparent that the need for further studies for ASAL development, consistent with AID and GOK priorities, exceeds the number of studies which can be undertaken with the funds requested under this project element. To assure that studies conducted under the project will be consistent with AID and GOK priorities, a study proposal will be prepared for USAID approval as a condition precedent to financing any study. A summary description of each study under Category A is provided below: only the titles of the studies suggested under Category B are listed.

Category A. Six studies are included under this category.

Rural Access Roads. Roads construction and improvement is often a prerequisite for investment in activities designed to increase agricultural production (to enable farm inputs and output to be transported and marketed economically). Roads are also needed for afforestation activities, small scale irrigation, and mobile health services. In Kitui District, the lack of rural access roads is striking, yet they are needed to permit investment in various activities proposed for AID-financing under Phase II of the ASAL Development Project.

Water Resources Development. Lack of water is the most important constraint to the development of the ASALs, but not nearly enough is known about the potential for water development. In Kitui District, potable water will probably be supplied to most people (about 65 percent) by boreholes and water harvesting from roofs;

subsurface dams may be another viable alternative. Possibilities for increasing agricultural production through the development of small scale irrigation also needs investigation. Substantial feasibility work is required prior to major investment in water development activities.

Agricultural Research (Kibwezi). The GOK has requested AID to finance the development of a dryland farming base for teaching and research at Kibwezi, which is adjacent to Kitui District. This facility would be operated by the Faculty of Agriculture of the University of Nairobi, but would be closely linked with the agricultural research stations administered by the Ministry of Agriculture. This is attractive because it integrates agricultural teaching and research in a way similar to the U.S. land grant university model. AID has indicated to the Government that a feasibility study is warranted to define the role and to determine the need for this institution.

Afforestation and Tree Nurseries. Forestry resources are declining in Kitui District, the price of fuel is increasing, land is eroding, and rivers which once flowed all year are now characterized by flash flooding and dry cycles. Increasing the land allocated to tree production may have merit as a means of achieving commercial objectives, conservation objectives, and meeting energy needs. A prerequisite to the planting of trees is a dependable supply of seedlings. This study will outline plans for improved economic, organizational, and technical efficiency of eight tree nurseries in Kitui District.

Seed Production. Seed production in Kenya is highly developed, but it is geared to the high potential areas. This suggests the possibility of expanding into other areas, in particular, producing seeds applicable under the dry conditions of the ASALs. On the other hand, the market for seeds in the ASALs will be substantially less than in the more densely populated areas; in addition, hybrid maize seed must be purchased each new season in contrast to the seeds for crops most suitable in the ASALs. Therefore, the economic viability of an ASAL seed multiplication operation needs to be studied.

Crop and Livestock Development. This activity includes: (a) the potential for developing an economical package of practices for small farm production systems; (b) the economic and technical potential for dairy cattle and improved oxen; (c) the potential for more efficient production of small ruminant livestock; (d) the economic and technical potential for the expansion of beekeeping and poultry; (e) requirements to improve insect control for crops and

livestock; and (f) the potential for agroforestry in ASAL production systems.

Category B. Four studies are currently proposed under this category.

Rural Marketing Centers.

Small Scale Industry.

Ukamba Agricultural Institute in Kitui District.

Energy and Power Needs.

The budget for this project component (including all three elements of Data Collection and Analysis) is summarized below.

| Grant Financing ($000) | AID | GOK | Total |
|---|---|---|---|
| Long-Term Personnel | $2,327 | $ 801 | $3,128 |
| Short-Term Consultants | 60 | 30 | 90 |
| Local Hire Consultants | 50 | 0 | 50 |
| Training | 75 | 32 | 107 |
| Commodities | 648 | 12 | 660 |
| Feasibility Studies | 600 | 300 | 900 |
| Evaluation | 120 | 0 | 120 |
| Total | $3,880 | $1,175 | $5,055 |

### 3. Soil and Water Conservation

As indicated above, migration into ASAL areas together with indigenous population growth is increasing drastically. Moreover, the farming practices carried out by the increased number of smallholders are having a devastating effect on this fragile ecosystem. Farmers clear and plow an area for cultivation, but after three or four years they must abandon it because of reduced fertility. Once abandoned, the land is invaded by less desirable plant species, mostly thorn bush and other non-palatable weedy growth. These species typically do not have root systems that will hold the soil in place against the erosive forces of rainfall and the overland flow of runoff water. Consequently, gullies are formed, sheet erosion removes valuable topsoil, and downstream water-collecting facilities are silted up. In addition, benefits expected from investments in dams, wells, roads and other physical infrastructure are reduced substantially because of the erosion.

Relative to the severity of the problem, very little conservation is being practiced in the ASALs. Programs that are implemented rely heavily on bench terracing and a small number of other costly structures. Virtually no emphasis is placed on the much less costly, but frequently more effective, vegetative practices. Because little engineering skill is incorporated into the design of conservation structures, erosion problems are often exacerbated rather than corrected. Except for a small number of people in the Soil and Water Conservation Branch of the Ministry of Agriculture, who are already overwhelmed with administrative duties, virtually no soil and water conservation engineering capability exists in Kenya. College and university curricula have few in-depth courses in soil and water conservation, and only a small number of students enroll each term. No formal training program exists for field staff, although a few extension officers have had a two week introduction to soil and water conservation. Except for a Provincial Soil and Water Conservation officer in each province, no field staff exist whose main responsibility is soil and water conservation. Other donor-supported ASAL development projects have not incorporated formal programs to train soil and water conservation people, although some on-the-job training is carried out under the EEC-supported project in Machakos.12/ Under these circumstances, it is not surprising that a serious erosion problem obtains in the ASALs.

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12/ Lack of training has serious consequences, as indicated during a brief visit to Kitui District. Where attempts had been made to combat erosion, terrace systems were often not properly aligned with respect to contour and gradient. They were either outletted into unprotected waterways or depressions, or they were not outletted at all. The greater amount of water that collected in the terraces broke out and caused more severe gullying and erosion than would have occurred had no terrace been built. One surface storage dam had completely filled with sediment in less than ten years, making it a wasted effort. The need for sound technical expertise to plan, design, and supervise conservation activities is apparent.

This project component is designed to test an array of activities, particularly soil and water conservation techniques, in a pilot area of Kitui District.13/ To complement this program, moisture conserving tillage implements will be designed and tested and afforestation activities will be supported .14/ By arresting soil erosion, improving soil tilth and fertility, and enhancing the soil moisture regime, 21,000 subsistence farmers will be able to realize higher crop yields; they will also be able to plant better variety and higher quality crops on the same land. Benefits in the form of reduced sedimentation and better flood control will also result. Probably the most important benefit is the protection and preservation of the soil resource and the maintenance of its production capability.

The pilot area located in parts of Central and Mwingi Divisions, consists of 333,200 hectares; see Map 3. It includes Matinyani, Changwithya, Nzambani, Miambani, and Yatta locations in Central Division; and Mutonguni, Mgwani, and Mwingi locations in Mwingi Division. It has a population of approximately 173,000; population density is estimated at 52 persons per square kilometer, which compares to an average of 13 persons per square kilometer for the entire district. The pilot area consists of approximately 150,000 hectares in ecozone IV which is classified as "semi-arid" (mean annual rainfall of between 500 and 800 millimeters occurring in a bimodal pattern); approximately 140,000 hectares in ecozone V which is classified as "arid" (mean annual rainfall of between 350 and 500

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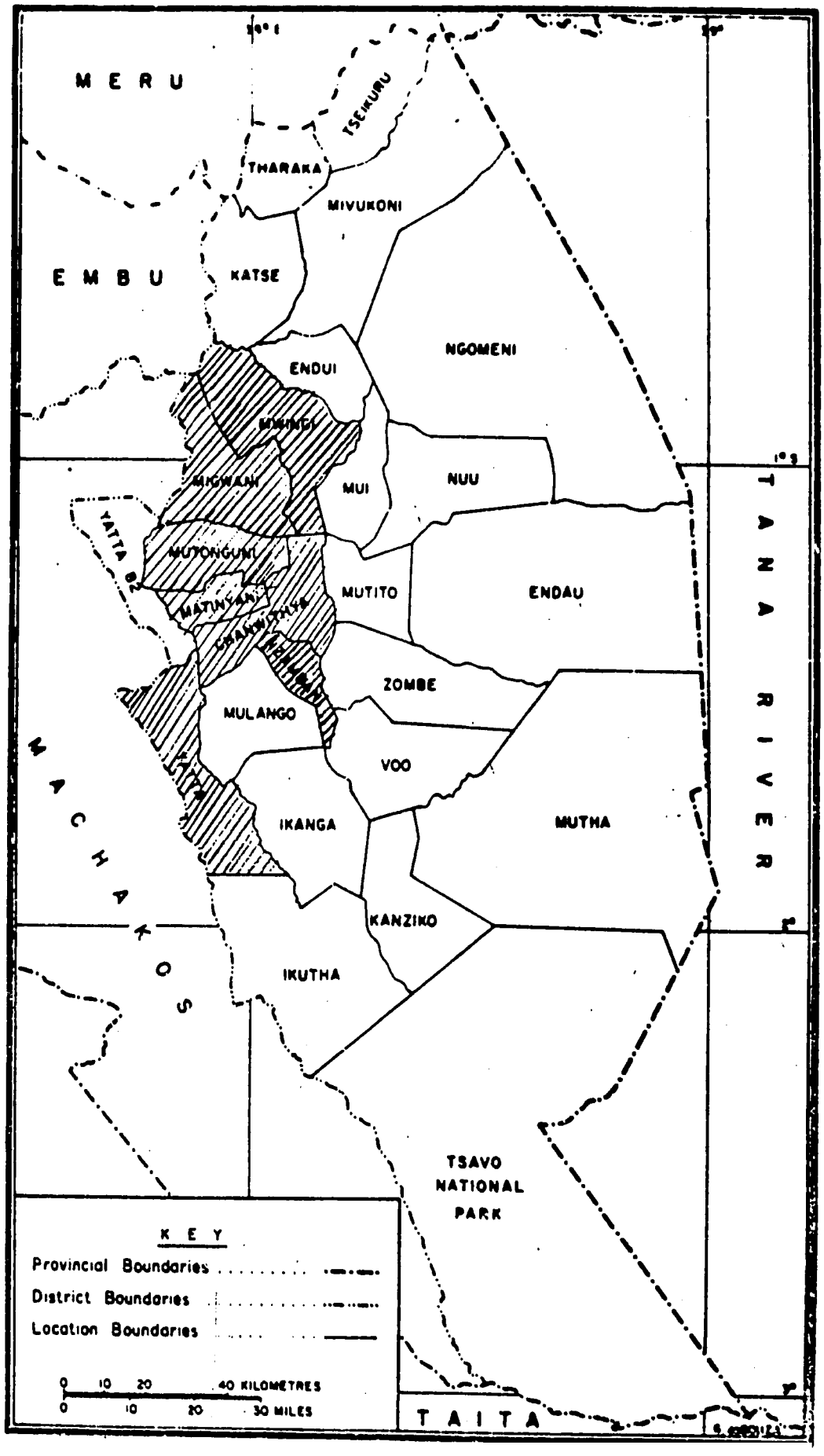
13/ The practices that will be applied have all been researched in Kenya or elsewhere and have been found to be viable control measures. Their application in the pilot area of Kitui District will be evaluated to determine their relative effectiveness and acceptability under local conditions. For drier conditions found outside the pilot area, there may be scope for other measures including runoff irrigation and artificial recharge of ground water to firm up the flow of high level springs found in parts of Kitui District. However, research, possibly conducted at the proposed Kibwezi research station, is needed to determine their effectiveness.

14/ Water conservation consisting of surface storage structures (dams) would be an important contribution to this water-deficient area. However, nearly all the dams in Kitui District below the 1,000 millimeter isohyet already are, or will be within ten years, filled with sediment, making them ineffective. This sedimentation is the result of uncontrolled soil erosion. Building more dams at this stage would provide only a temporary solution to the water problem because they also would soon become filled with sediment. Therefore, dam building (except for small farm ponds) has not been included as part of this project component. Other practices that are included, however, will reduce sediment yield and water runoff rates. Given the relatively small amount of water related activities, it is felt that the economic and social analyses adequately address the concerns of Section 611(b) of the FAA.

MAP 3. MAP OF KITUI DISTRICT SHOWING PILOT AREA.



millimeters); and the remainder in ecozone III which is medium potential land. For Kitui District as a whole, 92 percent of the land is in zone V, 5 percent in zone IV, and 3 percent in zone III.

GOK Institutional Organization. The Land Development Division of the Ministry of Agriculture has a Soil and Water Conservation Branch headed by a soil conservation officer. In addition, there is a soil conservation officer in each province in which conservation activities are being implemented. On the district level, however, soil conservation activities are the responsibility of district agricultural officers, assisted by land development officers. Technical services are provided to the field by agricultural extension agents who normally have a certificate level education in general agriculture, with two weeks to one month orientation training in soil and water conservation principles.

In Kitui District, a single technician (a farm management specialist) is responsible for all soil and water conservation programs. Under the supervision of the District Agricultural Officer, he is assigned responsibility, together with other duties, for a small conservation program. To make significant soil and water conservation progress in Kitui District, additional staff and organizational changes are needed. The Better Living Institute (BLI), a government owned facility near Kitui town, will be used as a training center, and a site for locating staff housing for foreign technicians. The BLI is administered jointly by the Ministries of Agriculture and Health, and its original purpose was to train farmers and farm families in agriculture and health care. It consists of 350 acres of land with topographic and climatic features similar to those of much of Kitui District, making it ideal for conservation demonstration purposes.15/

Technical Assistance. An AID-financed technical assistance team, led by a land use planner/conservationist, will be stationed

15/ In addition to the 350 acres of farmland, the BLI includes a one hectare nursery for producing horticultural planting stock and sod grasses, three well designed classrooms, an assembly hall with projection room, hostel facilities for 80 persons, kitchen and dining facilities for 60 persons (though the kitchen facilities require extension), and office and storage space for instructional staff. Available staff housing is fully occupied. However, there are five acres of vacant land on campus which will be used for construction of seven houses to accommodate technical assistance personnel. Electricity is available and reliable (220 volt, 50 cycle, single phase). The water supply from Kitui town's reticulated water system is rationed; therefore, reserve water tanks will be provided for each house.

in Kitui at the BLI to develop the soil conservation program described in detail below and to train Kenyans to supervise it. Other team members will be a soil conservation engineer, a soil surveyor, a forage crops specialist, an agronomist, an agricultural economist, a farm mechanization expert, and several short-term consultants, including a hydrologist. (Annex K sets forth specific job funtions and tours of duty for these technicians). The team will be responsible to the District Agricultural Officer.

The GOK has agreed to appoint a Soil Conservation Officer for Kitui District, who will work closely with the team leader; the GOK will also provide other appropriately qualified personnel to work with the other technicians.

The initial tasks of the technical advisors together with the Kenyan conservation team are: (a) design a conservation development plan for the training and demonstration farm located on the 350 acres at the BLI; 16/ (b) develop criteria for carrying out inventories to determine conservation needs on a sub-catchment basis; (c) develop training curricula, identify training materials required, and schedule training sessions for the BLI; (d) prepare commodity requests for items which need to be procured; and (e) identify training needs to be met through overseas participant training. In addition, the agricultural economist will begin to collect baseline data for subsequent economic analyses.

Training. Under the tutelage of the U.S. technicians, three month training courses will be conducted at the BLI in land use planning and soil and water conservation principles and practices. (Annex E defines these practicies.) The training will cover job planning, estimating, executing, supervising and inspecting; surveying and design; technical details of various soil conservation land treatment measures; mapping and the use of aerial photographs as planning tools; and the development of standards. Selected officers will be given training abroad in modern conservation techniques. 17/

16/ Construction works and their maintenance will be contracted out to local farmer groups on a piece-work basis. Completion of this activity will take three to four years, and will serve as "training for the trainers" in planning, designing, and implementing conservation measures on the land.

17/ Candidates will be selected for participant training based on demonstrated qualifications and the potential for further development. Degree training (B.Sc.) will be provided to at least one candidate. During years 2, 3, 4, and 5, two candidates per year will be provided one year of academic training in either a U.S. university or at the Asian Institute of Technology in Bangkok. Non-academic training will be offered to about six operating personnel (mostly certificate level graduates) for on-the-job training (4 months)

17/ (Continued)
with the U.S. Soil Conservation Service in soil survey, engineering, farm planning, and range conservation. Training will be offered to about six supervisory and administrative personnel to observe and study soil and water conservation program management systems and techniques in the U.S. In addition, the project provides funds to train selected technical persons in the ministries of Water Development and Works. Up to six participants from each ministry will be supported for an average training period of two years per participant. In addition, short-term training for a maximum of one year and, in some cases, practical training in other developing countries will be provided for water engineers who are specialized in rural roads design and construction. The objective of the training is to have qualified Kenyans in the Ministry of Water Development and the Ministry of Works to implement projects for which feasibility study funds have been included in this project. This training is essential if Kenyan manpower is to be in place in time for the follow-on investments. Each Ministry will submit annual plans for the use of these training funds and will demonstrate in the plans the relevance of the proposed training to ASAL development. Training of this type, which draws on the Agricultural Sector Support Project model (615-0169), is viewed by the Mission and the GOK as vital in alleviating the human resources constraint to ASAL development.

Following the three-month course at the BLI, the trainees will spend three months in the field where they will participate in actual conservation planning and designing of sub-catchment areas. Initially, this will take place at Matinyani location (at the request of district officials), which consists of numerous micro-size sub-catchments in the upper reaches of the Kitui watershed. It comprises about 6 percent of the pilot area. During the three month period, they will assist in forming farmer conservation committees, organizing barazas, surveying and designing conservation works, organizing and supervising work groups, conducting farmer training sessions, and certifying completed projects in accordance with acceptable standards. In addition alternative methods of contracting with local self-help groups and procedures for making payments for labor will be developed and tested at this location. At the end of the six-month training course, the trainees will be prepared for assignment to the sub-location, location, or division level.

During the first year, training classes will be small. After that, the GOK has agreed to provide a minimum of 20 (maximum of 30) trainees (certificate level graduates) for each training session. By the fourth year of the project 55 of the trained Soil Conservation Technicians will have been assigned to cover the pilot area. The GOK has agreed to establish and fill the posts of Division Soil Conservation Officer for the two divisions in which the pilot activities will take place, Central and Mwingi, as well as the 55 positions of Soil Conservation Technician. Other trainees who successfully complete the training program may be assigned to other parts of Kitui District or other ASAL districts.

Soil Conservation Works. After a Soil Conservation Technician has been trained (three months at the BLI and three months on-the-job), he will supervise soil conservation works. Within a sub-location, there are usually numerous micro size sub-catchment areas defined by topography. The planning process begins at this sub-location level where the technician works with the self-help group (whose membership is usually 15 to 20 contiguous households) to prepare a conservation plan for the sub-catchment area. All conservation practices for controlling soil erosion, affecting more favorable soil moisture retention, improving soil tilth and improving the production potential of the land are considered for application. In consultation with the group, the technician prepares the work plan which identifies and

describes the practices mutually agreed upon for application. The work plan specifies the amount of work to be performed and the expected schedule of operations, and estimates the cost of materials and services. After review by the sub-location which includes the self-help groups, the completed work plan is submitted through the Division Soil Conservation Officer to the District Development Committee. Upon approval by the District Development Committee, disbursement authority is given to implement the works project.

The topography and the scattered nature of cultivated land in the pilot area make mechanized soil conservation virtually impossible. It addition, there is a need to create employment opportunities for local residents. Therefore, all soil conservation measures will be labor-intensive with only limited use of small scale equipment.[18] The labor for constructing conservation works will be provided by self-help groups whose membership consists of farmers within the work area. Labor will be paid on the basis of tasks performed or on a piecework basis. The type of work required qualifies for the rural minimum wage for agricultural workers (K. Sh. 7.90 or approximately $1.05 per day). The administration of labor contracts with the self-help groups will follow existing procedures being used by district management. Each year the district receives an allocation of funds for a Rural Works Program. Some of these funds ($19,000 equivalent in 1978) are further allocated for soil and water conservation works. Thus, based on the work plans approved by the District Development Committee funds will be allocated by the Ministry of Finance to the District Development Committee for implementation of the plan.

Although the conservation works will be supervised by the Soil Conservation Technician at the sub-location (or location) level, responsibility for disbursement of funds, materials, tools, or

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18/ Tools and equipment will be made available to the self-help groups. Seven four-wheeled vehicles will be provided to the foreign technicians, and ten motorcycles, to key soil conservation field technicians. (Motorcycles are available for purchase using concessional loans from an existing Ministry of Agriculture loan program). Four rubber-tired farm-type tractors will be provided for project-wide use. Each will be equipped with a front-end loader attachment and a rear-mounted PTO-driven cement mixer attachment. The tractors will be used mainly for taking materials and tools into river-bed areas where sub-surface dams are to be built. Four-wheel trailers to be pulled by these tractors will be provided to transport cement, form-work, tools, sand and stone to these sites; the cement mixer will improve the quality of concrete produced for the dams.

equipment remains with the District Soil Conservation Officer. There are several ways to disburse the money. Each individual laborer could be paid in accordance with work performed, which, though most equitable, would be time consuming and administratively difficult. Alternatively, cash could be paid to the group as a whole for a job completed; this would help preserve the group concept, and any individual payments within the group would be administered by group management. This latter alternative would permit the group to obtain financial resources for collectively beneficial purposes; for example, they could be used for operation and maintenance of the conservation works,[19] extension of other development activities for group benefit, or to paying each member his/her earned wages. A rural sociologist will advise on the most appropriate procedure for handling the payment of labor.

This pilot project emphasizes vegetative control measures.[20] However, because vegetative practices have not been used extensively in the pilot area, some testing will be required to determine the adaptability of various grasses and other vegetation to ASAL conditions. A careful monitoring and evaluation system will be implemented in conjunction with this activity. Some of the soil conservation measures require a substantial labor input, and it is not certain that the short-run production benefits will equal the conservation costs. Analyses of the incremental yield increases over time, beginning with the initial base line data, will indicate when the economic justification of the conservation activites occurs. Based on these analyses carried out by the agricultural economist, cost sharing

19/ The self-help groups will be responsible for maintaining the conservation systems in their areas. Basic operation and maintenance plans will be tailored to meet local requirements based on the particular mix of practices applied in the various areas.

20/ Eventually, a sod grass source should be located in every sub-location. A single farm household could furnish plant materials for sodding waterways, contour strips, and protective cover for conservation structures under a contract. Alternatively, the government could lease land and provide supervision for producing plant materials, but the work for nurturing would still have to be contracted or hired out. The former arrangement seems superior because the contract would be between the producer and farmers on the conservation committee or self-help group at the sub-location level. All self-help groups within the sub-location would then have ready access to plant materials which would be paid for out of the operations and management funds of the groups.

guidelines (between individuals and the government) will be developed in the final year of the project.

Complementary Project Elements. To complement the soil conservation activity described above, two additional elements are needed: (a) moisture conserving agricultural implements; and (b) afforestation. Each is discussed in turn.

As part of the soil and water conservation training program, technicians will be trained in the use of new tillage implements which will be designed and tested in terms of their ability to conserve moisture, retard soil erosion, minimize draft-power, and reduce weeding time. A total of 25 skid-type toolbars and 5 wheel-type toolbars, with attachments, will be fabricated as prototypes. Their design will draw on existing research in Kenya concerning hand tools, animal-drawn tillage implements, and construction equipment such as slip scrapers and chisel type scarifiers. These oxen-drawn toolbars will be distributed to selected locations during the first year of the project for testing purposes. Based on an evaluation of their utility, specifications for an improved toolbar design will be prepared, and up to 2,000 skid-type toolbars will be produced over the remaining four years of the project. Local farmer cooperative stores will market these implements directly to farmers, and local entrepreneurs will be encouraged to improve their capability to repair and service farm tools and implements. Hand tools of improved design will also be introduced.21/

The Forestry Department of the Ministry of Natural Resources has trained foresters, office staff, and land available for nurseries to grow seedlings. These seedlings are used for: (a) afforestation programs; (b) soil and water conservation activities; (c) planting forests in the upper regions of river catchments on land unsuitable for cultivation; that is, for conservation, not commercial, purposes; (d) creating small woodlots on farms that have low potential land; and (e) planting timber forests on hill lands that are under the jurisdiction of the Forestry Department. Eight nursery sites are strategically located throughout Kitui District to service these programs. All eight are critically short of: (a) labor for preparing the land and seeding the nurseries; and (b) vehicles. Unless these two constraints are alleviated, insufficient seedlings will be available for soil and water conservation purposes, and no other source of seedlings exists. To fill this need, AID will finance a truck, tractor, landrover, and trailer in year one; labor to seed nurseries in years one and two; and a small amount of labor to transplant seedlings from the nurseries to the soil and water conservation pilot area in years three, four, and five; this area will be given priority in the distribution of seedlings.

21/ Except those for which waivers are sought, all commodities will have their source and origin in the U.S. or Kenya.

The estimated budget for this component is as follows.

| Grant Financing ($000) | AID | GOK | Total |
|---|---|---|---|
| Long-Term Personnel | $3,398 | $ 195 | $3,593 |
| Short-Term Consultants | 140 | 70 | 210 |
| Local Hire Consultants | 208 | 0 | 208 |
| Training | 790 | 340 | 1,130 |
| Commodities | 598 | 426 | 1,024 |
| Field Labor Costs | 762 | 3,049 | 3,811 |
| Management Services | 200 | 0 | 200 |
| Evaluation | 360 | 0 | 360 |
| Total | $6,456 | $4,080 | $10,536 |

# III. PROJECT SPECIFIC ANALYSES

## A. Economic Analysis

Overview. In view of the nature of this project (planning, data collection and analysis, training, and testing/demonstration activities), a quantified cost/benefit analysis is not feasible or practicable. Rather, the economic analysis needs to examine the extent to which project costs relative to project objectives are reasonable; the impact of the project on its intended beneficiaries; and the recurrent cost implications of the project. The detailed economic analysis in Annex G concludes that the ASAL Development Project is economically sound. Project costs are reasonable relative to the project purpose; the project constitutes an important and necessary step in developing programs which will directly benefit a large number of smallholders and pastoralists in the ASALs; and the project and large-scale follow-on activities are consistent with significant GOK budget allocations for its ASAL Development Program as detailed in the Development Plan.

Rationale. The main theme of the Development Plan is the alleviation of poverty and the provision of basic human needs for all Kenyans. The Plan states that "The development of arid and semi-arid lands will also receive special attention from Government during the Fourth Plan Period. . . . Arid and Semi-Arid Lands Development Programme is a new high priority activity of the Government and the Ministry of Agriculture." 1/ The ASAL Framework Document details the GOK's ASAL development strategy, stressing the need for coordinated ASAL planning and data gathering activities and the need to move slowly from the identification of specific problems, to testing solutions, and finally to large-scale investment activities. The Mission's CDSS (January 1979) sets forth a development assistance strategy which includes the ASALs as one of two geographic areas of emphasis, and points out that the returns to investment in ASAL development activities are not likely to materialize until 1985 or 1990.

The ASAL Development Project has been designed to address the planning and data gathering requirements of what is anticipated to be a major development activity during the Fourth Plan period and beyond. The Ministry of Agriculture alone will spend well over $35 million in development expenditures for ASAL development and larger amounts for recurrent expenditures during the Plan period. Of this, $16 million is for soil and water conservation. GOK expenditures, together with substantial assistance anticipated from the large donor community, yields a program in the range of $140

1/ Development Plan, pp. 14, 253.

million. A program of this magnitude requires proper planning to insure that the resources are efficiently allocated.

Soil and water conservation activities were identified in the Pre-Investment Study as a crucial intervention point necessary to arrest the declining productivity of the ASALs. The estimated value of agricultural production losses in the Kitui/Machakos/Embu area are $2 million per year (Report No. 3); overall production is declining at the rate of 3 per cent per year due to the loss of soil fertility alone. Substantial production losses also result from the reduced lifespan of existing infrastructure, such as downstream water collection facilities, dams, wells, and roads. The benefits associated with the soil conservation program include increased production levels through higher yields and acreage expansion, a higher livestock carrying capacity and improved downstream availability of water. This component is the initial step in the development of more widespread soil and water conservation activities.

While soil and water conservation can arrest the decline in soil fertility, increased agricultural production depends on a series of other activities, including improved crop varieties, currently being developed under the AID-supported Dryland Cropping Systems Research Project (615-0180); an expanded and more efficient agricultural extension service, being assisted under the Agricultural Systems Support Project (ASSP, 615-0169); research on range management and livestock development in the ASALs, funded under the ASSP; and agricultural credit and smallholder production services, assisted by Agriculture Sector Loan I (615-0171), ASSP, and the IBRD's Integrated Agricultural Development Project. Because supporting activities are in place, the widespread adoption of soil and water conservation techniques being tested under this project are likely to contribute to increased agricultural production in the ASALs.

Beneficiaries. The beneficiaries of the ASAL Development Project are smallholder farmers and pastoralists. The planning and data gathering components generate only indirect benefits to this group, as is to be expected from such activities. The soil and water conservation component will provided increased employment opportunities to the intended beneficiaries and improved production potentials. The project has been designed: (a) to be responsive to the needs of the beneficiaries, and (b) to facilitate the dissemination of tested soil and water conservation methods to the beneficiaries. The planning component includes assistance at the district level to insure an information flow between the district and headquarters, and also to insure that projects are designed that

make a significant impact on the target group. Training soil conservation technicians, utilizing demonstration units, and placing AID funded technicians in the field significantly increases the likelihood that tested techniques will indeed be appropriate to the needs of the intended beneficiaries, will be properly disseminated, and will be adopted.

Recurrent Costs. The GOK's Development Plan has earmarked significant levels of development expenditures specifically for ASAL development activities and even larger amounts under other budgetary line items for ASAL development. This project does not in itself imply significant recurrent cost burdens for the GOK. Aside from a relatively small number of counterparts, the only measurable incremental expenditure will be the salaries of the soil conservation technicians. The real recurrent cost issue concerns follow-on activities. The ASAL development activities likely to result from the feasibility studies financed under this project do not represent unplanned or unbudgeted activities for the GOK. Rather, they are consistent with the policies, programs, and budget details set forth in the Development Plan, reflected in the 1979/80 Budget, and outlined in the ASAL Framework Document. The GOK is planning a major expansion of ASAL activities and has budgeted for the additional costs associated with this expansion. The GOK's ASAL planning units must monitor the design and implementation of ASAL activities to insure that sufficient funds are available within budget earmarkings. Macroeconomic analyses by both the IBRD and the Mission indicate that the Plan is internally consistent and that planned expenditures can be financed from anticipated revenues and foreign assistance without an undue strain on the GOK's domestic borrowing capacity.

## B. Social Soundness Analysis

Beneficiaries. The project will directly benefit an estimated 21,000 farm families in Kitui District; 170 certificate level graduates through training in soil and water conservation methods; and approximately 40 people, primarily in the GOK, through training received outside of Kenya. The indirect beneficiaries will be other Kitui families and residents in similar ASAL areas.

In Kitui District, most of the direct beneficiaries will be those residing in eight locations of Central and Mwingi divisions. The benefits derived by these approximately 21,000 farm families will be in the form of improved oxen-drawn tillage equipment and hand tools, training in soil and water conservation techniques, access to employment opportunities, and, in the long run, improved nutrition. The latter will be the result of better crop yields as well as the

opportunity for growing a wider variety of crops through the application of soil and water conservation techniques and the use of more efficient farm tools and equipment. The strategies for both the soil and water conservation and the hand tools and tillage equipment elements are geared to reaching the rural poor and women. The soil and water conservation strategy includes the creation of jobs for unskilled laborers. The hand tools and tillage equipment strategy includes the testing of equipment on farms of poorer households and grants of 200 oxen-drawn toolbars to registered groups (composed mostly of women) undertaking communal agricultural activities.

Approximately 170 certificate level holders, many of whom will be technical assistants in the Ministry of Agriculture (MOA), will receive six months of training in soil and water conservation principles and practices. Not all of the trainees will be recruited from Kitui District, but rather from similar ASAL districts. At present, relatively few women serve as MOA technical assistants whose job includes soil and water conservation. However, efforts will be made to recruit qualified women for the training courses.

Approximately 40 persons, primarily from the GOK, will be the beneficiaries of training outside of Kenya. An estimated 20 government employees will receive long-term education in specialized fields such as hydrogeology and soil and water conservation. Recipients of short term training will include 6 persons on study tours to learn more about agricultural mechanization, and 14 persons receiving practical training in land use planning. Currently, few women are employed in the units from which candidates will be selected; however, attention will be given to include women among those who receive training. While the trainees will be the direct beneficiaries, the knowledge and skills gained will help them be more effective in their work, the results of which affect thousands of rural Kenyans.

Indirect benefits will be obtained by ASAL residents outside Kitui District through enhancement of the GOK's administrative and planning capability and technical competence. Also, a set of technologies and delivery strategies tested in Kitui District should be applicable to similar ASAL areas. Additional Kitui farm families will be secondary beneficiaries of the institutionalized district soil and water conservation program, and the availability of improved hand tools and tillage equipment. All the Kitui residents will indirectly benefit from the strengthening of the role of the District Development Committee and the availability of better data on the district for planning and implementation purposes.

Social Impact. The project contains two significant social impact features. First, local participation in decision-making will occur at various levels. The District Development

Committee, composed of Kitui representatives and district-level officers, will play an active role in planning, reviewing and allocating funds. Also, local representatives will assist in drawing-up soil and water conservation work plans. Second, improvement of farming conditions and access to employment opportunities should increase incomes and spur increased farm and non-farm production.

Social Factors. Knowledge of socio-economic matters in the ASALs is relatively sparse. Data are available on some aspects of traditional societies, but few sources deal with societies in the process of change. Further, only a few studies identify the rural poor and focus on constraints they encounter. Because of the dearth of information on sociological matters, the project considers the inputs from sociologists vital.

A sociologist, a Kenyan or a foreigner with at least two years experience in Kenya, will be assigned to the Kitui project team to advise other project experts, help establish criteria and procedures, monitor project implementation, and contribute to the design and analyses of baseline data collection. This person will liaise with the sociologist in the ASAL Branch who is currently in the process of being recruited. Funds will be made available to assist the ASAL sociologist to collect data for planning and for program monitoring and evaluation.

The ASAL Branch sociologist and the Kitui-based sociologist will be consulted by experts conducting the feasibility studies under this project so that they may become aware of major sociological issues related to their topics of investigation.

## C. Technical Feasibility

This project seeks to establish a basis for launching a national accelerated development program in arid and semi-arid lands through (a) enhanced planning and analytic capability (manpower development) and (b) testing an array of soil and water conservation techniques and tillage methods. In addition the conservation activities that are implemented in portions of Kitui District will preserve and improve the agricultural production base of those areas.

Manpower Development. Important elements of manpower development are education and training, on-the-job experience, and the availability of planning tools. Each component of the project provides for Kenyans to receive education and training both in Kenya

and overseas.[2/] The advisors and technicians financed under this project will work with Kenyan counterparts who will gain informal training and on-the-job experience from this interaction. Under the soil and water conservation component, both in-service and on-the-job training are central ingredients.

The planning tools (for example, maps, various types of data, results of conservation tests) generated by the project will assist Kenyans working in ASAL development to be more effective national and district level planners, land use planners, land adjudicators, data gatherers and analysts, and soil conservation technicians.

The techniques employed by this project to enhance the expertise of Kenyan personnel are considered appropriate and sound.

Soil and Water Conservation. The techniques to be used in the soil and water conservation component of the project were selected on the basis of recommendations made in the Pre-Investment Study; findings of the soil conservation research team at the University of Nairobi; a review of the on-going EEC-funded soil conservation program in Machakos District; two field trips to Kitui District; and consultations with Kitui District officials and members of the ASAL Branch in the Department of Agriculture. It was agreed that the technology chosen for testing and application in this project is the most appropriate type.

The techniques are simple since conservation practices are not well developed in Kitui District. (The use of more sophisticated measures will evolve with experience and the recommendations stemming from evaluations.) The technology does not include complex engineering designs or installation techniques. All conservation control measures considered can be easily understood by local farmers and can be applied by farmer groups without the use of heavy equipment. The package of practices chosen for a particular sub-location will be appropriate to the conditions that exist vis-a-vis soil characteristics, land slope, vegetative cover, past and present land use, and geographic positions in the watershed.

This project will give greater emphasis than is presently the case to the use of vegetative control measures. This technique, which is agronomic in nature, will provide relatively low cost protection and, at the same time, a much needed source of forage for livestock. The sod-grass species to be used in Kitui District are indigenous to Kenya and have already been proved effective as retardants to soil and water movements. The methods for incorporating vegetative control measures in contour strips, in waterways, for

2/ This effort complements AID's training activities under the Agricultural Sector Support Project (615-0169).

gully control and gully reclamation, and for protecting conservation structures will be stressed in the training program for Soil Conservation Technicians.

The lack of trained personnel in Kenya is a major limiting factor in launching soil conservation programs of sufficient scale. Presently, agricultural extension agents (technical assistants) are responsible for soil conservation work together with their other extension activities. If they are to fulfill their function of disseminating information for all facets of agricultural production, they will have neither the time nor the dedication to provide technical services for surveying, designing, and supervising the installation of conservation works. What is needed is a technical service group wholly dedicated to conservation.

Until such a cadre of technicians can be trained, soil and water conservation efforts will continue to rely on agricultural extension agents. Under this project, these extension agents will be given technical training in soil and water conservation for six months at a training site in Kitui District. This training, a central part of the project, is a three step process. The first step involves teaching soil and water conservation principles for three months. The second step involves on-the-job training under actual field conditions for an additional three months. The third step is to assign the former trainee the job of Soil Conservation Technician.

The proposed training program calls for 20 trainees in each class. With three classes trained per year, the annual output will be 60 people (or slightly less during the first year). The Department of Agriculture has agreed to provide sufficient certificate level personnel from the existing extension cadre for soil conservation training.

Some of the trainees will serve as Soil Conservation Technicians in the pilot area in Kitui District. One technician will be provided to each of the sub-locations in the pilot area over the four year period of the project. This number will certainly be trained for Kitui District. The remaining trained technicians will be posted to other ASAL areas of Kenya.

In addition to training soil conservation technicians to employ sound conservation techniques and supervise conservation works, the project tests hand tools and tillage equipment, and pays labor costs to Kitui residents to carry out conservation activities which will be planned with the participation of local committees.

Hand Tools and Agricultural Implements. Implements will be designed drawing on research results and tests at several sites within Kenya. In the U.S. and elsewhere implements of the type

provided in this project reduce soil moisture loss.

Only 30 toolbars will be produced initially to permit them to be field tested by local people in Kitui District who will evaluate them according to specified guidelines under the guidance of the implement engineer. The engineer will make necessary modifications in the design before the implements are produced in larger numbers. They will be manufactured in Kenya, probably in Nairobi, and will be of simple design and construction so that they can be repaired in Kitui by local artisans. The project provides for some training for repairmen.

The implements will be relatively inexpensive and provision of credit facilities for farmers will be explored by the engineer and other members of the Kitui contract team so that farmers who wish to purchase the new implements will be able to do so.

Since adequate housing for technical personnel is very scarce in Kitui town, the project will finance with grant-funds the construction of nine houses. The houses will accommodate eight long-term technicians and one house will be used as a guest house for short-term consultants and visitors, since no hotel with adequate accommodations presently exists in Kitui town. The houses will be built at the Better Living Institute operated jointly by the GOK's Ministry of Agriculture and Ministry of Health. The site is considered suitable for the technicians.

Standard Ministry of Work's design will be used. Each house will have four bedrooms, the total gross area being 100 square meters. According to the GOK's practice, each house will be provided with two-roomed quarters for household staff. The houses will be constructed of concrete blocks, PVC flooring, asbestos roofing, sheeting on timber trusses and soft board ceiling. The houses will be connected to the town's potable water supply and electrical supply. Septic tanks to treat waste water will be constructed.

The town's water source is boreholes which are not completely reliable for continuous supply because of malfunctioning pumping equipment at times. Therefore, either each house will be provided with a 200-gallon water storage tank or one elevated water storage tank will be built to cater for all the houses.

The MOW's standard design, specifications and cost estimates have been reviewed by the USAID/Kenya Engineer and have been found sufficient to ensure that cost estimates are reasonably firm as required under Section 611 (a) of the FAA.

## D. Administrative Feasibility

The project involves the following organizational units of the Government of Kenya:

1. Rural Planning Section (RPS) of the Ministry of Economic Planning and Community Affairs (MEPCA);

2. District Development Committee (DDC) of MEPCA;

3. Development Planning Division (DPD) of the Ministry of Agriculture (MOA);

4. Arid and Semi-Arid Lands Branch (ASALB) of the MOA;

5. Land Development Division (LDD) of the MOA;

6. Survey of Kenya (SK) of the Ministry of Lands and Settlement.

Of the above, the Rural Planning Section and the Development Planning Division are both receiving technical assistance under the Rural Planning Project (615-0162). In the implementation of this project, a consultant worked closely with the District Development Committee in Kitui District. Based on this experience, the administrative qualifications of these three government entities have been demonstrated and are considered adequate. Annex A provides organization charts for all three entities.

The Arid and Semi-Arid Lands Branch of the Project Management and Evaluation Division is a newly-created unit in the Ministry of Agriculture. It is the successor organization to the Marginal Lands Unit and retains essentially the same staff. At present, the professional staff numbers eight, including the Branch Head who successfully led the Marginal Lands Unit during its collaboration with the Consortium for International Development in 1977 and 1978 which resulted in the 10 volume Pre-Investment Study. The ASALB receives its funds through normal Ministry of Agriculture budgetary procedures and its staff through the usual methods of establishing posts and recruiting personnel. The ASALB has been assigned the major share of responsibility for collecting data relevant to the GOK's ASAL Development Program. However, it will be given increasing responsibility for implementing projects and programs under the MOA. The ASALB has inadequate numbers of technically trained personnel relative to the demands placed on it; this project will help to alleviate the problem.

The Land Development Division of the Ministry of Agriculture is comprised of three main branches at the national level: the Machinery and Mechanization Branch, the Soil and Water Conservation

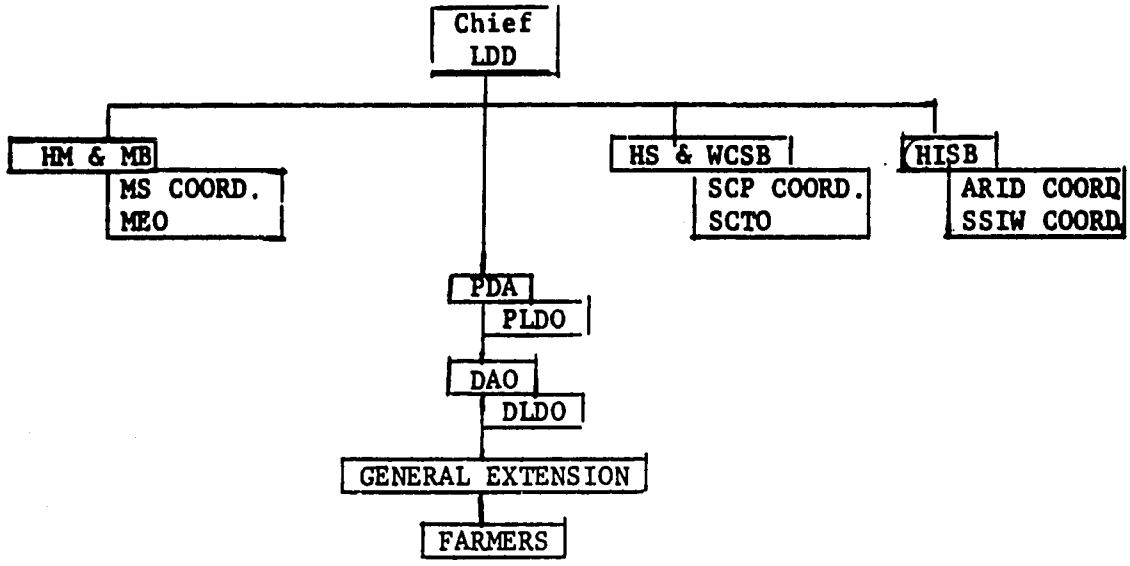
Service Branch, and the Irrigation Services Branch. Each is headed by a Branch Chief and is staffed by technical officers who provide support to the Head of the entire Division.

The line of authority, however, is not channeled through the branches to the district. Instead, it originates from the Head of the Land Development Division and passes to the Provincial Director of Agriculture who is assisted by the Provincial Land Development Officer who, in turn, is responsible for administering all soil and water conservation programs in the province. The line of authority for district programs originates from the Provincial Director of Agriculture and passes to the District Agricultural Officer who is assisted by a District Land Development Officer who, in turn, is responsible for soil and water conservation programs in the district. In the districts, programs are implemented in the field by agricultural extension technicians who are based at the division level and operate at the location and sub-location levels. Technical officers trained in the various agricultural disciplines serve the extension workers in the district in technical backstopping roles. Although the Land Development officers at the provincial level are trained soil and water conservationists, those at the district and division levels are not -- even though they have staff responsibility for soil and water conservation projects in their jurisdiction. This project will train Soil Conservation Technicians for work at the district and divisional levels. Chart 1 delineates the organizational structure of the Land Development Division.

The Survey of Kenya is an independent agency of the Government of Kenya, responsible for the production and publication of a wide variety of maps which are provided to other agencies of the government and to the general public. For some kinds of maps, e.g. topographic maps, the SK collects the data upon which the maps are based. For other kinds of maps, e.g. soil survey maps, the SK bases the maps upon data compiled by the user agency. As a regular agency of government, the SK follows the normal budgetary and staffing procedures.

The current Director of the SK and his top assistants are able and well trained. They have had considerable experience in dealing with a variety of foreign donors and private contractors. The SK is inadequately staffed (as are most GOK agencies), but these staff limitations are magnified by reliance upon obsolete technology, a problem which this project will alleviate.

Chart 1. Organization of the Land Development Division




Chief LDD.. .Chief, Land Development Division
HM & MB..... Head, Machinery and Mechanization Branch
MS Coord.....Machinery Services Coordinator
MEO.....Machinery Extension Officer
HS & WCSB.....Head, Soil and Water Conservation Services Branch
SCP Coord.....Soil Conservation Projects Coordinator
SCTO.....Soil Conservation Technical Officer
HISB.....Head, Irrigation Services Branch
Arid Coord.....Arid Region Irrigation Development Project Coordinator
SSIW Coord.....Small Scale Irrigation Unit Coordinator
PDA..... Provincial Director of Agriculture
PLDO.....Provincial Land Development Officer
DAO.....District Agricultural Officer
DLDO.....District Land Development Officer

E. <u>Initial Environmental Examination</u>

Project Location..... Kitui, Kenya

Project Title..... Arid and Semi-Arid Lands Development

Funding..... $13,000,000

Life of Project ..... Five years

IEE Prepared by ..... Pacific Consultants

Environmental Action Recommended Negative Determination

Mission Director's Concurrence _____

Glenwood P. Roane

Date..... June 29, 1979

Administrator's Decision..... (Concurrence/non-concurrence)

_____

Date ..... _____

## I. Examination of Nature, Scope, and Magnitude of Environmental Impacts

### A. Description of the Project

This project is structured to address many of the immediate concerns regarding Kenya's Arid and Semi-Arid Lands (ASAL) as identified by the ASAL Central Coordination Committee. It includes three components, one of which focuses on Kitui District. The components are:

1. Planning for ASAL Development. Assistance under this component will strengthen the capacity and capability of Kenya's ASAL planning organizations to carry out sound planning for the development of 82% of the country's land area, the arid and semi-arid zones.

2. Data Collection and Analysis for ASAL Development. Assistance under this component will help establish the base for collection of basic data and will develop procedures for interpreting, evaluating, storing, and using the data for planning purposes. It also provides for the production of aerial photographs and orthophoto maps for the project area where action-oriented programs will be launched. These maps will significantly accelerate the planning and design of soil and water conservation activities. It also assists in strengthening the capability to use and interpret aerial photographs, satellite imagery, multispectral photos, and remote sensing. The component provides funding for carrying out feasibility studies and subsequent design of new activities to support the ASAL Development Program.

3. Soil and Water Conservation. This component provides assistance for (a) manpower development through training and demonstration; (b) improved organization and work procedures through revision of the delivery system for technical services; (c) land development through measures to protect against erosion and improve soil management; and (d) improvement of applied technology through development of standards. The purpose of this project component is to test the effects of soil and water conservation practices in arresting the present high rate of resource degradation in a moisture deficient ecozone of Kenya. Conservation practices, most of which are already known and accepted, will be applied according to their effectiveness in reversing the degradation of the physical environment.

Assistance is also provided under this component for supplying through local fabricators and distributors an improved set of soil working implements which can be powered by animal-draft. These implements are designed to permit crop residues to remain on the soil surface to protect against erosion and at the same time provide the

minimum soil tillage necessary for planting and culturing field crops. Emphasis will be given to the design and adaptation of implements which conserve moisture in the soil, retard topsoil loss from the farm due to erosion, minimize draft power, and reduce weeding time for culturing crops. The effectiveness of these new implements will be tested under controlled field conditions.

B. Location of the Project

The area where activities affecting land form or existing physical features of natural resources will be carried out is Kitui District in Kenya. This area is characterized as rolling, undulating terrain with a well defined drainage pattern. Soil capability has been ajudged good based on reconnaissance level soil investigation. However, most of the area lies in a climatic zone unfavorable to high production/low risk farming activities. Rainfall is deficient and spread between two separate periods each year. Evaporation rates are high and except for a few springline seeps along one geologic faultline in the center of the District, there are no perennial water flows within the District boundaries. (The Athi River is a riparian stream along the western border.) The land is predominantly bushland with scattered enclaves where cultivation of crops is practiced. The human population is concentrated in the West-Central part of the District. This is the area selected for applying the soil and water conservation project component on a pilot basis.

C. Identification and Evaluation of Environmental Impacts

Component 1 of the project consists primarily of technical assistance and therefore does not raise environmental concerns.

Component 2 also consists of technical assistance. The social impact of carrying out aerial photography is discussed in the social soundness analysis. Although this project does not provide funds for implementing any activity based on the feasibility studies, each study will incorporate an environmental review to identify potential environmental issues.

Component 3, Soil and Water Conservation and Hand Tools and Tillage Implements, by their nature, will have an impact. As indicated above, this component is a pilot effort for testing the effectiveness of project interventions. As a pilot project, one of the tests of project impact will be its effects on the physical and human environment. The project team members will be required under their scope of work to perform assessments of the environmental impacts of their activities.

Soil conservation works consist of modifications in natural land form and of protective land treatment measures. The project area, lying within the arid and semi-arid zone of Kenya, is representative of 82% of the country's arable land that is already affected

by serious erosion and desertification. The conservation practices to be applied will provide interrruption of runoff water and reduction of sheet and gully erosion of soil materials. These practices include digging terraces, cutoff drains, small water detention facilities such as farm ponds, water harvesting from rock catchments, subsurface dams in streambeds, and water spreading facilities. Other practices which provide vegetal protection are contour strips, grassed waterways, and tree or grass plantings on terraced ridges, pond embankments, and other earthen structures. Crop residue and soil management practices such as minimum tillage and mulch farming using improved tillage methods provide further protection to cropped areas with concomitant effects through increased production.

Funds provided under this project will be used to apply these improved methods of conserving the soil and water resources. They will be beneficial both in terms of increased agricultural production and reduced soil erosion. Moreover, the conservation measures will ameliorate the rate of siltation affecting dams, reservoirs, and streams and the disruption of transportation caused by soil deposits on the roads. Funds are also provided to improve the capability of Kenyans to plan additional projects in the ASAL zone to arrest the environmental degradation presently occuring as a result of soil erosion. No funds are provided under this project for the procurement, distribution, or use of agricultural chemicals. Small bodies of standing water may be created by the construction of small ponds or water harvesting facilities. This may imply the creation of a potential for the spread of malarial and bilharzia vectors. However, these structures will be very small, averaging no more than 5 acre feet (or approximately ½ hectare surface area) of storage, and given the high evaporation rate extant in this area, it is considered that this potential adverse effect will be non-existent. Still, project management will arrange a protocol agreement between the Ministries of Agriculture and Health to provide a monitoring program for detection of malarial or bilharzia incidence and subsequently to provide for appropriate control measures.

The only building construction associated with this project is staff housing. Since these will be located within the environs of Kitui town, there will be no impact on the physical resources area where the project activities will be implemented. The houses will be of standard GOK Public Works design. They will be constructed on-campus, [illegible] doubling the number of staff houses that already exist. The site [illegible] the facilities is considered suitable by the USAID engineer. A potable water supply is available at the site from Kitui town's water supply which is drawn from boreholes. Electricity is available and reliable. Septic tanks for disposing of sewage wastes will be installed for every house. Plans will be approved by the USAID engineer. The houses will be constructed of concrete blocks with PVC flooring, asbestos roof sheeting on timber trusses, and soft board sheeting. Approximately 5 acres of vacant space is available

for new housing, so the seven new structures will not cause any undue crowding of existing staff houses. Based on the design team's inspection, review and consultation with the USAID/Kenya engineer, the house construction element of the project should be classified as environmentally neutral.

II. Recommendation for Environmental Action

The project will fund primarily technical assistance, training, and natural resource improving conservation activities.

Physical activities will primarily be of a pilot nature (see Section 216.2b and c of AID Handbook 3, App. 4B.) and will be expanded only after taking into account, under the auspices of the project team, environmental considerations addressed in Section 216. Thus, the initial stages of the project will serve to perform the functions of an EA.

Therefore, a negative determination is recommended.

(Note: The PID for this project indicates that "A public works program of small dam construction on Government-owned land will be carried out to lay the basis for water supply and irrigation programs. Actual construction will be carried out by the Ministry of Water Development operating through the District Development Committee and the PCU. One USAID advisor (an irrigation engineer) will be provided to assist in planning and implementing this program." (p. 6) The PID budgeted $5,000,000 for dam construction, almost 25% of the total project cost of $21,000,000. Issue E. of the PID states that "Some of the project elements (dam construction) may have of themselves possible negative environmental impacts which will have to be considered during the PRP-PP process." (p. 12) Accordingly, the PID Approval Message stated that the "PP will require an environmental assessment per A.I.D. Regulation 16." (p. 4) Because the ASAL Development Project does not include any dam construction as had been anticipated in the PID (see, for example, p. 20, footnote 14 of the PP), the PP does not include an environmental assessment.)

# IV. FINANCIAL PLAN

## A. General

Responsibility for project implementation rests with several GOK ministries and other organizations, depending upon project component and sub-component. This, together with the fact that many of the project outputs cannot be quantified accurately, makes it difficult to prepare a complete financial analysis including a financial rate of return; no cost/benefit analysis is provided since project benefits are not quantifiable.

## B. Project Costs

The total cost of the project is estimated at $18,591,000 of which $5,645,000 in Kenyan Shillings (K.Sh.) will be provided by the GOK. The GOK's contribution to the project comprises 30 percent of the total project cost and thus the requirements of Section 110 (a) of the FAA, as amended, are met.

Because of the nature of the project components (including a substantial level of technical assistance) AID's contribution will be a grant to the GOK. Certain local currency costs will be financed by AID including some local support costs, housing and furnishings for the long-term technicians, some in-country transportation, locally hired consultants, and a portion of the daily wages to be paid to laborers under the Soil and Water Conservation component. The GOK contribution will finance Kenyan personnel costs, transportation, office and clerical support, part of the costs associated with participant training, and a major portion of the daily wages for soil conservation activities.

The total U.S. contribution of $13.0 million and the GOK contribution of $5.6 million are disaggregated in terms of the three project components in Table IV-1. Table IV-2 disaggregates each component in terms of specific functional costs contributed by both AID and the GOK. (See Page 46)

Table IV-1
AID and GOK Contributions to Project by Component ($000)

| Component | AID | GOK | Total |
|---|---|---|---|
| 1. Planning for ASAL Development | $2,010 | $ 390 | $2,400 |
| 2. Data Collection and Analysis | 3,880 | 1,175 | 5,055 |
| 3. Soil and Water Conservation | 6,456 | 4,080 | 10,536 |
| Sub-Total | $12,346 | $5,645 | $17,991 |
| Contractor Fee | 600 | 0 | 600 |
| Total | $12,946 | $5,645 | $18,591 |

Table IV-2

Project Cost Summary; AID and GOK Contributions by Component ($000)

| Item | Planning for ASAL Development | | | Data Collection and Analysis | | | Soil and Water Conservation | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | AID | GOK | Total | AID | GOK | Total | AID | GOK | Total | |
| Long Term Personnel | $ 1,606 | $ 266 | $ 1,872 | $ 2,327 | $ 801 | $ 3,128 | $ 3,398 | $ 195 | $ 3,593 | $ 8,593 |
| Short Term Consultants | 120 | 60 | 180 | 60 | 30 | 90 | 140 | 70 | 210 | 480 |
| Commodities | 29 | 6 | 35 | 648 | 12 | 660 | 598 | 426 | 1,024 | 1,719 |
| Participant Training | 135 | 58 | 193 | 75 | 32 | 107 | 790 | 340 | 1,130 | 1,430 |
| Feasibility Studies | 0 | 0 | 0 | 600 | 300 | 900 | 0 | 0 | 0 | 900 |
| Local Hire Consultants | 0 | 0 | 0 | 50 | 0 | 50 | 208 | 0 | 208 | 258 |
| Field Labor Costs | 0 | 0 | 0 | 0 | 0 | 0 | 762 | 3,049 | 3,811 | 3,811 |
| Evaluation | 120 | 0 | 120 | 120 | 0 | 120 | 360 | 0 | 360 | 600 |
| Management Services | 0 | 0 | 0 | 0 | 0 | 0 | 200 | 0 | 200 | 200 |
| Sub-Total | $ 2,010 | $ 390 | $ 2,400 | $ 3,880 | $ 1,175 | $ 5,055 | $ 6,456 | $ 4,080 | $10,536 | $17,991 |
| Contractor Fee | | | | | | | | | | 600 |
| Total | | | | | | | | | | $18,591 |

The following sections provide disaggregated data in terms of four of the cost components listed in Table IV-2: (a) long-term personnel; (b) short-term consultants; (c) commodities; and (d) participant training. These data are disaggregated both by component and source of contribution.

1. Long-Term Personnel

Most long-term personnel will be hired through a single major contract. Table IV-3 (see Page 48) indicates the costs of the 689 person months of long-term expertise that will be required to implement the project. The costs may appear high because they include local support which is normally excluded from dollar contract budgets (housing and furnishings). They include the base salary plus a 30 percent fringe and benefit factor, a ten percent overseas allowance, and a 70 percent overhead rate. The salary is an average figure that incorporates a five percent annual increase each year. In addition, direct support costs are based upon location of assignment (Nairobi, or Kitui). These costs include transportation, shipment of household effects, housing, and education allowance. A 15 percent contingency/escalation factor is added to the total long-term personnel costs.

An AID-financed host country contract will be used to obtain the above services. It will permit the contractor to sub-contract for any required short-term consultants, participant training, and to the extent necessary, to act as the procurement agent for commodities of U.S. source and origin. Direct disbursement procedures will be used for both the U.S. dollar and the Kenyan Shilling payments under this contract. Separate invoices for dollar expenses and shilling expenses will be submitted monthly by the contractor to the appropriate GOK contracting officer for certification. They will then be forwarded to the USAID project manager for administrative approval (similar to that required under the AID direct Letter of Commitment procedure) and then forwarded to the USAID Controller for verification and payment. Actual payment will be made either by Kenyan Shilling check, or U.S. dollar check prepared by the Regional Finance Officer in Paris.

The direct disbursement procedure has several advantages over the Commercial Bank Letter of Commitment and the AID Direct Letter of Commitment: (a) There will

Table IV-3
Long-Term Personnel Costs; AID and GOK Contributions by Component ($000)

| Component | AID | GOK | Total |
|---|---|---|---|
| 1. Planning for ASAL Development | | | |
| Senior Planning Advisor | $ 551 | $ 117 | $ 668 |
| Senior Planning Advisor | 551 | 117 | 668 |
| Planning Advisor | 504 | 32 | 536 |
| Sub-Total | $1,606 | $ 266 | $1,872 |
| 2. Data Collection and Analysis | | | |
| Soil and Water Engineer | $ 523 | $ 186 | $ 709 |
| Soil Surveyor | 523 | 186 | 709 |
| Soil Surveyor | 523 | 186 | 709 |
| Range Ecologist | 523 | 186 | 709 |
| Aerial Photography Technician | 235 | 57 | 292 |
| Sub-Total | $2,327 | $ 801 | $3,128 |
| 3. Soil and Water Conservation | | | |
| Land Use Planner/Team Leader | $ 717 | $ 33 | $ 750 |
| Soil and Water Engineer | 523 | 32 | 555 |
| Soil Scientist | 523 | 32 | 555 |
| Farm Equipment Advisor | 523 | 32 | 555 |
| Technical Expertise a/ | 1,111 | 67 | 1,178 |
| Sub-Total | $3,397 | $ 196 | $3,593 |
| Total Long-Term Personnel | $7,330 | $1,263 | $8,593 |

a/ Includes an agronomist, forage crops specialist, agricultural economist, and executive officer.

be no banking charges normally associated with a Bank Letter of Commitment and related Letter of Credit, thereby providing a savings of approximately $250,000 over the five year life of the project; (b) Although the direct payment procedure adds approximately two additional invoices and checks per month to the work load of the Mission Controller's office, the record keeping requirements are no more than when the AID Direct Letter of Commitment procedure is used; (c) Current disbursement data will be available to the project manager two to three months earlier than if the Direct Letter of Commitment procedure were used.

Table IV-4 (see Page 50) indicates the number of person months of long-term personnel that will be required, on an annual basis, for each component of the project.

2. Short-Term Consultants

A total of 32 person months of short-term consulting assistance, to be provided under the prime contract, will be required to complement the long-term personnel. Costs for this assistance were estimated at $15,000 per month, which includes salary, benefits, overhead, transportation, per diem, and home office support. Table IV-5 (see Page 51 ) summarizes the estimated costs.

3. Commodities

The cost of project commodities is approximately $1.72 million, or 9 percent of the total project cost. These include nine houses in Kitui town for the long-term personnel, equipment and tools required under the Soil and Water Conservation component, and aerial photographs and landsat imagery. Most of the equipment and materials will be locally procured by the prime contractor. The GOK will be reimbursed for the cost of the houses, either on a milestone completion basis or on a completed house basis. The GOK will pay a 15 percent fee to cover house design and construction supervision by local architects and engineers. Each house is estimated to cost $34,000; thus, the GOK contribution will be about $5,100 per house, or a total of $45,900 A portion of the GOK contribution is for POL for the mechanized farm equipment and vehicles. In addition, the GOK will provide office space in Kitui and Nairobi for the contract team. A summary of commodity costs is provided in Table IV-6 (see Page 52 ) by component.

Table IV-4
Person Months of Long-Term Personnel, Annually, by Component

| Component | Year | | | | | |
|---|---|---|---|---|---|---|
| | FY 1980 | FY 1981 | FY 1982 | FY 1983 | FY 1984 | Total |
| **1. Planning for ASAL Development** | | | | | | |
| Senior Planning Advisor | 4 | 12 | 12 | 12 | 12 | 52 |
| Senior Planning Advisor | 4 | 12 | 12 | 12 | 12 | 52 |
| Planning Advisor | 3 | 12 | 12 | 12 | 12 | 51 |
| Sub-Total | 11 | 36 | 36 | 36 | 36 | 155 |
| **2. Data Collection and Analysis** | | | | | | |
| Soil and Water Engineer | 4 | 12 | 12 | 12 | 12 | 52 |
| Soil Surveyor | 3 | 12 | 12 | 12 | 12 | 51 |
| Soil Surveyor | 3 | 12 | 12 | 12 | 12 | 51 |
| Range Ecologist | 3 | 12 | 12 | 12 | 12 | 51 |
| Aerial Photography Technician | 8 | 12 | 6 | 0 | 0 | 26 |
| Sub-Total | 21 | 60 | 54 | 48 | 48 | 231 |
| **3. Soil and Water Conservation** | | | | | | |
| Land Use Planner/Team Leader | 4 | 12 | 12 | 12 | 12 | 52 |
| Soil and Water Engineer | 1 | 12 | 12 | 12 | 12 | 49 |
| Soil Scientist | 1 | 12 | 12 | 12 | 12 | 49 |
| Farm Equipment Advisor | 1 | 12 | 12 | 12 | 12 | 49 |
| Technical Expertise[a] | 8 | 24 | 24 | 24 | 24 | 104 |
| Sub-Total | 15 | 72 | 72 | 72 | 72 | 303 |
| Total Long-Term Personnel | 47 | 168 | 162 | 156 | 156 | 689 |

[a] Includes an agronomist (49 person months, FY 1981-84), forage crops specialist (24 person months, FY 1981-82), agricultural economist (24 person months, FY 1981-82), and executive officer (7 person months).

Table IV-5

Short-Term Consultants Costs, Annually by Component ($000)

| Component | Year | | | | | |
|---|---|---|---|---|---|---|
| | FY 1980 | FY 1981 | FY 1982 | FY 1983 | FY 1984 | Total |
| 1. Planning for ASAL Development | $ 60 | $ 60 | $ 30 | $ 30 | $ 0 | $180 |
| 2. Data Collection and Analysis | 0 | 45 | 30 | 15 | 0 | 90 |
| 3. Soil and Water Conservation | 45 | 45 | 30 | 30 | 60 | 210 |
| Total | $105 | $150 | $ 90 | $ 75 | $ 60 | $480 |

Table IV-7

Participant Training Costs, Annually by Component

| Component | Year | | | | | |
|---|---|---|---|---|---|---|
| | FY 1980 | FY 1981 | FY 1982 | FY 1983 | FY 1984 | Total |
| 1. Planning for ASAL Development | $ 43 | $ 64 | $ 64 | $ 22 | $ 0 | $ 193 |
| 2. Data Collection and Analysis | 0 | 43 | 43 | 21 | 0 | 107 |
| 3. Soil and Water Conservation | 86 | 344 | 356 | 344 | 0 | 1,130 |
| Total | $129 | $451 | $463 | $387 | $ 0 | $1,430 |

Table IV-6
Commodity Costs; AID and GOK Contributions by Component ($000)

| Commodity | Component: Planning for ASAL Development | | | Data Collection and Analysis | | | Soil and Water Conservation | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| | AID | GOK | Total | AID | GOK | Total | AID | GOK | Total | |
| **Technical Equipment** | | | | | | | | | | |
| Training Center | $ 0 | $ 0 | $ 0 | $ 0 | $ 0 | $ 0 | $ 15 | $ 0 | $ 15 | $ 15 |
| Vehicles | 0 | 0 | 0 | 24 | 0 | 24 | 114 | 0 | 114 | 138 |
| Tractors; Wagons | 0 | 0 | 0 | 0 | 0 | 0 | 115 | 0 | 115 | 115 |
| Staff Housing (9) | 29 | 5 | 34 | 0 | 0 | 0 | 232 | 41 | 273 | 307 |
| Housing Maintenance | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 | 4 | 5 |
| Vehicle Maintenance | 0 | 0 | 0 | 0 | 12 | 12 | 0 | 56 | 56 | 68 |
| Furniture; Guest Quarters | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 30 | 30 |
| **Tools and Implements** | | | | | | | | | | |
| Demonstration Farm | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 |
| Conservation Projects | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 130 | 130 | 130 |
| Field Project Equipment | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 25 | 25 |
| Prototype Tools | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 168 | 168 | 168 |
| **BLI Farm Development** | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 0 | 27 | 27 |
| **Staff Office Supplies and Equipment** | 0 | 0 | 0 | 25 | 0 | 25 | 40 | 25 | 65 | 90 |
| **Aerial Photographs** | 0 | 0 | 0 | 463 | 0 | 463 | 0 | 0 | 0 | 463 |
| **Landsat** | 0 | 0 | 0 | 136 | 0 | 136 | 0 | 0 | 0 | 136 |
| Total | $ 29 | $ 6 | $ 35 | $ 648 | $ 12 | $ 660 | $ 598 | $ 426 | $1,024 | $1,719 |

4. Participant Training

The project provides 53 person years of participant training. The costs have been estimated at $15,000 per person year, based on the current participant training cost experience of the Mission. The participant training program will be included under the prime contract. AID will approve all participant training sub-contracts let by the contractor with respect to curriculum and selection of institution. The expected disbursement for training is shown in Table IV-7 (see Page 51).

# V. IMPLEMENTATION PLAN

## A. Administrative Arrangements

1. Government of Kenya (GOK) - Grantee and Contracting Party

a. Component 1 - Planning. The GOK agencies responsible for implementing this component are: The Rural Planning Section of the Ministry of Economic Planning and Community Affairs (MEPCA) and the Project Preparation Section of the Development Planning Division (DPD)of the Ministry of Agriculture (MOA).

b. Component 2 - Data Collection and Analysis. The Arid and Semi-Arid Lands Branch (ASALB) of the Project Monitoring and Evaluation Division (PMED) of the MOA is responsible for implementing that portion of this component which concerns data gathering by the ASALB. The Survey of Kenya (SK) is responsible for implementing that portion of this component which concerns aerial photography and satellite imagery. USAID is responsible for implementing that portion of this component which deals with feasibility and design studies.

c. Component 3 - Soil and Water Conservation. The responsibility for implementing this component rests on the Land Development Division (LDD) of the MOA.

2. Reports - The GOK agencies listed below will provide reports as indicated:

a. Component 1.: Planning

(1) MEPCA, RPS
- (a) Annual work plans.
- (b) Annual training plan for participants; USAID will assist as may be necessary.
- (c) Quarterly reports on progress.
- (d) Other reports as required by AID.

(2) MOA, DPD
- (a) Annual work plans.
- (b) Annual training plan for participants.
- (c) Quarterly reports on progress.
- (d) Other reports as required by AID.

b. Component 2.: Data Collection and Analysis

(1) MOA, ASALB
- (a) Annual work plans.
- (b) Annual training plan for participants.
- (c) Quarterly reports on progress.
- (d) Procurement plan for commodities and services, prior to procurement.

(e) Quarterly report on procurement expenditures.
(f) Other reports as required by AID.

(2) SK
(a) Annual work plans.
(b) Procurement plan for commodities and services, prior to procurement.
(c) Quarterly report on procurement expenditures.
(d) Quarterly report on progress.
(e) Other reports as required by AID.

c. Component 3 - Soil and Water Conservation

(1) MOA, LDD
(a) Annual work plans.
(b) Annual training plans for participants; USAID and/or contractor will assist as may be necessary.
(c) Quarterly reports on progress
(d) Procurement plans for commodities and services prior to procurement.
(e) Quarterly reports on procurement expenditures.
(f) Other reports as required by AID.

3. AID - USAID/Kenya has the necessary delegations of authority to implement this project. For AID implementation purposes, management authority will be placed in the USAID Agriculture Division. One of the members of this Division will be designated Project Manager and will serve full time in this capacity. He will be assisted by other members of the Division and by the USAID engineer as necessary. REDSO will provide legal, contracting and other specialized personnel as required.

B. Implementation Schedules

Detailed implementation schedules are shown in Annex I.

C. Implementation Arrangements

Implementation arrangements are complex, reflecting the wide variety of skills and services to be supplied and the number of GOK agencies involved. Implementation will require the negotiation of four new contracts by the GOK; in addition, AID will contract with firms on the IQC list and others.

1. New contract between a U.S. firm and the GOK, represented by the MOA, to supply personnel and some associated services to MOA units as follows:

| | |
|---|---|
| ASALB: | 17 person years |
| LDD: | 25 person years |

2. New contract between a U.S. entity such as ERIM, and the Survey of Kenya, to provide two person years of personnel.

3. New contract between a U.S. university and the GOK, represented by MEPCA and MOA, to provide personnel services:

| | | |
|---|---|---|
| MEPCA (Nairobi) | : | 4 person years |
| MEPCA (Kitui) | : | 4 person years |
| MOA, DPD | : | 4 person years. |

4. New contract between a private firm and the Survey of Kenya to provide air photos and associated products and services.

5. For feasibility and design studies, AID will contract with firms on the IQC list and other U.S. or Kenyan entities as required.

6. Purchase of off-shore commodities will be done through host country contract or through use of PIO/C procedures.

7. Purchase of hand tools and oxen-drawn tillage implements for use in the soil and water conservation component of the project will be from local (Kenyan) sources. Prototype hand tools and tillage implements have been developed for Kenyan conditions through research in Kenya. These prototypes will be purchased for field testing. Kenyan manufacturers will be encouraged to build multiple units of those items for which field testing warrants their use on a wider scale.

The contractor selected in item 1. above will have responsibility for procuring the small tools and tillage implements for field testing.

8. New contract(s) between a U.S. entity (consulting firm/university) and GOK/USAID to provide 50 person months of services for evaluation and management services.

# VI. EVALUATION PLAN

## A. Background

Because the project will test soil conservation technologies and agricultural production implements in a semi-arid area, it is extremely important to monitor and evaluate the total impact of the three components on the ASAL pilot area. To determine how effectively project outputs reach the intended beneficiaries, an evaluation or assessment system will be an integral part of project implementation. The system will possess some of the following characteristics:

1. The evaluation system is a tool that the project staff uses to determine adjustments necessary in project implementation in order to assure that project goals are always being addressed.

2. The system can contain several "mechanisms" to collect baseline data and comparable data throughout the duration of the project. This helps to integrate the evaluation and implementation processes.

3. The system needs to identify major project implementation constraints and data gaps in order to assure the collection of necessary baseline data for later comparisons. One particular data gap that will need to be addressed is the manner and degree to which the beneficiaries actually benefit.

4. The system could contain a component that analyzes issues relating to the project as a whole, e.g., spread effect within and between components. Such analyses would probably need to be done by consultants or a staff member with this as his sole assignment.

5. The system needs to treat the smallholder farm household as a whole and complex social and economic unit, examining the points of contact/interaction between the project and the farm unit. Such analysis requires a solid socio-economic data base, supported by non-quantitative evaluation, in order to capture the dynamics of change.

6. The system should incorporate strong social science expertise to suggest ways to implement the project more effectively. As with other aspects of project implementation and evaluation, it is important that analysis continue throughout the life of the project. The following sources in Kenya can assist in social science analyses: the Department of Sociology and the Institute for Development Studies at the University of Nairobi, and the National Integrated Sample Survey Program. Still, it is important that individual social scientists be on the evaluation teams.

B. Evaluation System

The evaluation system will have three components: (a) annual USAID/GOK reviews, (b) individual component evaluations (as deemed necessary), and (c) special in-depth evaluations.

The first USAID review will commence about one year from the date on which initial conditions precedent to disbursement are met and will focus on the initial implementation phases, performance to date, whether or not any actions are required to mitigate problems which might arise later, and the progress and results of the feasibility studies. The USAID evaluations will be held annually, and involved GOK officials may be asked to participate. As implementation proceeds, the focus of these reviews will shift toward evaluating progress in achieving project purpose and outputs, recognizing that they will not be completely realized until project conclusion.

Individual component-specific evaluations, carried out in greater depth than the annual Mission reviews, will be held twice during the life of the project for each of the following components: planning, data gathering and analysis, and soil conservation (including tillage implements). These evaluations will address special issues which may arise concerning any one component, in contrast to the broader in-depth evaluations discussed below. The component evaluations will review implementation, progress toward achieving goals, and the degree to which particular components are testing methodologies and their appropriate application in the context of the smallholders' needs and the economic, social, and administrative realities of the target areas. The Mission has budgeted 24 person months of evaluation services to conduct the component evaluations. The USAID, with GOK concurrence, will prepare scopes of work which may be carried out by AID/W personnel and/or outside consultants, including Kenyans, as circumstances may warrent.

Finally, AID will fund two project-wide, in-depth evaluations in FY 1982 and FY 1984. These evaluations will focus on the dynamics of the development process in the pilot area. Detailed socio-economic survey data will be collected and combined with non-quantitative field interviews, in order to examine the farming household as an integrated socio-economic unit. This "whole farm" perspective permits the evaluation to assess project impact, to identify areas where project components need to be modified in order to focus their impact, and to provide insights into how the project's components comply with the needs, demands, and opportunities of the household. The Central Bureau of Statistics and the Ministry of Agriculture routinely collect data which may assist in these evaluations.

The baseline data and non-quantitative interviews will provide one major input for the evaluation of the overall project; the second input will be the annual reviews and the two component-specific evaluations. One contractor (under a host-country/USAID contract) will conduct the two project-wide evaluations, gathering the baseline data, conducting interviews, and providing overall project assessment and recommendations. The project-wide evaluations will be of considerable utility to the GOK and the ASAL planning groups by documenting the micro level aspects of development dynamics in Kitui District. They will require approximately 16 person months of evaluation services. The USAID, with GOK concurrence, will prepare scopes of work and the evaluations may be performed by outside consultants in collaboration with Kenyans, as circumstances may warrent.

The three sets of evaluations detailed above, annual, component, and project-wide, will afford Mission management with tools for monitoring project implementation and for outlining future ASAL development activities. Most importantly, the evaluations will provide the GOK with information necessary for successfully guiding the gradual evolution of the ASAL Development Program.

## VII. CONDITIONS AND COVENANTS

Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing assistance for ASAL and Kitui District Planning, the Government will submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that there are qualified counterparts in place for the project-financed long-term technical advisors provided under the Planning component for the project. This condition will apply separately to the Ministry of Economic Planning and Community Affairs and to the Ministry of Agriculture.

Prior to any disbursement, or the issuance of any commitment document, for the purpose of financing under this Agreement any contract for technical, construction or other service to be entered into by the Government, or for any contract for commodity procurement, where such procurement of goods or services exceeds $50,000, A.I.D. will approve each such contract and/or designs and specifications in writing. This requirement may be satisfied separately for each such contract action.

Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing any soil conservation sub-project, the Government will submit to A.I.D., in form and substance satisfactory to A.I.D., a report describing the sub-project including a detailed description of the sub-project area, method of carrying out the work, cost estimates, accounting systems, including copies of forms to be used to account for cash disbursements through the District level, and environmental examination. Details of such report will be described more fully in Project Implementation Letters (PILs).

Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing studies not identified in the project agreement's amplified description, the Government will submit to A.I.D., in form and substance satisfactory to A.I.D., study proposals describing, inter alia, cost estimates for the study, manpower requirements, proposed course of action, and relationship between the particular study and the Government's ASAL Development Program. Specific content and form for these proposals will be addressed in PILs. This condition may be satisfied separately for each study.

Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing construction at the Better Living Institute, the Government will submit to A.I.D., in form and substance satisfactory to A.I.D., final plans, specifications and cost estimates for such construction. This condition may be satisfied separately for each unit of construction.

Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing procurement of animal drawn implements resulting from the project's first phase design and testing program, the Government will submit to A.I.D., in form and substance satisfactory to A.I.D., a plan describing the procedures for distribution of such implements including, inter alia, marketing mechanisms to be utilized, credit facilities to be made available, criteria for farmer eligibility in the program, and, where applicable, extent of Government subsidies.

Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing physical activities under the soil and water conservation component of the project, the Government will submit to AID, in form and substance satisfactory to AID, evidence that it has set aside, at its Better Living Institute, land and facilities adequate to serve as the project's water and soil conservation demonstration and training center.

The Government will covenant to continue the existing structure, or provide other adequate mechanisms, for administering ASALs. The Government will keep A.I.D. advised in the event that the existing administrative structure, including the Inter-Ministerial Committee on ASALs, the ASAL Central Coordinating Committee, and the ASAL Core Technical Committee, is altered.

The Government will covenant to provide, in addition to the counterparts mentioned in the initial condition precedent, qualified counterparts for project-financed technical advisors in accordance with the schedule included as part of the project agreement's amplified description, which may be subsequently modified by the parties in Project Implementation Letters (PILs). Additionally, the Government will, unless the parties otherwise agree in writing, take such steps as may be necessary to establish the positions of forester and cartographer within the ASAL Branch of the Ministry of Agriculture.

The Government will covenant to take all necessary steps to assure that the Survey of Kenya deploys the resources necessary for aerial photography and mapping of Kitui District so that photography and mapping are completed by June 1981, or such later date as A.I.D. may agree to in writing.

The Government will covenant to provide, on a timely basis, approximately 20-30 certificate level graduates to receive basic training in soil and water conservation principles and practices at the project's facility at the Better Living Institute. Timing for these institutional courses will be generally described in the project agreement's amplified project description and will be more specifically defined in subsequent PILs.

The Government will covenant to make available, upon completion of training, means of transportation, motorized or other, to persons successfully completing project training at the Better Living Institute. This covenant applies only to those technicians posted to a position of responsibility for soil and water conservation in Kitui District.

The Government will covenant to make available on a timely basis qualified individuals to undertake participant training funded under the project. Such participants will be made available in accordance with the general time frame indicated in the project agreement's amplified project description, and which will be described in greater detail in subsequent PILs. Except as A.I.D. otherwise agrees in writing, the Government will also assure that such persons trained under the project will be returned to such positions within the Government, commensurate with the nature and level of training received, as may be agreed to by the parties.

The Government will covenant to have an independant Chartered Accounting firm undertake annual audits for the soil and water conservation component, particularly the accounting and use of project commodities and the cash disbursement system for labor.

The Government will covenant to prepare in form and substance satisfactory to AID periodic training plans for participant training financed under the project. The content of these plans and their timing will be the subject of subsequent PILs.

The Government (subject to the approval of annual budgets) will covenant to finance a significant portion of the recurrent costs associated with the project, including the soil and water conservation activities in Kitui District. Details of such financing will be described more fully in PILs.

# PLANNING FOR ASAL DEVELOPMENT

## A. Background

The Government of Kenya (GOK) has accorded a clear emphasis to the development of its arid and semi-arid lands (ASALs). This is manifest in the Development Plan (1979-83), the ASAL Framework Document, and more recently, at the GOK-sponsored seminar on ASAL Development which was attended by high level representatives from key Government ministries and many donor organizations. Because the success of the ASAL Development Program depends upon the commitment of substantial resources over an extended period of time, a major ASAL planning effort is required to ensure that those resources are allocated efficiently.

Two ministries will have major planning responsibilities for ASAL development. The Ministry of Economic Planning and Community Affairs will monitor the integration and coordination of the activities administered by the operating ministries. The Ministry of Agriculture will identify and assign priorities among a large proportion of these activities, since agriculture is crucial to the successful development of the ASALs. The Permanent Secretaries of both ministries recognize the importance of systematic forward planning to help guide efficient resource allocation. Both will expand their respective planning staffs to accommodate the new demands created by the Government's commitment to ASAL development. At the same time, both have requested planning assistance to complement this expansion.

The United States was asked to play a leading role in assisting the GOK plan its ASAL Development Program. The Ambassador responded positively to this request when he met with Government officials at the highest levels. This project component is designed to help meet the GOK's ASAL planning needs in such a way as to complement both on-going and proposed AID-supported planning assistance to the ministries of Economic Planning, Agriculture, and Health.

## B. GOK Organization for ASAL Planning

The ASAL Framework Document establishes the organizational structure for planning and coordinating the ASAL Development Program. For the most part, existing organizations will be augmented with additional staff with particular expertise in and responsibilities for the ASALs. Ultimate responsibility for policy decisions regarding ASAL development will lie with the Cabinet. An Interministerial Committee on ASALs, consisting of the Permanent Secretaries of the key operating ministries, will meet twice a year to interpret the Cabinet's policies. The actual planning for ASAL development rests primarily with two ministries: Economic Planning and Agriculture.

1. Ministry of Economic Planning. The Ministry of Economic Planning, through the ASAL Central Coordinating Committee (consisting of senior planning and technical officers from the same ministries represented on the Inter-ministerial Committee), is the main instrument for coordinating all ASAL planning efforts. (These ministries include Agriculture, Water Development, Natural Resources, Cooperative Development, Works, Housing and Social Services, Health, Lands and Settlement, and Tourism and Wildlife). This committee will meet six times a year. The Rural Planning Section of the Ministry of Economic Planning, which carries out the day to day analytical work on which planning and policy decisions are based, will serve as its Secretariat. To enable it to perform its new ASAL-related activities, the Permanent Secretary will add one planning officer to this section. In addition, this ministry has requested that a senior advisor be provided to assist the expanded Rural Planning Section in its overall planning responsibilities for the ASALs.

AID is currently providing technical assistance to this section under the Rural Planning Project (615-0162). Through a contract between the Government and the Harvard Institute for International Development, three advisors have been working since 1976 to help improve the Government's capability to implement a system of decentralized planning. Although the project is scheduled to terminate in December 1980, the Mission has recommended in the FY 1981 ABS that planning assistance be continued for an additional four years. This recommendation is based on the results of an external evaluation of the project that was carried out in March 1979. The provision of an additional (fourth) advisor to the Rural Planning Section not only would strengthen and complement the existing staff but also would constitute a key input to the overall planning activities of the ASAL Development Program. (Figure 1 indicates the organizational structure of the Rural Planning Section, delineating both Kenyan and advisory positions.)

2. Ministry of Agriculture. Many ASAL development activities will be administered by the Ministry of Agriculture. Three other ministries key to the development of the ASALs are Water Development, Natural Resources, and Works. Together, representatives from these four ministries will constitute the Core Technical Committee. The Director of Agriculture will chair this committee and, because of his position, will be able to approve ASAL programs and projects expeditiously. The Development Planning Division in the Ministry of Agriculture is the key planning organization for projects in this area and, in a sense, will serve as the Secretariat to the Core Technical Committee. The Ministry of Agriculture will add two planning officers to the Project Preparation Section of this division and has also requested that an external advisor be provided to work with these two planning officers solely on the ASAL Development Program.

AID is currently providing technical assistance under the Rural Planning Project to the Development Planning Division. This is provided under a multi-donor financed contract between the Government and the Harvard Institute for International Development, to which AID contributes 37%. This Technical Assistance Pool includes ten advisors, and provision of an ASAL advisor would complement this on-going activity. (Figure 2 indicates the organizational structure for agricultural planning; it also refers to the ASAL Branch which will provide much of the data and analysis needed for effective ASAL planning.)

3. Ministry of Health. Other ministries may also need to expand their planning capabilities. In particular, the Ministry of Health has requested AID's assistance for a health planning project and the Mission expects to obligate funds for this in FY 1979. In addition to technical assistance, this project will provide master's level training in health planning to approximately fifteen Kenyans who will be assigned to posts at the Ministry of Health headquarters and also at provincial and district levels.

Improved health is widely recognized to be particularly important in the ASALs. Although health activities will not be funded under this ASAL Development Project, the Health Planning Project will help focus attention on ASAL health needs, and in that sense, will closely complement the AID-supported planning activities in the ministries of Economic Planning and Agriculture.

C. Assistance for ASAL Planning

Working within the existing organizational structure for ASAL planning described above, and taking into consideration AID's on-going and proposed planning assistance to the Government of Kenya, the Mission will provide three ASAL advisors as requested by the GOK. Two advisors will provide ASAL planning assistance at the national level for the development of all ASALs, and a third advisor will work at the district level, focussing specifically on planning for Kitui District. The three positions are described below.

1. Planning Assistance for All ASALS. One advisor will work in the Rural Planning Section of the Ministry of Economic Planning and the other in the Project Preparation Section (Development Planning Division) of the Ministry of Agriculture. Each will work with a Kenyan economist/planner who has been specifically assigned to carry out planning and related analyses for the ASALs. The former advisor will require a background in economic planning and the ability to integrate plans horizontally (across various ministries) and vertically (from the district to the national level). He/she will work for a period of four years commencing in July 1980.

This advisor's work will complement that being carried out by the three AID-financed advisors working under the Rural Planning Project, which the Mission has proposed for continuation as Rural Planning II in the FY 1981 ABS. The second advisor will require a background in agriculture, planning, and economics, and must have previous experience with arid and semi-arid lands. This advisor will also be assigned for a period of four years commencing in July 1980.

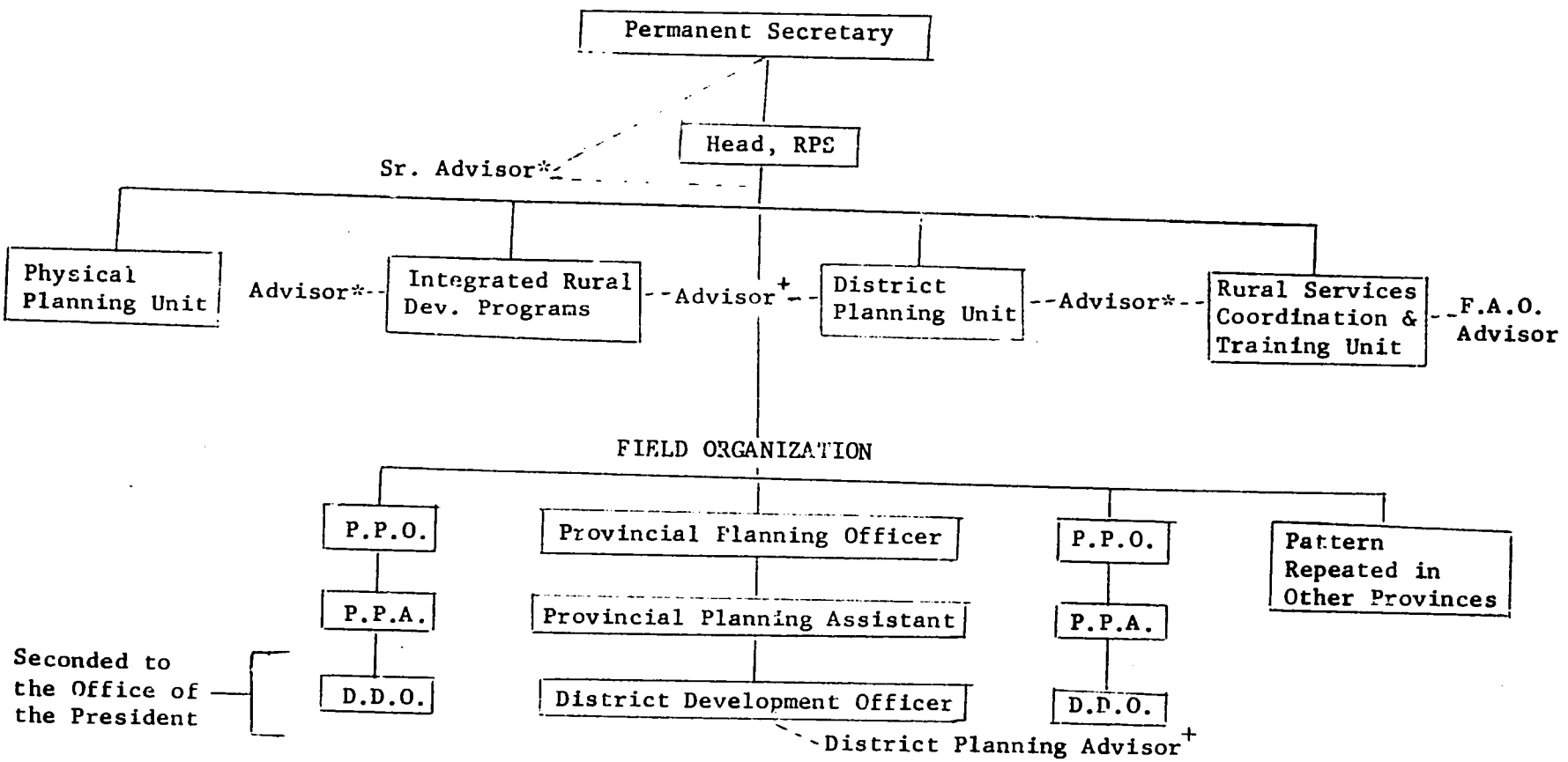
2. Planning Assistance for Kitui District. The third advisor will be an economic planner, bureaucratically under the Rural Planning Section of the Ministry of Economic Planning, but posted in Kitui District where the bulk of AID-supported investment activities will be focussed. This advisor will commence work in July 1980, for a period of four years. Pending the training of a District Planning Officer, this advisor's counterpart will be the District Development Officer, who is currently responsible for preparing the District Development Plan. (The Mission has proposed that approximately twenty District Planning Officers be trained under the Rural Planning II Project.)

Providing a planning advisor at the district level has several objectives: (a) it facilitates a close linkage between district planning and national planning, thereby encouraging greater feedback and a more participatory planning process; (b) it creates an opportunity to monitor various AID-supported ASAL activities in Kitui District; (approximately four other advisors/technicians will be working in Kitui which will also aid in this effort); (c) it improves the quality of decentralized planning, thereby reinforcing previous and current AID-assisted efforts under the Rural Planning Project (and its proposed successor); and most importantly (d) it fulfils a GOK request that donor assistance be provided at the district level. This request provides clear evidence of the Government's determination to ensure that the process of decentralized rural planning, operating through the District Development Committees, actually works. (See Figure 3.)

3. Consultants and Participant Training. This project component provides twelve person months of short term consultants to complement the work of the long-term advisors. It also provides nine person years of participant training at the graduate level.

The outputs from the other two components of this project will assist the three advisors to carry out their planning functions. Data collected by the ASAL Branch, the Survey of Kenya, and the Soil Survey Department will provide a base for future ASAL planning. The results of feasibility studies funded under this project will also provide information needed by the Kitui District Planning Advisor as well as the national level advisors.

Figure 1. Working Organizational Chart for Rural Planning Section (June 1979)




*Under Rural Planning Project
+New advisors under the ASAL Development Project

Figure 2. Ministry of Agriculture's Organizational Structure for Planning

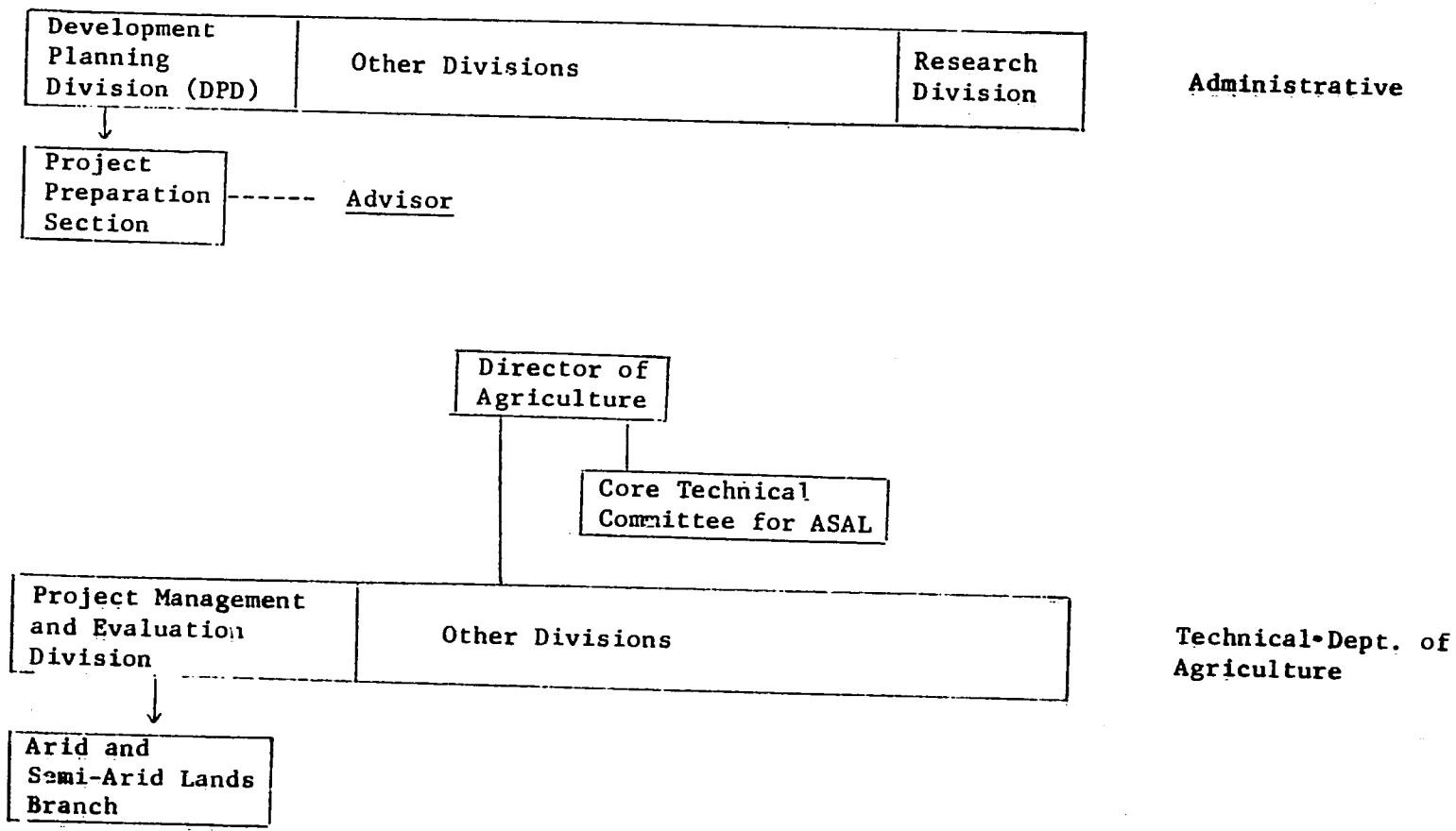
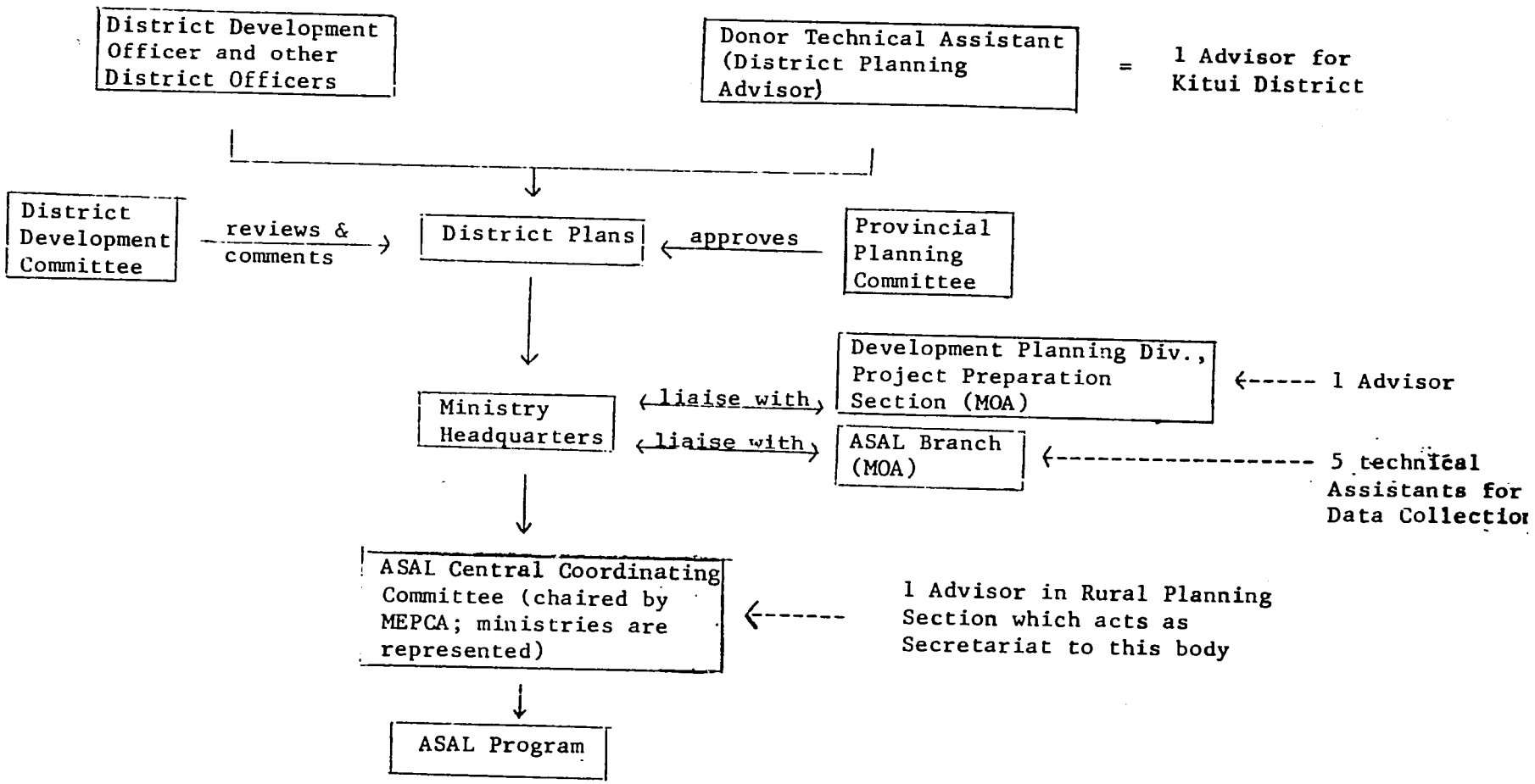


Figure 3. Decentralized Planning



## DATA COLLECTION AND ANALYSIS FOR ASAL DEVELOPMENT

The ASAL Framework Document charges four agencies of Government with the principal responsibility to collect data for ASAL areas. These are:

1. Central Bureau of Statistics (CBS);
2. Arid and Semi-Arid Lands Branch (ASALB) in the Project Management and Evaluation Division (PMED), Ministry of Agriculture;
3. District Staff (DS); and
4. Catchment Development Authorities (CDA).

In addition, the ASAL Central Coordinating Committee has the coordinating responsibility for the data-gathering function.

It is necessary to collect data for two reasons: first, to provide a knowledge base for planning purposes, and second, to provide the information required for project and program monitoring and evaluation. In the early stages of the program, collection of data for planning purposes is the principal objective. However, the data compiled for the first purpose often provide the baseline for the second.

Some of the data needed for planning have already been collected, either specifically for ASAL purposes, e.g., the Pre-Investment Study or for other purposes, e.g., the Integrated Rural Survey series of the CBS and meteorological data from various sources. Every attempt will be made to extract useful information from these and other sources including institutional libraries and experienced officials. However, there will remain a data collection task of large proportions. Most of the burden of collecting the new data is placed upon the ASALB, the only GOK unit assigned fulltime to this job. The ASALB staff is competent and experienced, having participated in the 15-month effort which resulted in the Pre-Investment Study. However, it is small in numbers. It consists of the Branch Head and seven other professionals.

The ASAL Framework Document provides an illustrative outline of basic data requirements for ASAL under eight categories, as shown below:

1. Land: Geographical location, climate, soil types, ecological zone, legal aspects.
2. Water: sources, quantity, quality, use, rights and access potential for further development for production (crops and livestock) and domestic use.

3. Demography and family based data: population size and growth rates, family sizes, family structure, income and consumption, potential labour supply and demand, target groups for the projects and methods of identification and phasing them into the projects.

4. Productive activities: livestock, cropping, charcoal.

5. Government Services: Status and adequacy of:

   - Agricultural services, e.g., extension, credit, marketing, storage, input supplies, training, farm management, research, prices.

   - Other key services, e.g., education, health, roads and communications, cooperatives, small scale industries.

6. Natural resources: Status and degree of soil erosion, water conservation, vegetation preservation and wildlife conservation.

7. Projects: Both government and non-government supported; whether completed, on-going or planned.

8. Organizations: Social structure, co-operatives, religious groupings and economic structures.

Data coverage for any complex activity usually results from a compromise between what the planners would like to have and what they can afford. The latter half of the equation concerns not only staff and money, but also time, and perhaps more importantly, the ability to utilize. There is little benefit in compiling data unless they are so handled as to be at least potentially useful in decision making. It follows that avoidance of unnecessary data gathering is as important as ensuring that all necessary data are taken.

The present system of controlling data coverage seems to be working reasonably well. The ASAL Central Coordinating Committee, which is the final arbiter, includes representatives of the planners, the data gatherers and the implementing agencies. This should ensure balanced judgment.

Assistance to ASALB. Present staff resources cannot produce the quality and quantity of data demanded by the program. Additionally, the ASALB will pick up some share of the implementation responsibility for the agricultural program a few years from now.

The basic problem of the ASALB is the one which affects many areas of developmental activity in Kenya: a severe shortage of trained personnel. There are, for example, only five soil surveyors in the Government of Kenya service. ASALB already has two of them, which is a reasonable share. However, two people are not enough to

survey the ASAL hectarage which needs to be done in the next 3-4 years. The logical solution to the ASALB problem, as well as the general manpower problem in critical areas, involves adding some foreign staff to cover the immediate needs, and at the same time, taking steps to make the present Kenyan staff more effective by increased on-the-job and formal training.

The ASALB needs a larger staff, including coverage of some skill areas not now covered, some staff training, and comparatively modest investment in equipment. There are obviously dangers in adding too large a foreign complement to an activity such as this. However, the proposal below stays well within the size limit for effective utilization.

Staff Enhancement. Positions described below are to be filled through an AID-financed contract between the GOK and a U.S. entity. Third-country nationals are acceptable providing their technical competence is assured. People recruited under this contract will serve as working members of ASALB under the leadership of its Head. In those cases where they bring new skills to ASALB, members will provide a training resource for their Kenyan colleagues. The contract group will not work as a team, in the usual sense, but as individuals woven into the fabric of the ASALB organization. However, a senior member of the group will provide liaison with the Head of ASALB and the AID project manager.

A. Foreign Experts Required

1. Soil and Water Engineer. Required for four years. To be posted in Nairobi but can expect to be in the field 60% of the time. Will work with the member of the ASALB whose specialized skills are in hydro-geology and who is expected to join ASALB by January 1980.

2. Soil Surveyor. Two experienced soil surveyors are required for 4 years. Will be posted in Nairobi but can expect to be in the field 70 - 80% of the time. Will work directly with the two experienced soil surveyors on ASALB staff.

3. Range Ecologist. A drylands range ecologist is required for four years to supplemnt the skills of the livestock member of the ASALB staff.

4. Agronomist. Required for 2-3 months in each of two years of the project. Person should be knowledgeable of crop species and varieties and farming practices suitable for dryland agriculture. These skills will supplement those of the soils members of ASALB.

B. GOK Commitment

To ensure that the foreign experts will serve their intended purpose, the GOK will be asked to commit itself to the following:

1. Establish and fill the post of forester.
2. Establish and fill the post of cartographer.
3. Fill the vacancy for hydro-geologist.
4. Fill the vacancy for rural sociologist.
5. Establish and fill positions for secretary, copy typist and telephone operator.

C. Staff Training

The ASALB has in view a program which would provide either long-term university schooling or short-term training to each professional member of its staff. ASALB also hopes to provide training which will allow some of its sub-professional staff to attain professional rank. Training should be encouraged. However, it seems likely that few people can be spared from their job responsibilities during the duration of this project. The five person years of training provided in this project component strikes a reasonable compromise between training needs and work demands. It is not possible at this time to provide details of the training programs. Exactly who will be trained and in what speciality depends on a number of factors, including the exact skill composition of the contract group.

D. AID will provide:

1. Funds for the purchase of a photocopier and photocopy supplies, plus some office and field equipment for the foreign experts to supplement the material left behind by the Consortium for International Development. Estimated cost is $25,000.

2. Funds for hire of enumerators, data coders, data processors, and similar sub-professional help, and/or professional services

under contract or otherwise, to assist ASALB staff in data collection and analysis. Estimated cost is $50,000.

Project termination date will approximately coincide with the time when the ASALB will have completed its major data collection responsibilities on the ASAL areas.

# LAND USE PLANNING AND ADJUDICATION

The ASAL Framework Document attributes the delay in the implementation of development projects in the ASAL areas, in part, to the lack of detailed land use planning. It also points out that land adjudication and registration (which certifies communal or individual rights to land holdings) need to be expanded and accelerated, especially in the ASALs where the program is least advanced. Alleviation of these problems requires the compilation of certain physical data in the form of maps, which are produced from aerial photographs. Thus, aerial photography must play a major role in the initial stages of Kenya's ASAL Development Program.

For certain geographic areas, aerial photographs already exist, but they are either out of date (taken in 1967) or of inferior quality. Therefore, they are of limited value because the information they provide is inconsistent with present land use patterns. Moreover, the Pre-Investment Study concluded that if up-to-date, rectified aerial photographs for Kitui District were available, they would serve to accelerate the land adjudication process because their accuracy would result in fewer disputes and less litigation.

This annex contains the following sections:

1. Evaluation of available maps, aerial photos and remote sensing imagery
2. Modern techniques of collecting data for land use planning
3. Summary of desirable techniques and the capability of the GOK to use them
4. Proposed assistance under the ASAL Development project

## I. Evaluation of Available Maps, Aerial Photos and Remote Sensing Imagery

### A. Survey of Kenya (SK)

The Survey of Kenya is one of five departments in the Ministry of Lands and Settlement. The other four departments are: Physical Planning, Lands, Settlement, and Land Adjudication. It is the principal source of maps and photographs of Kenya for both domestic and foreign users. It makes the physical base maps and stores thematic maps 1/ and aerial photographs, including their by-products.

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1/ Thematic maps include all maps except topographic maps.

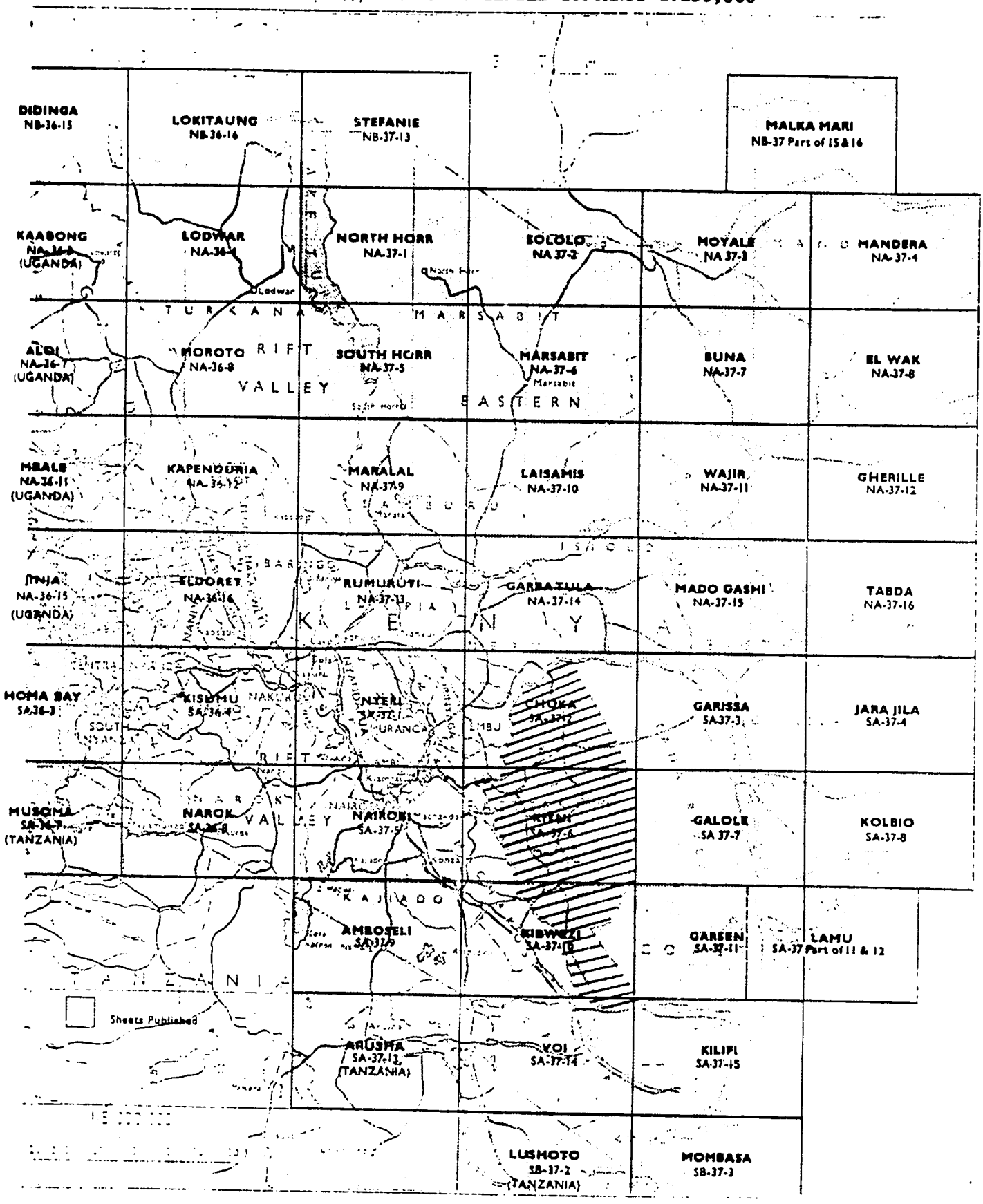
Table 1 summarizes the types of service which SK offers and the principal users of the services.

Table 1. List Of Users And Type Of Service Offered By SK

| Name Of User | Type Of Service |
|---|---|
| President's Office | Maps for Police |
| Army and Air Force | Defense maps |
| Foreign Affairs | Marking & mapping of international boundaries |
| Local Government | Boundary maps for local Government areas |
| Tourism & Wildlife | National Park maps, Game Reserve maps, Town Map Guide, Hunting Map of Kenya, Tourist maps of Kenya, maps of East Africa Safari, and Map of Mt. Kenya |
| Agriculture | Thematic maps (e.g. soil, vegetation, etc.) |
| Forests | Boundry maps |
| Works | Air Survey for new road routes |
| Power & Communication, and Civil Aviation | Aerodrome charts |
| Education | Maps for use in examinations |
| Administration | Maps of administrative boundaries at different scales |
| Land Department | Maps & plans showing situation boundaries & areas, and areas of all individual properties registered in the Land Registry |
| Land Settlement | Base maps for planning scheme layout and title maps for registration of ownership |
| Land Adjudication | Base maps and title maps |
| All Users | Atlas of Kenya |

1. Topographic Maps. The whole country has been covered by topographic maps at the scale 1:250,000. (See Figure 1). These maps were drawn in the 1960's with data compiled from geological maps, other topographic maps, and aerial photographs made by the Directorate of Overseas Survey (DOS) (a U.K. government organization) and other sources. The maps, published in 1974, offer information about the major rivers, both annual and permanent, and the major physiographic features, e.g., plateaus, depressions, mountains. The maps indicate

FIGURE L. SUMMARY OF AVAILABLE TOPOMAPS 1:250,000



elevation by contour lines drawn at 250 or 500 foot intervals. Trigonometric points are represented and major cultural features (cities, schools, roads) are shown.

Kitui District is covered by the following sheets at scale 1:250,000:

| | |
|---|---|
| Chuka | SA-37-2 |
| Kitui | SA-37-6 |
| Kibwezi | SA-37-10 |
| Voi | SA-37-14 (small part of Kitui District in NE corner of sheet) |
| Kilifi | SA-37-15 (very small part of Kitui District in NW corner of sheet) |

Considering their small scale, these sheets are very well prepared. However, they are not up-to-date and it can be expected that new aerial photographs would show significant changes in the cultural features even at this scale. This observation can be expected to apply to the rest of the ASAL area. Moreover, the areas with relatively higher potential, such as Ecozone IV, are likely to show the greatest changes in cultural features.

Topographic maps at larger scales exist for part of the country. The eastern portion of Kitui District, comprising less than half of the district, has been covered at 1:100,000. (See Figure 2 which is a map index.) The western part of Kitui District has been mapped at a scale of 1:50,000. Twenty-eight sheets, eleven of which show contour lines, were published in 1969 based on aerial photographs made by DOS in 1967. (See Figure 3.)

The Survey of Kenya is now coordinating activities to update these topographic maps and print new sheets. The best information is that new sheets for the area south of latitude S 2°00' and west of 38°30' have been printed from photos made by a Canadian agency. The Survey of Kenya is preparing maps for the area west of 38°30' and north of S 2°00'. Six sheets have already been printed. Under a Japanese contract, 12 sheets covering the area east of 38°30' between S 0°15' and S 2°00' have been compiled but have not yet been field-checked. Mapping of the southern portion, also under the Japanese contract, has not yet started nor has mapping of the northern part, under contract to DOS.

The availability of 1:50,000 topographic maps for other ASAL areas is probably even more unfavorable than for Kitui District. Most of the areas of Ecozones IV, V and VI are not covered by maps at this scale, nor are they scheduled for mapping under any current program.

FIGURE 2. SUMMARY OF AVAILABLE TOPOMAPS 1:100,000

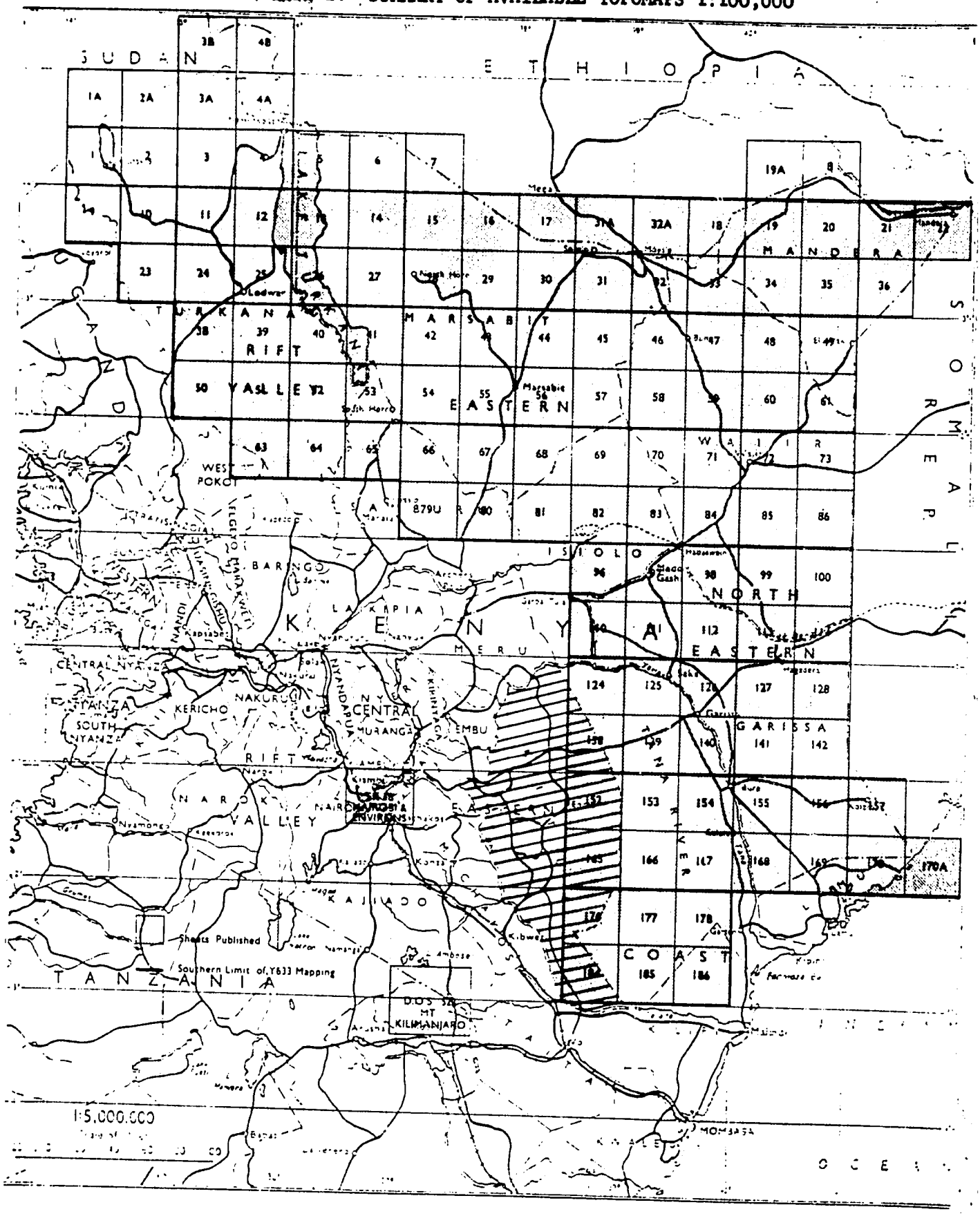
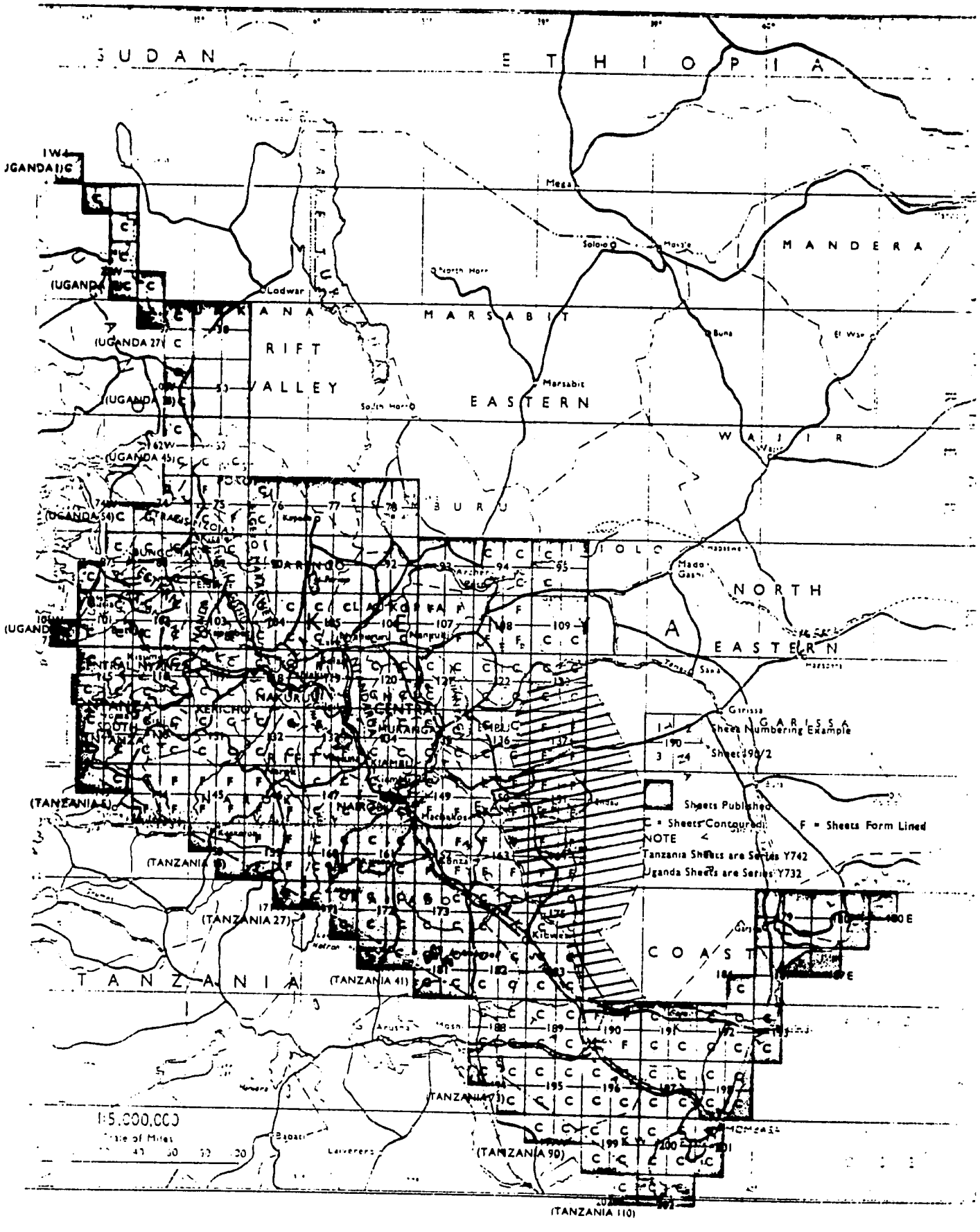


FIGURE 3. SUMMARY OF AVAILABLE TOPOMAPS 1:50,000



2. Aerial Photographs. Most of the aerial photographs of ASAL areas are old and none is rectified. 2/ The use of unrectified aerial photos leads to errors in measurement of areas, a serious handicap in land adjudication. Use of old, unrectified photos for land use mapping, land use planning, soil survey, and vegetation surveys makes for a difficult and inefficient operation. It may also lead to false impressions.

Table 2 summarizes the availability of aerial photographs of Kitui District.

Table 2
Aerial Photographs For Kitui District

| REGION | SCALE | DATE | AGENCY |
|---|---|---|---|
| Eastern | 1:80,000 | 1956-1960 | R.A.F. a/ |
| Southeastern | 1:50,000 | 1967 | R.A.F. |
| Southwestern | 1:30,000 to 1:65,000 | 1963-1970 | Canadian Contract |
| Western | 1:50,000 | 1967 | R.A.F. |

Source: S.K. Annual Report of December 31, 1973.
a/ Royal Air Force.

3. Thematic Maps. The Survey of Kenya compiles and prints thematic maps based on data supplied by other departments. Most of these maps are included in the National Atlas of Kenya, the last edition of which was published in 1970. Is is now being up-dated, mainly with respect to certain social aspects. The Central Bureau of Statistics is the principal supplier of the new information. Most of the maps in the Atlas are at scale 1:3,000,000.

B. Department of Soil Survey

The Department of Soil Survey, Ministry of Agriculture, is responsible for surveying the soils of the whole country. An exploratory soil map at the scale 1:500,000 is in draft form for the entire country and the department is now working on a reconnaissance soil survey at 1:100,000. Priority has been given to the areas of high agricultural potential. Technical assistance is being provided to the Soil Survey unit by the Dutch Government.

The Soil Survey is following both the FAO and the USDA Soil Taxonomy systems in classifying the Kenyan soils. The legend of the

2/ Rectified photographs have been corrected for distortion caused by camera and curvature of the earth.

soils map indicates the general physiographic unit of the soil pedon. In addition, the map presents other soil characteristics such as parent material, texture, color, structure, drainage, and depth. Aerial photographs are usually used before the field work to locate the preliminary boundaries of the soil units and the field work is supplemented by laboratory analysis. Although the soil unit legends show classification to the soil family level in some cases, and to the sub-group level in others, there are sometimes overlaps or conflicts between sub-orders or even orders. This is probably due to the general scale upon which the soil surveyors are working. Also, the maps produced do not demonstrate the strong relationship between the position of the soil unit on the landscape and the soil's properties.

The Soil Survey of Kenya (SSK) has only five soil surveyors on its staff. Two of them have been seconded to the Arid and Semi-Arid Lands Branch to map ASAL soils. Photo-interpretation is a well-accepted technique at SSK and most of its limited number of surveyors have had some training at The International Institute for Aerial Survey and Earth Sciences. However, the severe limitation in staff and the poor quality of aerial photographs impede the progress of soil survey in the ASAL and other areas.

C. Department of Land Adjudication

The process of land adjudication can be divided into two categories of activity:

1. The social, procedural, legal process which handles the declaration of a specific area for adjudication, publication of proposed actions, review and resolution of disputes, and final adjudication. These steps of the process are the responsibility of the Land Adjudication Department.
2. The physical process of measuring the parcel from aerial photographs and in a field and finally providing the new titleholder a blueprint showing the outlines of his plot in relation to his neighbor's plots, roads, etc. The Survey of Kenya has responsibility for this part of the process.

There are two kinds of land adjudication. The first is for range-land, in which the title to a comparatively large parcel of land is given to a trustee acting on behalf of a group. This type is based upon topographic maps at a scale of 1:50,000 and so long as these are available, the process proceeds fairly rapidly and satisfactorily. The other type of adjudication bestows title on individual owners and since the parcels are small and many, the process is time-consuming. This type is based upon unrectified aerial photographs at a scale of 1:12,500 enlarged to a scale of 1:2,500. The 5-times enlargement increases the distortion and the consequent errors. Table 3 shows the progress of adjudication for each of the two types

TABLE 3. **KITUI DISTRICT ADJUDICATION PROGRESS CHART**

Until 10/5/1979

| | ADJUDICATION SECTION | NO. OF PARCELS | DATED DECLARED | ADJ. REGISTER PUBL. | ADJ. REGISTER FINAL | COMPUTED AREA |
|---|---|---|---|---|---|---|
| 1. | KALIA | 1217 | 12.5.1971 | 23.2.1973 | 28.2.1975 | 1664.00 |
| 2. | KASAINI | 599 | 12.5.1971 | 13.9.1972 | 21.11.1974 | 3460.00 |
| 3. | KALIMANI | 1051 | 12.5.1971 | 13.11.1973 | 11.11.1975 | 1996.00 |
| 4. | KITHUMULA | 544 | 12.5.1971 | 2.3.1973 | 4.11.1974 | 1301.00 |
| 5. | KAUMA | 1514 | 12.5.1971 | 23.2.1973 | 11.11.1975 | 1990.00 |
| 6. | MATULU | 1282 | 12.5.1971 | 7.2.1975 | 21.11.1977 | 1410.00 |
| 7. | KALINDILO | 788 | 12.5.1971 | 17.4.1974 | 5.5.1978 | 9022.00 |
| 8. | MITHINI | 1567 | 16.8.1972 | 25.6.1975 | 19.12.1978 | 2093.00 |
| 9. | NGUNI | 1(Ranch) | 18.11.1972 | 15.11.1973 | 20.2.1975 | 9379.00 |
| 10. | MUTUNE | 1009 | 25.4.1973 | 22.10.1978 | 8.3.1977 | 918.00 |
| 11. | MISEWANI | | 2.5.1973 | 30.3.1976 | - | - |
| 12. | WIKILIEYE | 1488 | 8.5.1973 | 16.7.75 | 5.5.1978 | 3186.00 |
| 13. | TUNGUTU | 1219 | 15.5.1973 | 29.1.75 | 8.3.1977 | 2090.00 |
| 14. | KAVETA | | 5.9.1973 | 1.12.1976 | - | - |
| 15. | KAUWI | | 12.9.1973 | 14.9.1976 | | |
| 16. | MASENGO | | 24.5.1974 | | | |
| 17. | MULUTU | | 7.8.1974 | 27.6.1978 | | |
| 18. | KYANIKA | | 4.1.74 | 6.12.77 | | |
| 19. | KATULANI | | 31.12.74 | 22.11.77 | | |
| 20. | NZALAE MIGWANI | 3(Ranch) | 12.2.1975 | 25.2.1976 | 12.6.1978 | 2966.00 |
| 21. | MALUMA | | 3.4.1975 | 23.1.1979 | | |
| 22. | KYAMBOO | | 12.6.1975 | | | |
| 23. | NGUNYUMU | 1(Ranch) | 17.12.1974 | 26.6.1975 | 2.3.1976 | 4935.00 |
| 24. | MULUNDI | | 6.8.1975 | 30.3.1979 | [illegible] | |
| 25. | KILAWA | 2(Ranch) | 9.10.1976 | 28.3.1977 | 15.11.1978 | 1407.00 |
| 26. | NZALAE MUYONGUNI | | 22.10.1976 | | | |
| 27. | UTOONI | | 27.10.1976 | 24.1.1979 | | |
| 28. | ITOLEKA | | 4.11.1976 | | | |
| 29. | KAIMU | | 22.12.1976 | | | |
| 30. | KAKEANI | | 25.2.1977 | | | |
| 31. | MDUSYANI | | 9.8.1977 | 26.3.1979 | | |
| 32 | | | | | | |
| 33. | NZAUMI | | 6.9.1977 | | | |
| 34. | USIAMI | | 23.11.1977 | | | |
| 35. | NZAWA | | 25.10.1978 | | | |
| 36. | NDUMONI | | 10.10.1975 | 27.3.1979 | | |
| 37. | KATHUNGI | | 22.2.1979 | | | |
| 38. | KATULANI | | 21.2.1979 | | | |
| 39. | KALILUMI | | 27.2.1979 | | | |
| 40. | KAVUTA | | 29.3.1979 | | | |
| 41. | KAVISUMI | | 28.3.1979 | | | |

in Kitui District. Insofar as one can determine, the ASAL areas have been given a very low priority by both the Survey of Kenya and the Land Adjudication Department.

Land adjudication is not the limiting factor in land use planning, the activity that takes place under the Department of Physical Planning in the Ministry of Lands and Settlement. Land use planning could be carried out if the required information were available on soils, topography, vegetation, and socio-economic factors, whether the land had been adjudicated or not. The best way to accelerate the land use planning process, as well as the adjudication process, is to make available new aerial photographs of high quality.

D. Regional Remote Sensing Facility

The Regional Remote Sensing Facility in Nairobi is a unit under the United Nations Economic Commission for Africa. It is sponsored jointly by the Regional Center for Services in Surveying and Mapping and the U.S. Agency for International Development. The center was established as the result of an agreement between five African countries: Kenya, Malawi, Somalia, Tanzania and Uganda.

When the facility becomes fully operational, it intends to provide the following services:

1. Training and short courses in surveying and mapping, including photo interpretation and imagery analysis of various remote sensing data.
2. Interpretation and analytical assistance for users unable to provide their own services.
3. Distribution of remote sensing material and products including aerial photographs and Landsat imagery.
4. Its own photographic laboratory which will have the capability to offer the above and other services.
5. Storage capability and review facilities (browse file) of regional remote sensing data imagery.
6. Assistance and advice to USAID missions in design and monitoring remote sensing projects in this region.

At present, the facility does not have the capacity to do all of the above. The browse file is in a beginning phase. Coverage of Kenya on file consists of images of band 5 with less than 30% cloud cover for the period 1972-76, plus a few color images and 4-band sets. In addition to the above services, the Regional Center for Services in Surveying and Mapping, the parent organization of the Regional Remote Sensing Facility, provides services in mapping and surveying including aerial photography, photogrammetry and ortho-photo mapping.

At this time, NASA is not collecting data over Kenya since no one has asked for the data and turning off the recorders extends the capacity of the satellite. If the data are desired for ASAL monitoring, the GOK and USAID will need to make special arrangements with NASA.

## II. Modern Techniques of Collecting Data for Land Use Planning

The ASAL Development Program attempts to control the land use of the arid and semi-arid areas in a way which will benefit the majority of the inhabitants over the long run. Another way to describe the same objective is to say that it is an attempt to reach a balance between the requirements of the people living there and the physical resources of the area. To do this, data which characterize the landscape are needed. The landscape itself is the result of interaction between natural and cultural components over a long period of time. An understanding of the reacting forces is essential to predicting what may be expected to happen in the future under various land use practices.

This section discusses the methods of data collection which meet those tests. Essentially, the methods utilize modern aerial photography and satellite imagery.

The first step in land use design is compilation of information on the changes which have occurred in the landscape in such a manner as to provide uniform data suitable for spatial and temporal analysis.

While estimates vary somewhat, the ASAL areas are said to comprise about 82% of Kenya's lands. The classification is heavily based on climatological data, such as rainfall measured at a series of specific points on the ground. The accuracy of the boundaries so drawn depends upon having a sufficient number of recording sites at properly chosen locations. Since rainfall varies substantially over rather short distances in Kenya, the proper choices are difficult to make. Also, precipitation is not the only determinant to be considered in land use decisions. Landforms, soil types, and vegetative cover may change from one location to another although precipitation does not. These factors may have as much effect on the landscape as precipitation. What is needed are observations which integrate the effects of all the contributing factors. This type of observation allows the region to be divided into distinct ecological units.

### A. Use of Landsat in ASAL Mapping

Spectral and spatial analysis makes it easy to identify ecological boundaries between high potential areas and ASAL areas.

The variation in vegetative cover during the different seasons, as observed by Landsat imagery, can be used to draw accurate boundaries between major ecological units. Utilization of the four bands of Landsat imagery at the scale of 1:1,000,000 is sufficient to delineate ASAL boundaries. Only basic training is required for successful interpretation.

A methodology has also been developed to use Landsat imagery to map different land system components such as geological structure, vegetation, and drainage patterns. By grouping similar combinations of such components, a map of Physical Geographical Units (PGU) can be produced. Each unit can be considered a production unit. Balancing the socio-economic demands against the productive capacity of the unit allows the development of adequate land use planning. Visual spectral analysis (using a color composite approach) of Landsat imagery at the scale of 1:250,000 is recommended for drawing PGU boundaries.

B. Use of Modern Aerial Photography in the ASAL Development Program

The ASAL Development Program suffers from the lack of recent aerial photographs taken and processed by modern techniques. This section discusses the types of information which are desirable and how modern aerial photography contributes to its collection.

1. Topographic Maps

Production of topographic maps for Kitui District (and for ASALs in general) suffers a significant delay due to:

a) Lack of recent aerial photographs;
b) The difficulty of producing maps from unrectified photographs; (Lack of sufficiently trained personnel and modern equipment aggravates the problem.)
c) The low priority given to mapping low potential lands, i.e., ASALs.

New aerial photographs and production of orthophoto maps would greatly ameliorate the present situation.

2. Land Adjudication

Expeditious land adjudication depends upon the availability of accurate aerial photographs which can be used directly for the adjudication of individual parcels. These aerial photographs also provide the basic material for production of topographic maps at a scale of 1:50,000, used in the adjudication of group-owned ranches.

3. Vegetation Mapping

Vegetative cover is an important characteristic to be considered in land use planning. Since the type and density of vegetation changes rapidly under the influence of climate and use, mapping from old aerial photographs leads to false evaluation. Multispectral aerial photographs provide the most adequate type of observation for this kind of mapping.

4. Soil Survey

The information collected by a detailed soil survey is of great value in land use planning. Understanding the relation between the environment and soil properties guides the selection of an adequate land management system. A detailed soil survey should provide information about the following: parent material, major geological formations, landscape position, soil texture, soil structure, soil fertility, and drainage. The boundaries of the mapping unit (soil family) must be accurately drawn and the unit characterized by its position in the landscape. This requires toposequence studies. Interpretation of recent aerial photographs is the most efficient tool to produce the desired level of detail.

5. Slope Analysis

Kitui District was formed as the result of uplift and denudation. Slope analysis is important to define and map the hill slope segments so that the expected earth movement and overland flow of water can be predicted. Such analysis is valuable in classifying the various types of erosion.

Slopes can be classified by:

a) Degree or percent. This method treats the slope as a straight line. It can be evaluated by stereo pair observation of aerial photographs or, more accurately, by the contour intervals on orthophoto maps.

b) Hillslope segments. This method considers both the shape and position of the segments. Table 4 shows the relationship between the various segments and both mass movement and overland flow of water. Stereoscopic photo interpretation provides an adequate method to obtain this information.

TABLE 4

| SLOPE ELEMENT | OVERLAND FLOW | MASS MOVEMENT |
|---|---|---|
| Waxing | No erosion | Creep |
| Free Face | Rill Action | Slipping |
| Debris Slope | Debris | Sliding |
| Wanning or Pediment | Sheet | Minor Creep |

6. Surface Hydrology

The limited amount of rainfall and the topography of the ASAL areas make surface hydrology an essential component of resource analysis. This component can be divided into two mapping elements: drainage and watershed basins:

a) Drainage

Topographic maps at any scale are unable to present the total drainage system due to limits imposed by the information load. Aerial photographs and orthophoto maps do not suffer from this limitation if the photographic resolution is adequate. Given the nature of the terrain in Kitui District, aerial photographs at a scale of 1:20,000 taken by metric camera RC10 and orthophoto maps at a scale of 1:10,000 would provide the desired level of data collection. Quantitative measurements of drainage density, frequency, and order are useful data for land use planning and may be derived from aerial photos.

b) Watershed basins

Delineation of clear and accurate boundaries of each watershed basin and its catchment area is an essential element in understanding surface hydrology. The basin can be classified as a closed or open system after locating the boundaries and the water inputs and output.

7. Soil and Water Conservation

Based on the information regarding the various components discussed above, suitable conservation practices can be recommended. Specifically, the detailed design of a conservation project requires:

a) Contour maps at 5 meters interval. They can be produced from recent aerial photographs using orthophoto techniques.

b) Slope classifications plotted through the orthophoto technique described in 5, above.

8. Small-scale irrigation

If the land use analysis indicates areas with a potential for small-scale irrigation, additional data are required which can be obtained directly from the detailed soil survey. The other essential element is information about the source of irrigation water and the drainage pattern. Adequate drainage is as essential to an irrigation system as availability of water. Orthophoto maps can provide accurate information about the terrain. Much of the site selection and planning can be done in the office at low cost and in a very short time by using orthophoto maps in conjunction with a detailed soil survey.

9. Rangeland Inventory

The essential components of a rangeland inventory are information regarding vegetation composition and density, and drinking points.

a) Vegetation Density

The first step is to develop a relationship between the distribution of plant association and the landscape. Within each association, the canopy density can be estimated at various seasons from black and white aerial photographs at scale 1:20,000. Estimation of the carrying capacity of the plant association is done in the field. With the correlation established between the gradations shown on the photos and the field estimates, carrying capacities can then be read from the photos. Integration of unit carrying capacities yields the total carrying capacity of the ranch or other areas.

Multispectral aerial photography provides a way to distinguish between species, to estimate their densities and, in some cases, to differentiate between healthy plants and those under stress. This analysis is possible because each plant has its own spectral signature, i.e., reflects back radiation at particular wave lengths along the electromagnetic spectrum. Aerial cameras equipped with an array of lenses using different filters collect radiation at the required wave lengths. Interpretation of the data is then usually done visually through color composition techniques using the additive color viewer.

10. Rural Roads

Recent aerial photographs of existing rural roads provide a way to evaluate the efficiency of the network and to predict future road needs. They provide information regarding the best positions on the landform for new roads and availability of materials for road building. They also help to indicate maintenance requirements.

11. Land Adjudication

It is debatable whether land use planning should precede land adjudication or vice versa. In any case, speeding up the process and improving accuracy are desirable. The availability of orthophoto maps at 1:10,000 is the key requirement. Most of the work can then be done in the office, field work being required only to enter the physical features marking the borders of each holding. Improved accuracy reduces conflicts and the delays inherent in review procedures.

## III. Summary of Desirable Techniques and Capability of the GOK to Use Them

### A. Desirable Landsat Imagery

1. Specifications

-- Most recent imagery for all of Kenya for 2 years;

-- Two covers each year, one during rainy season; one during dry;

-- Maximum accepted cloud cover 30%;

-- Scales and bands of MSS:

at 1:3,300,000 bands 4, 5, 6, 7 in positive transparency;
at 1:1,000,000 bands 4, 5, 6, 7 in prints;
at 1:250,000 enhanced bands 5 and 7.

2. Purpose

-- Map ASAL units based on landform, vegetation, drainage and other ecological criteria;

-- Regional land use planning;

-- Site selection for detailed surveys.

## B. Desirable Aerial Photos and their Products

### 1. Specifications

-- Recent aerial photos for Kitui District at 1:20,000;

-- Photo index of recent photos;

-- Orthophoto maps at 1:10,000.

### 2. Purpose: Discussed earlier in paper

### 3. In-country Capability

The Survey of Kenya is the only GOK organization which has the responsibility to procure and provide aerial photographs. It has the following facilities:

-- Metric camera RC8 for aerial photographs;

-- Photo laboratory;

-- Division of photogrammetry.

It also has the following problems:

-- Since it has no aircraft to fly the metric camera, it must depend on the Department of Overseas Survey;

-- The photographic laboratory is overloaded and is facing a financial problem because the budget does not reflect the increased costs of materials;

-- Personnel are being lost to the private sector due to salary disparties;

-- It does not produce mosaics or orthophoto maps.

## C. Maps

### 1. Topographic Maps

The cartographic division of the Survey of Kenya is prepared to compile and produce topographic maps at 1:50,000 but is hampered by the lack of original information material, i.e., recent aerial photographs. This is particularly true for Kitui District and most of the ASALs.

### 2. Thematic Maps

The major thematic maps required for land use planning are the soil survey maps produced by the Soil Survey of Kenya. The Soil Survey is still operating at the reconnaissance level (1:250,000) which is unsatisfactory As noted earlier, it lacks staff and it must depend on the National Laboratory for most of its analysis. The shortage of staff and laboratory facilities make it difficult to establish correlations between soil properties and landscapes.

D. Private Sector

These are three companies in Kenya operating in the field of aerial survey. Field Research Services (FRS) covers the full range of consulting and flying. Gouff does not have its own aircraft in Kenya which limits its ability to take on large projects. Geosurvey International has the following in-country facilities:

-- Cessna 402 and 326 aircraft;

-- Wild RC8, RC9, RC10 and multispectral $I^2S$ cameras;

-- Ground survey team;

-- Facilities for aerial triangulation, plotting and mapping;

-- Facilities for production of orthophoto maps by Topocart with orthophoto attachment.

IV. Proposed Assistance under the ASAL Development Project

A. Introduction

In this section, alternative levels of technical assistance are analyzed, including estimated costs, which are intended to alleviate the problems described on page 1 of this annex. Table 5 summarizes the estimated costs of various processes and of coverage:

TABLE 5

| Landsat | | Estimated Cost |
|---|---|---|
| Phase 1: | Contract for Kitui District only | $ 136,000 |
| Phase 2: | Contract for entire country, and includes institution building | 310,600 |
| **Aerial Photographs** | | |
| For Kitui District only | | 669,624 |
| For all ASALs | | 15,539,129 |

Based on the analysis, it was decided to include for funding under the ASAL Development Project only Phase 1 of the Landsat element and only Kitui District for the Aerial Photography element. Aerial photography (including orthophoto maps) for all the ASALs was excluded because of the high cost, especially when weighed against the likelihood that capability would exist for using only a small portion of the data in the short run. It was decided to defer a decision on whether or not to fund Phase 2 of the Landsat element, possibly under a follow-on project, until the experience of Phase 1 is evaluated. Nevertheless, the complete analysis is retained in this annex for future reference.

The provision of black and white aerial photographs will accelerate the production of thematic maps which are a pre-requisite for land use planning; they will also accelerate the up-dating of topographic maps which are required for group ranch adjudication. The production of orthophoto maps from the black and white aerial photographs will accelerate individual land adjudication. Multi-spectral aerial photographs are needed for detailed range management planning, including estimates of the carrying capacity of the land and for monitoring changes in vegetative cover and other environmental impacts. Landsat imagery will be provided to monitor land use changes. These individual processes (or tools) are summarized below in relation to the various kinds of information each will provide.

Maps based on recent black and white aerial photographs will provide data needed for:

-- group ranch adjudication;
-- rural road mapping and planning;
-- water point selection;
-- drainage pattern analysis;
-- detailed soil surveys;
-- mapping vegetation associations for rangeland inventories;
-- landscape analysis;
-- slope analysis;
-- mapping geomorphological units.

Orthophoto maps will be produced from the black and white aerial photographs to provide data needed for·

-- individual land adjudication;
-- planning rural roads construction;
-- designing small scale irrigation;

B. Summary of Proposed Assistance

The Survey of Kenya is responsible for providing topographic maps and aerial photographs to all government agencies. AID will finance a contract between the Survey of Kenya and a private firm to provide black and white aerial photographs and multispectral aerial photographs for all of Kitui District. Orthophoto maps will be produced for the 400,000 hectares in Kitui District where the soil and water conservation activities will be implemented on a pilot basis. AID will provide one long-term advisor to assist the Director of the Survey of Kenya to monitor the contractor's performance. The advisor will also design training courses concerning the production and use of orthophoto maps for students at the Polytechnic who are preparing to join the Survey of Kenya, and he will design a modern data bank system for the Survey of Kenya.

Finally, AID will finance the purchase of Landsat imagery (and its interpretation) for all of Kitui District for two consecutive years from a U.S. supplier.

C. Detailed Description of Proposed Assistance

1. Map land units at a scale of 1:250,000 from Landsat imagery.

Phase 1: Purchase interpretation of Landsat imagery of Kitui District.

(a) Place an order with a U.S. organization such as the Environment Remote Sensing Institute of Michigan (ERIM) for interpretation of multispectral imagery of Kitui District, utilizing computer compatible tapes of the Landsat MSS system.

(b) In order to monitor changes in land use and environment, repeat the process in year 2. Estimated cost is $68,000 for each year.

Phase 2: Develop within Kenya the ability to interpret Landsat images for all ASAL areas (beginning in year 3 and financed under a separate project).

Implementation steps:

(a) Assemble team of the following specialists: geomorphologist, soil surveyor, vegetation or range management specialist, geologist, and two cartographers. (Only the cartographers are available from the Survey of Kenya. The other members would be seconded from the ASALB or other agencies.)

(b) Send team to the U.S. for 3-4 weeks training at EROS, followed by 2 months on-the-job training at the Survey of Kenya.

(c) Provide an additive color viewer such as the $I^2S$ manufactured by International Image System and a Zoom-Transfer Scope (Model 53-0504-20 manufactured by Bausch

& Lomb), either by new purchase or by recapture from Central Bureau of Statistics.

(d) Provide a U.S. expert as described below:
-- 10 years experience in mapping physical features of the landscape;
-- 5 years experience in use of aerial photos and remote sensing;
-- some experience in cartography.

This expert's duties would be to:
-- provide on-the-job training of team members in mapping land units from Landsat imagery;
-- develop criteria to differentiate arid from semi-arid land;
-- plan and carry out low altitude flights with team to establish interpretation keys.

2. Acquire aerial photos as listed below.

They will be procured by contract between the Survey of Kenya and a private firm. This project will provide the services of a U.S. expert for 2 years to assist with the procurement contract and to monitor contractor performance.

a. Specifications for photos

(1) For land adjudication

-- aerial photographs at scale of 1:40,000 with 90% overlap;

-- areas to be flown are all of Kitui District; Table 6 shows areas to be adjudicated between 1980-83 and to be in progress in 1982-83

-- orthophoto maps at scale of 1:10,000 for the 400,000 hectare pilot area.

(2) For multipurpose uses

-- aerial photographs at scale of 1:20,000 with overlap 60% and sidelap 30% to be provided in five copies;

-- orthophoto maps at scale of 1:10,000 with 5 meters contour;

-- multispectral aerial photographs at bands corresponding to MSS of Landsat, scale of 1:20,000.

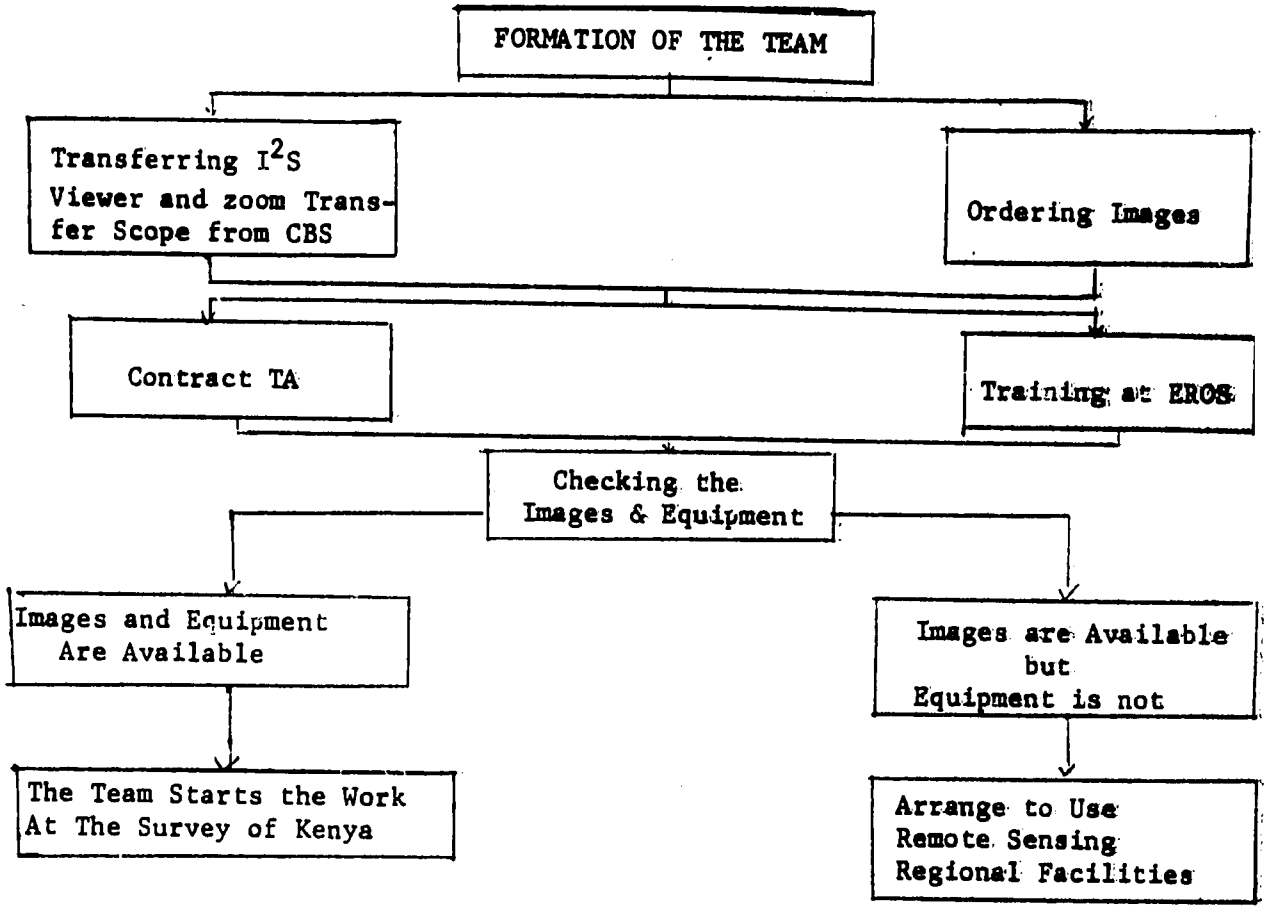



Figure 4. Flow Sheet Diagram of Phase 2. for Mapping Land Units of ASAL Areas.

Table 6 Areas Requiring Special Aerial Photographs For Land Adjudication

| District | Areas to be Adjudicated | | | Areas to be in Progress | | Total |
|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1982 - 1983 | ha |
| Garissa | | | | 500 | 1,000 | 1,500 |
| Wajir | | | | 500 | 1,000 | 1,500 |
| Mandera | | | | 500 | 1,000 | 1,500 |
| Machakos | 17,141 | 34,897 | 35,595 | 48,189 | 75,100 | 210,922 |
| Kitui | 21,000 | 33,137 | 38,652 | 37,770 | 259,084 | 389,643 |
| Embu | 33,918 | 26,743 | 12,297 | 22,816 | | 301,124 |
| Meru | 6,350 | 3,320 | 8,604 | 9,754 | 64,482 | 92,510 |
| Isiolo | 1,000 | 5,000 | 5,000 | 5,000 | 5,000 | 26,000 |
| Marasabit | 500 | 1,000 | 1,000 | 1,000 | 1,000 | 4,500 |
| Kilifi | 3,757 | 3,789 | 3,308 | 2,394 | 1,800 | 15,048 |
| Kwale | 71,060 | 41,688 | 8,625 | 125,696 | | 247,070 |
| Taita | 118,941 | 1,808 | 3,715 | 2,581 | | 127,045 |
| Tana River | | | 500 | 1,000 | 1,000 | 2,500 |
| Nyeri | | | | | | |
| Kiambu | | | | | | |
| Muranga | | | | | | |
| Kirinyaga | | | | | | |
| Kajiado | 17,307 | 97,859 | 79,533 | 53,799 | | 248,498 |
| Narok | 66,956 | 35,837 | 115,781 | 35,337 | 407,212 | 1,261,123 |
| Nakuru | 4,796 | | | | | 4,796 |
| E. Marajwet | 11,007 | 9,443 | 10,441 | 4,962 | 18,284 | 54,137 |
| Baringo | 6,192 | 3,835 | 6,476 | 9,310 | 27,877 | 53,690 |
| West Pokot | 16,396 | 13,042 | 5,733 | 12,950 | 7,030 | 54,151 |
| Sambury | 43,120 | 212,458 | 200,000 | 135,000 | 359,000 | 1,049,578 |
| Laikipa | 8,870 | | | | | 8,870 |
| Total (ha) | 538,412 | 523,089 | 532,260 | 509,058 | 1,228,869 | 14,673,458 |

b. Specifications on contract

(1) Photos to be taken with Wild RC10 metric camera aircraft such as Cessna 404 or 402 equipped with accurate remote control navigation system.

(2) Multispectral photographs to be taken with International Image System ($I^2S$) 1215 camera using Kodak Aerographic infrared 4224 film.

(3) Orthophoto mapping to be carried out using Carl Zeiss Topocart B/Orthophoto B combination with all accessories for large image tilts and earth curvature rectification.

(4) The contract should be given as one project (or mission) for aerial photographic cover. Orthophoto mapping can be scheduled according to priorities so that the contractor has flexibility to fly over the areas clear of cloud at the time this is possible. Photographic seasons of the ASALs are the end of December to March, 2 weeks June/July, and 2 weeks September/October.

(5) The contracted private company will provide 5 copies of the 1:20,000 aerial photographs. The copies will be available at the Survey of Kenya for the government development agencies. Users from the private sector should order their requirements directly from the contractor with Survey of Kenya's approval.

c. Duties of the U.S. Expert

The U.S. expert will provide technical assistance to the Director of the Survey of Kenya in connection with the procurement of this contract. He/she will design training courses to be offered by the Kenya Polytechnic for students preparing to join the Survey of Kenya. Courses should be oriented toward the use of orthophoto maps. This expert will also design a data bank system for the Survey of Kenya.

## COST ESTIMATES

Landsat:

| | | | |
|---|---|---|---|
| Phase 1: | Contract with a U.S. firm such as ERIM for Kitui District only | | $136,000 |
| Phase 2: | for entire country, to develop Kenyan capability (not part of project) | | |
| | Materials | | |
| | Landsat 1:3,300,000 | $ 3,000 | |
| | Landsat 1:1,000,000 | 1,500 | |
| | Enhanced Landsat 1:250,000 | 8,000 | |
| | Miscellaneous | 20,000 | 32,500 |
| | Equipment | | |
| | Five Stereoscopes | 1,100 | |
| | Two Landrovers | 50,000 | 51,100 |
| | Personnel | | |
| | Technical Expert (2 years) | | 200,000 |
| | Overseas training | | |
| | Six persons - 6 weeks (transportation, fees, per diem) | | 27,000 |
| | Sub-total | | $ 310,600 |

Aerial Photographs:

A. For Kitui District only:

| | | |
|---|---|---|
| Materials: | | |
| Aerial photographs 1:20,000 (5 sets plus 3 copies photo index) | $ 135,000 | |
| Aerial photographs 1:40,000 For orthophoto (400,000 ha.) | 12,400 | |
| Ground control, aerial triangulation and orthophoto mapping | 102,000 | |
| Multispectral photography | 213,500 | |
| Total Materials | | $462,900 |
| Personnel: | | |
| One expert for 2 years | | 309,190 |
| TOTAL | | $ 772,090 |

B. For all ASALs (not part of project)

| | |
|---|---|
| Materials: | |
| Aerial photography 1:20,000 (5 sets plus 3 copies photo index) | $630,961 |
| Aerial photographs 1:40,000 | 454,879 |
| Ground control, aerial triangulation and orthophoto mapping | 3,741,743 |
| Multispectral photography | 10,711,546 |

## EXPLANATION OF THE COSTS

1. Cost estimates of aerial photographs and their products have been calculated from a quotation from Geosurvey International at the following rates:

-- $ 4.3/Km.$^2$ For aerial photography at 1:20,000 with 60% overlap and 30% sidelap including 5 sets of contact prints and 3 sets of photo index.

-- $ 3.1/Km.$^2$ for aerial photography at 1:40,000 with 90% overlap for orthophoto mapping.

-- $25.5/Km.$^2$ for ground control based on 1:40,000 photography, aerial triangulation and orthophoto mapping plotted at scale of 1:10,000 with 5 meter contours.

-- $ 7.3/Km.$^2$ for multispectral photography at scale of 1:20,000.

2. Calculation of areas for land adjudication was based on the Fourth National Development Plan until 1983. Areas considered for orthophotomapping are those in the 400,000 hectare pilot area to be in the progress of adjudication until 1983.

3. It would be helpful if the Plan had distinguished between areas for individual adjudication and areas for group adjudication. Orthophoto mapping is mostly required for areas for individual adjudication. Areas for group ranches need only up-to-date topographic maps at scale 1:50,000,which can be produced by the Survey of Kenya from recent aerial photographs at scale 1:20,000.

4. The reason for limiting the areas to the National Development Plan (until 1983) is thatthere is no value in having the orthophoto mapping based on aerial photographs taken now because by the time of use they will not be up-to-date.

5. In defining priorities for development and the right areas for adjudication, cost estimates can be modified based on the rates given previously.

6. In areas that do not require land adjudication, but still need detailed land use analysis, aerial photography at scale 1:20,000 is recommended.

7. In areas of rangeland management, multispectral aerial photographs are recommended.

## ASAL-RELATED FEASIBILITY AND PROJECT DESIGN STUDIES

Implementation of the GOK's ASAL Development Program will require substantial capital investment in a multitude of activities, especially those designed to provide physical infrastructure and to develop the area's water potential. To determine whether or not these investments are technically and economically sound, this project element provides funds to finance selected reconnaissance level or full-scale feasibility studies and project design activities. This will provide the threshold information needed for large scale capital investment in the ASALs, and in particular, in Kitui District under the Arid and Semi-Arid Lands Development Project -- Phase II, for which funds will be requested in FY 1981.

The specific studies likely to be financed under this element are listed below under two categories. Category A includes activities that are of high priority (as determined by estimating the gestation periods and logical sequencing of a wide range of investment needs) and for which preliminary scopes of work have been prepared. Category B activities are perceived to be important, but the degree of priority that should be accorded them is, at best, uncertain. The studies included in the two categories are not exhaustive, but rather illustrative; for example, the Pre-Investment Study identifies approximately 20 other activities that may warrant further examination. It is possible that some studies for which scopes of work have been prepared (Category A) will not be funded and that proposals for studies not appearing on the Category B list will be approved for AID financing. However, it is apparent that the need for further studies for ASAL development, consistent with AID and GOK priorities, exceeds the number of studies which can be undertaken with the funds requested under this project element. To assure that studies conducted under the project will be consistent with AID and GOK priorities, a study proposal will be prepared for USAID approval as a condition precedent to financing any study.

Six studies are included under Category A as follows: (a) Rural Access Roads; (b) Water Resources Development; (c) Agricultural Research (Kibwezi); (d) Afforestation and Tree Nurseries; (e) Seed Production; and (f) Crop and Livestock Development (including the potential for developing an economical package of practices for small farm production systems, the economic and technical potential for dairy cattle and improved oxen, the potential for more efficient production of small ruminant livestock, the economic and technical potential for the expansion of beekeeping and poultry, requirements to improve insect control for crops and livestock, and the potential for agroforestry in ASAL production systems. Four studies are proposed under Category B: (a) Rural Marketing Centers; (b) Small Scale Industry; (c) Ukamba Agricultural Institute in Kitui District; and (d) Energy and Power Needs.

# RURAL ACCESS ROADS

## Brief Description of the Activity

The recently completed AID-financed Pre-Investment Study of the arid and semi-arid lands identified approximately 1,500 kilometers of existing secondary and minor roads in Kitui District which require upgrading to all-weather standards and up to 400 kilometers of new rural roads and ten rural bridges which require construction. The proposed rural roads will complement other activities planned in the Arid and Semi-Arid Lands Development Project by providing small holders all-weather access to rural market centers, agricultural input and crop storage facilities, and social services such as health centers and educational and vocational training facilities. In addition, the all-weather access roads will assist the Government to implement and monitor soil and water conservation programs and to provide agricultural extension services to small holders.

The Government of Kenya's Ministry of Works (MOW) is presently implementing a major program for upgrading existing secondary and minor roads to all-weather standards throughout the country (Graveling, Bridging and Culverting-GBC). The program is financed by three donors - AID in Western and Nyanza Provinces (Projects 615-0168 and 615-0170); West Germany in Rift Valley Province; and Canada in Eastern and Coast Provinces. In addition, the Government of Japan is providing assistance to maintain roads in the Northeast Province and the World Bank has recently loaned $90 million to the GOK for the Government's five-year Highway Sector Development Plan (1979-1983). The loan funds will mainly assist the Government strengthen and reconstruct existing paved roads, upgrade existing earth/gravel roads to bituminous paved standard, and upgrade existing earth roads to all-weather standard.

Upgrading of secondary and minor roads (GBC program) is carried out mainly by capital-intensive technology whereas the rural access roads are constructed by using labor-intensive technology.

AID, from funds available in Project 615-0168, is financing a pilot maintenance program for low volume roads (which include secondary and minor roads and rural access roads). The main objective of the program is to develop road maintenance procedures using labor-intensive technology to the extent that the technology is cost-effective. The program commenced in February 1978 and will continue until 1982. The Government's 1979-1983 Development Plan emphasizes the establishment of definite maintenance targets, training of required person-power, and provision of the right type and amount of equipment. According to the development plan, the Government will make available in the 1979/1980 GOK Fiscal Year $32 million from recurrent funds for road maintenance activities compared to $25 million in 1978/1979, approximately a 28 percent increase.

Relevance to Development Needs of the ASALs

The target area's road users are the direct beneficiaries. Secondary beneficiaries are the farmers who gain greater access to goods and services, and experience lower input prices and reduced transport costs for their produce. Experience with rural roads in western Kenya indicates that total road-generated benefits are distributed as follows: transporters, 24%; traders, 17%; government, 13%; small farmers and co-operatives, 38%; other, 8%. A detailed socio-economic evaluation of the beneficiary impact of rural roads is currently underway under Projects 615-0168 and 615-0170, and some preliminary results will be available by June 1980.

Kitui District is presently served by 2,641 kilometers of classified roads (all classified roads are maintained by MOW), 2099 kilometers (79 percent) of which are classified as secondary and minor roads. The majority of these secondary and minor roads have an earth surface without proper drainage and hence they are impassable during wet periods. Moreover, these roads were constructed more than 20 years ago and were not designed to meet the present traffic and loadings. By upgrading the roads to meet the traffic demands, it is believed that MOW will be in a better position to maintain the roads.

In addition to the classified road network, the district is served by numerous unclassified roads which are not maintained by MOW because they do not meet MOW's minimum design and construction standards. Some of these roads may have to be reconstructed to meet the transport needs of the district. Also, some new roads may

be constructed. Both reconstructed unclassified roads and new roads will be maintained by MOW. These roads will be constructed by using labor-intensive technology.

Preliminary Scope of Work

It is proposed that funds be provided under this project for an economic and technical feasibility study for the construction of rural roads (secondary, minor and access roads) in Kitui District. The major objective of the study will be to:

a. Evaluate existing secondary and minor roads and determine types of improvement (Graveling, Bridging and Culverting) needed to upgrade roads to all-weather standard. Determine level of improvement needed.

b. Specify changes, if any, needed in the road selection criteria presently used by the Ministry of Works for rural roads.

c. Examine design and construction standards presently used by MOW and recommend changes, if any.

d. Evaluate construction technology for GBC and rural access roads and recommend improvements, if any, specifically in regard to the use of labor-intensive technology for GBC roads to the extent it is cost effective.

e. Provide a list of equipment required for the project, and its cost.

f. Examine MOW's administrative capacity and provide a list of additional technical personnel, stipulating the qualifications and experience needed to implement the project.

g. Evaluate MOW's training program for road foremen, equipment operators, technicians, etc., and identify and specify sources of personnel including labor for administration and construction work needed for the project.

h. Recommend procedure(s) with cost estimates and organization required to maintain rural roads.

i. Estimate the probable benefits due to savings in vehicle operating costs and increased agricultural production.

j. Analyze impacts of the rural roads program on both the human and physical environment and recommend procedure(s) to mitigate or minimize impacts, especially adverse impacts. Provide guidelines which will be applied in site selection to ensure environmental concerns are satisfactorily addressed.

k. Prepare a social soundness analysis for the project.

l. Prepare a financial plan for the Host Government contribution to the project and a recurrent budget analysis focusing on the projected maintenance expenditures.

m. Estimate direct benefits to the local population from the project.

n. Prepare a plan for execution of the project.

o. Calculate internal rates of return for various alternatives considered.

Personnel Requirements

To accomplish the above work, it is proposed that AID provide grant funds for a three person feasibility design team consisting of: a highway engineer - 2 person months; a transport economist - 1 person month; and a social scientist/anthropologist - 1 person month. This team will be part of the group preparing feasibility studies for other components of the ASAL Project, and will coordinate its work with that group so that the study takes into consideration other planned development projects in the area.

Estimated Cost of the Study

4 person months $60,000.

# WATER RESOURCES DEVELOPMENT IN KITUI DISTRICT

## Brief Description of the Activity

This proposed study is directed to water development in Kitui District within the context of overall soil and water conservation. For development planning purposes, prefeasibility and feasibility studies should be carried out on the basis of water catchments (drainage basins), at both the macro and micro scales. This rationale applies not only to water development projects but also to overall soil and water conservation. Some basic data in Kenya are now available on a macro-catchment basis, for example streamflow and precipitation data. There are serious gaps, however, in other types of data, for example the sediment loads of streams and the water quality of both surface and ground water.

As a first step in planning prefeasibility and feasibility studies, it will be desirable to determine to what extent the computer-based water data bank in the Ministry of Water Development (MOWD) can be effectively utilized. At least three programs have been in use: BOROP (Borehole data output); BORSTA (Borehole Statistic-); and PLOTDA (graphic plots of drainage boundaries for project areas). Other programs set up by Tippetts-Abbett-McCarthy-Stratton (TAMS) for the National Water Plan may also exist which would be useful in prefeasibility and feasibility studies.

The second step will be to identify those water catchments within Kitui District which are most urgently in need of water development and/or soil conservation. Priorities will need to be established with respect to which catchments will be selected for intensive feasibility studies versus more general prefeasibility studies. Drainage basins of the order of about 2,500 $km^2$ might be considered for feasibility studies and about 5,000 $km^2$ for prefeasibility studies. Standard drainage areas, basins and sub-basins have already been identified for Kenya as part of the Master Water Plan; consequently it is logical that pre-feasibility and/or feasibility studies be organized along similar lines.

Also, it will be desirable to proceed from prefeasibility studies at the basin level to feasibility studies at the sub-basin level. The prefeasibility studies would be immediate precursors to feasibility studies. The former would provide for data compilation and analysis, field inventories and identification of water development sites, while the latter would provide for their selection, design, costing and organization for operation and maintenance.

Within the ASAL areas there is a considerable range in geologic, topographic and climatic environments, and related land use and human settlement patterns. Consequently, it will be desirable to select in Kitui District drainage basins with differing characteristics for study and development so that the experience gained can be projected to other basins. At least three such basins should be selected. Both the prefeasibility and feasibility studies would be directed to water supply for livestock, rural and village use, small municipalities (less than 10,000 people), and minor irrigation (garden size plots).

Relevance to Development Needs of ASALs

One of the objectives of the Ministry of Water Development is to provide water sources for all rural people at a reasonable walking distance from their homes. For Kitui, that distance is five kilometers. At present many residents of Kitui District walk farther than that to find water during the dry season. Most of the responsibility for transporting water falls on women.

The inhabitants of the Kitui area perceive that access to a dependable water supply is their most urgent need.[1/] Projects undertaken as a result of this feasibility study will help to meet both the Government of Kenya's objectives and the strongly felt needs of the local residents. They would be the direct beneficiaries of any improved availability of water. Larger and more dependable water supplies located closer to their homes would mean more water for domestic use, for livestock and for crops.

Preliminary Scope of Work

A. Prefeasibility studies. As presently foreseen, a prefeasibility study could include all or part of the following elements for each basin in Kitui District selected for study:

1. Prepare a base map at scale 1:50,000 showing streams, roads and population centers.

2. Compile, summarize and study all existing streamflow data including: (a) maximum, minumum and mean annual monthly runoff; (b) maximum and minumun instantaneous discharges of record; and (c) low-flow and flood frequency. Analyze the data.

3. Compile all existing water-quality and sediment data.

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1/ Pre-Investment Study, Vol. 1, p. 127.

4. Compile and summarize all existing precipitation and evaporation data including: (a) maximum, minimum and mean annual and monthly rainfall data, and (b) duration and frequency of droughts. Analyze the data.

5. Estimate the direct runoff produced by individual rain storms on small watersheds contributory to existing tanks, reservoirs, and potential rock catchments.

6. Establish and observe temporary rain gauging stations on contributory watersheds and staff gauges on tanks and reservoirs to make measurements required for item A.5. above.

7. Compile and summarize available data on all existing surface-water points including pipelines, water towers, local reticulation schemes, earth dams and reservoirs, excavated tanks (hafirs), rock catchments, subsurface dams and roof-top catchments. Such data would include, among other things, original quantities of excavation and embankments and volume of water stored, and original water depths and surface areas of reservoirs, tanks, and rock catchments, volume of sand behind subsurface dams and volume of water in transient storage in sand. Analyze the data.

8. Compile and summarize existing data on boreholes, dug wells, and springs. (Data for boreholes are already available in the BOROP program of the MOWD.) Analyze the data.

9. Estimate the rates of siltation of existing reservoirs and tanks through hydrographic surveys of present water storage capacity vs. initial storage capacity at time of construction.

10. Conduct a field inventory of all existing water developments (water points) to determine their current operating condition and requirements for rehabilitation and/or replacement.

11. Identify potential sites for new water developments based on geologic, hydrologic and topographic criteria, taking into account problems with existing water points and their service areas.

12. Identify the most appropriate type of water development in accordance with natural conditions prevailing at the site.

13. Estimate approximate sizes and water yields of water development structures at identified sites.

14. Locate sites of existing and potential water developments on appropriate maps.

15. Develop a plan at drainage basin level establishing priorities for rehabilitation of existing and construction of new water points for livestock, rural and village water supply, small muncipalities (less than 10,000 people) and minor irrigation (garden size plots). Water developments for large-scale irrigation, hydropower and/or industrial use would not be considered.

16. Present data compilation, field inventories, estimates, analyses, and maps with a discussion of conclusions and recommendations in a prefeasibility report.

B. Feasibility studies. These studies would follow the prefeasibility studies and would include all or part of the following elements:

1. Based on the prefeasibility studies, develop engineering design criteria appropriate for construction of new surface-water developments. These might include, among others, ways and means of: (a) reducing siltation in earth dams and reservoirs and excavated tanks; (b) developing self-flushing and/or off-channel reservoirs; (c) protecting reservoirs and tanks against human and animal degradation while at the same time permitting their effective use; (d) optimizing the construction of subsurface dams on sand rivers and their use for gravity and pumped water supplies; (e) developing high-level springs with appropriate captation structures, gravity pipelines and overnight storage at points of use; (f) optimizing the construction of water harvesting catchments on rock outcrops (inselbergs) for gravity or pumped water supplies; and (g) delivering water to the human population and livestock.

2. Develop criteria for selection of sites for boreholes with respect to local geologic and hydrologic conditions and to other water developments. Boreholes will probably be used conjunctively with surface-water developments for most purposes, exclusive of livestock use.

3. Select sites for construction of new water developments based on priorities established in A. 15.

4. Design plans and cross sections for specific surface-water development sites with estimates of quantities of earth or rock to be moved or excavated and of concrete and/or masonry work in diversion structures, core walls, control gates, pipes, culverts, spillways, and other structures.

5. Estimate costs for land clearing, earth moving, excavation, construction, equipment, transportation, manpower, access roads, and materials, monthly and annual operation and maintenance of surface-water developments.

6. Estimate costs for construction of boreholes including manpower, transportation, access roads, materials, drilling equipment, casing, drilling of boreholes, pump and motor, pump house, manpower, and annual operation and maintenance.

7. Estimate costs of installation, annual operation and maintenance for water distribution systems including livestock watering facilities, pipelines, storage tanks, and taps.

8. Develop institutional requirements including recurring budgets, personnel, equipment, transportation, and materials for continuing operation and maintenance of rehabiliated and newly constructed water developments.

9. Present design, cost and other data in a feasibility report together with maps, plans and cross sections.

10. Prepare environmental assessment report, identifying environmental impact of each proposed Development scheme on human and physical environment. If sites are not yet selected, prepare guidelines and criteria to assess environmental impact of each site.

Personnel Requirements

To accomplish the above work, it is proposed that AID provide grant funds for a four person feasibility design team consisting of: a water resource engineer - 4 person-months; a water engineer experienced in mechanical systems and in the operation, maintenance and development of tube wells - 4 person months; a financial analyst experienced in the economics of water development - 3 person months; an environmentalist to assess the impact on the natural environment as a result of the project recommendations - 3 person months.

Estimated Cost

14 person months - $210,000

SUPPLEMENTAL NOTE

At many sites there may be choices to be made concerning what kind of development is most appropriate. The following descriptions highlight areas for consideration in the selection of the types of water developments to be pursued.

1. Boreholes in Kenya presently cost from about KSh.50,000 ($6,500) to KSh. 100,000 ($13,000) each including the costs of drilling, developing, casing, pump, motor and pump house. Total

cost would depend on the diameter, length of casing, depth of borehole, size of pump and motor. Assuming an average cost of KSh. 75,000 ($9,750) and an average yield of 42 l/min from the Precambian rock terrain, the capital cost for borehole water would be KSh. 298 ($40) per $m^3$ of installed capacity if the borehole is pumped 10 hours a day (about average) or KSh. 124 ($16) per $m^3$ if pumped continuously (not likely). These estimates do not take into account continuing operating costs for pumping energy and for maintenance. Boreholes, however, generally provide potable water requiring little or no treatment and, therefore, they are attractive as sources of water for human consumption in villages and small municipalities. In the geologic environment of the ASALs (largely Precambrian basement rocks and Tertiary and Quaternary volcanic rocks) the costs of construction, operation and maintenance are generally too great and the potential yields are too small for boreholes to be considered for irrigation, except marginally for household gardens.

2. Where high-level springs exist, as in parts of the Baringo-Kerio area, they can be developed by protected captation boxes and the flows delivered by gravity pipelines to population centers and/or for livestock watering on lower ground. If surpluses exist, small-scale minor irrigation may also be possible. Spring captations have a number of advantages over borehole supplies: namely, low initial construction and maintenance costs plus provision of water of sanitary quality equal to that from boreholes. The chief capital and maintenance costs are for the spring captation boxes, the delivery pipelines and any balancing storage tanks that may be required at points of use.

3. Roof-top catchments with one or more side-hill masonry storage tanks may be an attractive option for relatively clean domestic water for scattered populations in hilly areas with relatively high rainfall, as in parts of Embu District and the western part of Machakos District. In lower rainfall areas they can provide only intermittent water supplies.

4. Earth dams and reservoirs have been the most favored method of surface-water storage in most of the ASALs, because they are considered to be most cost effective in terms of the quantity of water which can be stored per unit of initial construction costs. They are, however, vulnerable to rapid siltation in many places and must be cleaned periodically if they are to remain viable. Most earth dams in the ASALs, if they are not periodically desilted, can be expected to have a useful reservoir life of less than 15 years. (In some cases, reservoir life may be less than 10 years. The reservoir behind the earth dam at Kitui, for example, is reported to have silted up in a period of about 6 years.) The cost of earth dams and reservoirs is chiefly in

the amount of earth which has to be moved. Earth moving of this type in Kenya is now reported to range from about KSh. 15 ($2) to KSh. 25 ($3.25) per $m^3$. Also the cost effectiveness of the reservoir can be judged on the basis of the volume of earth which has to be moved per volume of water stored. Least cost effective is a small excavated reservoir. The minimum acceptable depth of water at the dam face is generally considered to be about 3 m. Most of the larger earth dams which have been constructed in the ASALs with earth-moving machinery during the past 20 years have had initial storage capacities averaging about 45,000 $m^3$. The smaller dams constructed with hand labor and some animal scoops generally have had capacities of less than 10,000 $m^3$. The cost of desilting a reservoir is on the average about twice the cost of new construction per unit volume of water storage provided. Thus, where the capacity reduction due to silting exceeds about half the initial storage volume, it is usually cheaper to construct a new dam downstream and to leave the upper older one as a silt trap. Only where there is no alternative downstream of the dam site should desilting of a completely silted up existing reservoir be considered.

In addition to the siltation problem, an earth dam and reservoir must be protected from human and animal degredation. This can involve protection of the facility by fencing and/or a thorn brush enclosure with provision of an effective means for drawing off water without giving the human and animal population direct access to the facility. In some places in the ASALs water is drawn off from the reservoir by a gravity pipe line leading to a watering point at which a concrete tank is kept continuously full from the pipeline and is controlled by a float valve. For general community and livestock use, tanks of about 4.5 to 45 $m^3$ capacity have been used.

Another problem with earth dam reservoirs is their susceptibility to pollution so that some form of treatment is essential if the water is to be suitable for human consumption. In the absence of treatment, the human population is vulnerable to water-born disease.

5. In many places in the Machakos-Kitui area and elsewhere in the ASALs, there are large masses of bare rock (tors or inselbergs) which may rise 50 to 200 m above surrounding peneplains. These have been utilized since the early 1950s in water harvesting projects to collect and store water in <u>rock catchments</u>. Construction of these catchments generally involves building low but carefully aligned masonry walls or "farlands" around the rock mass so as to catch the bulk of the rainwater falling on it and to guide this water into a storage reservoir built at the foot of the rock mass itself. Storage has often been achieved most effectively by

cleaning out deep pockets of weathered rock material which may be 5 to 10 m deep with a virtually impervious base. Dams of concrete or masonry have been constructed to create deep, narrow reservoirs with minimal potential evaporation and siltation losses. Alternatively, in more open storage sites, earth dams with concrete core walls have been used. Such dams have been raised to heights of 7 to 8 m with concrete core walls extending 6 to 9 m below ground level to reach solid rock and form an effective seal. Rock catchments have been built in the ASALs with initial storage capacities ranging from less than 10,000 $m^3$ to as much as 70,000 $m^3$. About one hectare of rock catchment area has been considered sufficient for about 1,500 $m^3$ of reservoir storage in low rainfall areas averaging about 500mm annually. In higher rainfall areas, small catchment areas can provide relatively large volumes of runoff for reservoir storage. A rock catchment with dam and reservoir costs about three times as much as a subsurface dam.

6. The subsurface dam is another type of water retention and storage facility which has been increasingly utilized in Kenya since the early 1950s. These structures depend, first, on the availability of extensive deposits of coarse quartz sand such as are commonly found in the larger ephemeral streams (sand rivers) of Machakos and Kitui districts; and, second, on the presence of a rock ledge across the stream channel. The principle is simply the retardation and accumulation of the underflow which moves through the sand. By constructing a concrete or masonry barrier (subsurface dam at a rock ledge across a sand river) water saturated sand collects behind the barrier, which has now become a weir. Initially, the barrier needs to be no higher than the original sand surface but it needs to be well-footed in the underlying bedrock. Each year during dry periods it can be raised 50 cm or so by adding a new course of concrete or masonry on top of the barrier, thereby providing space for collection of more sand on its upstream side from successive floods. By giving careful attention to the height of each course which is added, only the course bed-load sand of the stream accumulated behind the barrier and the river sand and silt are carried over the top during floods. The coarser the sand the greater its storage and water yielding capacity. Subsurface dams on the larger sand rivers can be expected to have yields in the range of 25 to 100 $m^3/d$ during normal dry seasons. Considerably larger yields could be expected during the rainy seasons.

Water accumulated in the sand fill can be drawn off by gravity through perforated pipe laid in the sand and draining through a conveyance pipe passing through the dam to a downstream watering point. Alternatively, a concrete collector well can be constructed in the sand fill and the water drawn off with a centrifugal pump set on the bank of the river.

The water drawn from subsurface dams, because of filtration through sand, can be expected to have a considerably better sanitary quality than that from earth dam reservoirs or rock catchments.

7. For all types of surface-water facilities, that is, earth dams and reservoirs, rock catchments and subsurface dams, it will be important to protect the facility from human and animal degredation. Watering points should be located downstream of the dams (it they are to be served by gravity) so that the human and animal populations do not have to draw water directly from the facility itself.

# AGRICULTURAL RESEARCH (KIBWEZI)

## Background

The inadequacy of hard research data relevant to the agriculture of ASAL areas has been a matter of concern for some time. The ATAC report of 1977 recommended attention to the continuing development of training and research for the dryland areas. Since that time a number of steps have been taken to examine the research needs of Kenyan agriculture.

There is now before the Government of Kenya a proposal to move its research activities out of the Ministry of Agriculture into a new parastatal organization. This proposal is likely to be implemented soon. The discussions which preceded this proposal included systematic examination of the research needs of Kenyan agriculture. The process is still going on. There is now in the planning stage a national symposium tentatively scheduled for August 1979, under the working title "Agricultural Research in Kenya in the 80's". Participants will include all senior agricultural research officers and heads of Kenyan agricultural research stations and probably some foreign invitees.

During the past year USAID/Nairobi has developed one project (615-0180 - Food Crops Research) which is entirely addressed to the research needs of the ASAL and another (615-0169 - Agricultural Systems Support) which has a substantial component concerned with research on range management. Systematic examination of the research needs of ASAL agriculture was an important part of the process used to develop those projects.

The FAO is a collaborator in the first of the above projects and both the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Institute for Tropical Agriculture (IITA) are involved in cooperative experiments with the

There is one possible gap in research coverage. Some long-term experiments to estimate the effect of various agricultural practices on production, erosion, nutrient depletion, etc., are usually thought to be desirable. If the ecology of the ASAL areas is as fragile as most people believe, such experiments are doubly desirable. Since it appears that trials of this type are not now underway, they should seem to be logical candidates for the research program which is the focus of this feasibility study.

The GOK has requested USAID assistance for "A Project for the Development of a Dryland Farming Base for Teaching and Research in the Faculty of Agriculture", to be located at Kibwezi. The Faculty of Agriculture of the University of Nairobi has been allocated 4,770 hectares in the Kibwezi area. Several farm families are now living on the proposed site. The Faculty of Agriculture intends to integrate these families into the research process - in effect, to use them for pre-extension studies, or for on-farm testing of research results prior to mass educational programs.

The University plans soon to move a few people to the area and establish a small control station, partly so they can start interacting with the people there. Discussions between the local country council and University officials indicated that the local people were receptive to the plan.

Topographicmaps (1:50,000) are available for the Kibwezi site. Air photos (1:30,000) are also available, although more up-to-date ones are needed. Soil survey information at a reconnaissance scale (1:250,000) is available but no detailed mapping has been done. Meteorological records for the general area are available and presumably these data are applicable to this particular site.

Purpose of the Station. The station is expected to serve as a faility for teaching dryland farming techniques to students at the B.Sc. level and as a research facility for M.Sc. and Ph.D students. While the facility is to be administered by the Faculty of Agriculture the research function will be to provide a link in the chain of research stations for the arid and semi-arid lands of Kenya. The stations other than Kibwezi are administered by the Ministry of Agriculture. Both the Ministry of Agriculture and the Faculty of Agriculture state that the Kibwezi station fills an important gap, that the research will be jointly planned, and that the research results will be used by the MOA in farmer education programs at the Farmer Training Centers. The set of research stations for arid and semi-arid lands consists of:

| STATION | AVERAGE ANNUAL RAINFALL |
|---|---|
| Embu | 800 - 850 mm |
| Katumani | 500 - 700 mm |
| Kibwezi | 300 - 400 mm |
| Kiboko | 300 - 400 mm |

The Kibwezi site is near the Kiboko Range Research Station and, therefore, is in the same general climatic regime. The programs differ, however. Kiboko is concerned with improving the management and productivity of range lands. The proposal is that Kibwizi will be looking into the development of technologies which will allow a family to make a decent living through crop farming on 10 to 20 hectare plots, or through some combination of crop farming and range management.

Relevance to Development Needs of Asals. The proposal is highly relevant to the program to develop the arid and semi-arid lands. Further, there is reason to believe that GOK considers the U.S. as a good source of assistance in dryland agriculture.

AID will need to assure itself of the GOK conclusions that (1) there is a gap in the research coverage of the arid and semi-arid zone and (2) that Kibwezi provides a suitable location for work to fill that gap.

In the first instance, the most crucial question is the latter one. Apparently both the Ministry of Agriculture and the Faculty of Agriculture judge that the climatic regime at Kibwezi offers sufficient promise for crop farming and that experimentation on crop farming at this site would be fruitful. There are some foreign advisors who subscribe to this judgment. However, there are others who suggest that the climate at Kibwezi may be so close to the lower limit for crop production as to make crop failure likely too often for an experimental site. In any case, it seems that very careful attention would have to be paid to choice of crops. For example, Kibwezi is probably unsuitable for producing maize in many years but may offer better promise for crops with lower water requirements, e.g., sorghum, millet, pigeon peas, trees for browsing.

As to gaps in the present research coverage for the arid and semi-arid lands there are some possible lines of useful research activity which do not seem to be an important part of the present program. Chief among the missing are simple multi-year field experiments which would assess production trends and the effects on the land of various crops, including mixed cropping and perhaps agroforestry, various tillage methods, varietal tests, etc. Practices tested would be limited to those judged to be within the capability of farmers. Measurements and observations might include, in addition

to production data, estimates of erosion, nutrient depletion and perhaps other ecological parameters. They might also include socio-economic data, e.g., income, labor requirements, etc. Large yearly fluctuations in rainfall are characteristic of the arid and semi-arid zone. Substantial variations in mosture available to plants over fairly short distances are also characteristic. Given the availability of 4,770 hectares, it should be possible through multi-year experiments to give a fair estimation of the risk factors associated with various farm practices in this eco-zone. Knowledge regarding risk is tremendously important to the farmer.

The concept described above visualizes the Kibiwezi Station as a laboratory on which practices judged to be suited to the abilities and resources of the farmer could be carried out under conditons more strictly controlled than would be possible on farmers' fields. Most of the direction could be supplied from a distance, i.e., the campus of the University of Nairobi. If there were in residence at Kibwezi a few people who understood the need for careful control of the agricultural operations involved, only intermittant supervision by controlling scientists might be necessary after the experimental pattern had been established.

The University might wish to think of an advisory committee which would meet periodically to evaluate experimental findings and to suggest new experiments or changes in design. This committee should certainly include representatives of the Ministry of Agriculture and probably also representatives of foreign or international organizations engaged in the same type of research, e.g., ICRISAT and perhaps IITA. It might include other scientists individually prominent in relevant research; for instance from the University of Nairobi, particularly the social sciences.

In addition to serving the research function discussed above, the research plots could serve as a valuable training and demonstration resource for extension workers, soil conservationists, farmers, and perhaps others.

Preliminary scope of Work

Phase 1. The services of two scientists who have been engaged in or who have been administering crop production research under dryland conditions will be required to provide an assessment of the need for the proposed research and the suitability of the site for this purpose. They should define any constraints which environment or other conditions of the site might impose upon a research program. This assessment would require a visit to Kibwezi, a visit to Katumani, and elsewhere in Kenya, and discussions with MOA and the Faculty of Agriculture officials to determine whether a match-up is possible between the characteristics of the site, on the one hand,and the research requirements, on the other.

If the consultants' response to the above set of questions is generally favorable, they should develop and provide the following

a) a statement of the research responsibility assigned to the station and a brief outline of the types of experiments to be conducted.

b) to the extent appropriate, similar information on training.

c) suggestions regarding arrangements to plan and evaluate the research program at Kibwezi, linkages to other organizations and programs.

d) a rough estimate of the requirements for staff, buildings and equipment.

e) a rough estimate of the aid requirements (people, training, duration, money).

f) suggestions on methods of implementation of an AID project, including possible sources of necessary technical assistance.

Personnel Requirements. It is estimated that the above task might require two people for six weeks if their decision regarding the project is favorable. perhaps only half that long if their judgment is negative.

It should not be expected that the report described above would provide a basis for a fully detailed multi-year project. However, it should provide a good enough estimate of the probable benefits and costs of a project to allow a GOK/AID decision for or against and enough information on the scope and content of required assistance to allow the contractor to proceed with Phase 2 and produce a detailed design.

| | | |
|---|---|---|
| 2 Agricultural research scientists who have specialized in crops for arid and semi-arid lands. | 3 person months | $45,000 |

Phase 2.

Phase 2 might include:

(a) A detailed inventory of the existing resource base, to include a detailed soil survey; a description of existing plant life; an analysis of groundwater and underground water potential; an analysis of climatological relationships; and an inventory of the people that live on the land designated for the station, together with a description of their patterns of livelihood.

(b) Lay out a broad plan for operation of the station to accomplish the objectives for the station, taking into account the

resource base. This should include a full description of the desired linkages that the station should have with other research facilities in Kenya; with international agricultural research centers, especially ICRISAT; and with research institutions in other countries.

(c) Design the campus and the facilities required to carry out the program for the station, together with cost estimates.

(d) Do the engineering design and map the research plots/fields for the agronomic research and water conservation/spreading structures, including cost estimates.

(e) Develop a time-phased plan for both construction of facilities and conduct of research.

Personnel Requirements. Technical specialties will be specified by the Phase 1 team.

Estimated time required:

| | |
|---|---|
| U.S. consultants | 6 person months |
| Kenyan consultants | 5 person months |

# AFFORESTATION AND TREE NURSERIES

## Background

The Forestry Department has three programs in Kitui District:

A. Forest Planting Program. The goal is primarily for timber production. It entails planting 5,490 hectares on gazetted hills and 17,859 hectares on ungazetted hills. The length of time this takes depends on how rapidly constraints are removed.

B. Rural Afforestation Extension Scheme. The goal is to plant 450 hectares per year under two Forest Department programs:

1. Small numbers for planting along hedges and gullies.
2. For creating small woodlots on farms that have low potential land.

This will require 7.2 million seedlings per year. In addition, seedlings are to be provided for soil and water conservation activities of the Ministry of Agriculture for planting along cut-off drains and gullies.

C. Protective Forest Plantation Program. This is a new program. For soil and water conservation purposes, forests will be planted in the upper regions of river catchments on land unsuitable for crop cultivation. The goal is soil and water conservation rather than timber production; this calls for different species and different planting and husbandry techniques than where timber is the main objective.

Eight nursery sites are strategically located in the District to service the three programs. Five of the nurseries require further development to bring them up to standard. All eight are critically short on labor for preparing the land and seeding the nurseries. Some are short on water. Insufficient vehicles and equipment are additional constraints. Perhaps partly because the nurseries are undeveloped, underequipped and understaffed, the cost per seedling is high (Sh 0.95 each).

## Relevance to Development Needs of ASALs

Efficient nurseries to supply adequate quantities of appropriate seedlings are crucial for a successful soil and water conservation program, as well as for timber production.

Preliminary Scope of Work

The purpose of this feasibility study will be to assist the Forestry Department of the Ministry of Natural Resources to formulate a detailed plan for the 8 nurseries in Kitui District, so they can provide appropriate kinds of seedlings on a cost-effective basis for both soil and water conservation purposes and for timber production. (While the specific plans will be for the program in Kitui District, the principles will likely have application in other ASAL districts.)

Specific objectives will be to:

(a) Formulate procedures and organization/management systems suitable for program needs.

(b) Develop long-term plans for each nursery, with details regarding species and quantities of seedlings needed each year to attain program goals.

(c) Outline an effective seedling distribution system.

(d) Outline a nursery research program, aimed at developing improved species or combinations of species for attaining goals in soil and water conservation and timber production.

(e) Design a forestry information and monitoring system as a management tool for evaluating progress and assessing costs.

Personnel Requirements

This study will require two forestry experts who are widely experienced in afforestation in arid and semi-arid lands near the Equator.

Silviculture expert, 3 person months
Nursery expert, 3 person months

Estimated Cost of the Study

6 person months $90,000

# SEED PRODUCTION

## Background

The Pre-Investment Study provides a general outline of a project to produce high quality seeds for the farmers in the ASAL areas. The proposal identifies a list of items requiring further analysis if a final project were to be designed. The items fall into two categories: (a) information needed to allow better estimates of economic and financial viability; and (b) details of plant and farm layout and design, and equipment specifications.

A viable seed industry, based to a large extent on hybrid maize, already exists in Kenya. The market it serves is mainly in the high potential areas. Because hybrid maize seed must be purchased new each season, and because maize is a popular crop in the high potential areas, the market for seed is large enough to be commercially viable.

It is questionable whether a viable seed industry in semi-arid lands is possible without subsidy, at least in the early years. It would rely on a much thinner market, and be based to a large extent on seeds which are "open pollinated"(such as lentils, millets and grain sorghums) which need to be purchased only every few years. On the other hand, there is some evidence that hybrid sorghums adaptable to the semi-arid lands may be on the horizon, which potentially would strengthen the market; also, the market for hybrid maize may be expanding in the semi-arid lands.

A rough calculation, based on the admittedly rough cost estimates in the Pre-Investment Study, shows that if the capital costs of a 500 metric ton per year operation for semi-arid lands were written off in ten years, the cost of producing each kilogram of seed would be about 12 shillings. This compares to 3.3 shillings per kilogram which the Kenya Seed Company receives for hybrid maize. This cost is high enough to suggest the need for a thorough economic analysis as the first step in project consideration. A good case could be made for partial subsidization of seed production, if GOK desires, but reasonably accurate estimates of the real cost of the seed are desirable in any case. If the economic analysis results in a decision to proceed with a project, the suceeding step would be project design.

## Relevance to Development Needs of ASAL

One of the main elements required for increased crop production in ASALS is seeds of improved varieties. Considerable research is underway toward that end, and some improved varieties of crops that are traditionally grown in Kenya's ASALs are already available. Before these can be used on any significant scale,

system of multiplying the seed, processing it and distributing it throughout the ASALs is required.

At this time there is no organized seed program which adequately serves the small scale farmers in the semi-arid areas. Planting material is routinely in very short supply or unavailable. It is normal for ASAL farmers to plant seeds from their previous crop, from their neighbors, or from the local market.

Scope of Work

The economic analysis suggested by the Pre-Investment Study seems adequate. It includes the following points:

a) Re-examine the estimated costs.

b) Re-examine the prediction of yields in seed fields since those may be lower than would be expected for the farm site selected.

c) Prepare a financial analysis.

d) Compute a cost-benefit ratio.

Personnel Requirements

To accomplish the above work, it is proposed that AID provide grant funds for one person experienced in economic and cost analysis of seed production for 3 person months.

Estimated Cost

3 person months - $45,000.

## SOIL AND WATER CONSERVATION: DEFINITIONS OF PRACTICES

Structures. A structure is a designed device that is constructed or manufactured and used in a soil and water conservation or management system to retain. regulate or control the flow of water.

Good vegetative practices, together with proper land use, are necessary in a sound soil and water management program. However vegetative measures and simple practices alone may be inadequate to handle a concentration of water, and do not provide water storage for beneficial use. In such cases, structures are needed.

There are instances, also, where a high degree of safety and permanence is desired. Conservation measures may be required to provide insurance against loss of life or destruction of property. Vegetative control measures are subject to the influences of such uncertain factors as climate, diseases and insects, and are not always dependable. On the other hand, structures that are properly designed, installed and maintained have a long life and are dependable.

Structures are used for the following soil and water conservation purposes:

- Grade and gully control;
- Water storage;
- Water detention (flood prevention);
- Sediment storage;
- Surface water inlets;
- Water level control;
- Drainage;
- Irrigation;
- Shore protection;
- Streambank protection;
- Tide protection.

Contour Strips. Strips of vegetation, usually grass, are planted on the contour. They are of varying widths and function to interrupt and retard overland flow of excess rain water. As the flow is retarded by the vegetal matter, soil material being moved by the water flow settles out thereby reducing soil erosion. The grass can be harvested and used as forage for livestock on the farm. This practice is applied where land slopes are less than 8%.

Grassed Waterways and Outlets. These are natural or constructed waterways shaped to required dimensions and vegetated for safe disposal of runoff from a field, diversion, terrace or other structure. Vegetated outlets and waterways are used for the following purposes:

- As outlets for diversions and terraces;
- As outlets for surface and sub-surface drainage systems or sloping land;
- To dispose of water collected by road ditches or discharged through culverts;
- To rehabilitate natural drains carrying concentrations of runoff.

Structure Protection. This practice consists of planting grasses, trees, or root forming plant material for the purpose of anchoring disturbed earth against the erosive forces of rain drops and runoff water. It may also be provided by revetments of wire mesh, rock masonry, rubble rock, and in some cases, plastic membranes.

Range Seeding. Artificial seeding of grazing areas using improved grasses can provide for increased grazing capacity if strict control measures are applied to the area seeded. Seedbed preparation is done by clearing the area of undesirable species of bushes, shrubs, and weeds either by mechanical means or by controlled fires. Seeding can be done by drill seeding, hand broadcast seeding, or by aerial seeding.

Deferred Grazing. New seedings must be protected from grazing until the plant stock has become established. Consequently, restrictions against grazing are imposed, usually for two seasons duration. Grazing need not be deferred where no new seeding is done, but the potential for natural reseeding of existing native pasture is better if the area is relieved of grazing pressure for at least one season.

Fencing. This practice is used to enforce protection of new seedings of range grasses, tree plantings, and conservation structures from livestock encroachment.

Afforestation. This practice includes all planting where the purpose is to protect the soil resources against erosion. It is usually applied on the steeper slopes where cultivation even with terrace protection is hazardous.

Mulch Farming. Crop residues as a by-product of crop harvest are left in the field on the soil surface as a buffer against erosion caused by rain. Sometimes dead plant materials are transported to the field to provide a protective layer against erosion. As an additional benefit this practice provides some insulation protection against evaporation of soil moisture. When used in combination with minimum tillage (use of a chisel plow which loosens the soil for aeration but does not turn it over exposing raw soil to the surface), this practice has proved most beneficial to dryland cropping in rainfall deficient areas.

Fallow Systems. In rainfall deficient areas and where soil depth is not limiting, cropping is practiced only during alternate seasons. The ground is not planted to crops and weedy growth is controlled to permit a buildup of moisture in the soil in preparation for the next cropping season. It is usually practiced by rotating fields on the farm in a crop, fallow, crop rotation.

Terraces. A terrace is an earth embankment, or a ridge and channel, constructed across the slope at a suitable location to intercept surface runoff water. It may be constructed with an acceptable grade to an outlet or with a level channel and ridge. In Kenya, terraces are as follows:

A. Narrow based

1. Ridge type, in which there is no change in ground slope, and no excavated channel on the upper side either because it has never been constructed or has become silted up.

2. Channel type, in which there is no change in ground slope but there is a definite channel on the upper side of the ridge. The largest are similar to cutoffs.

B. Bench type

1. Forward sloping, in which there is a bank of sufficient height to reduce the slope of the cultivated land; most of these have arisen by the "fanya juu" method.

2. Level, in which banks are of sufficient height to completely level the cultivated area.

3. Backward sloping, in which any runoff accumulates at the rear of the bench. This is often considered to be the ideal arrangement (See Sheng, 1977.)

Diversions. A diversion is an individually-designed graded channel with a supporting ridge on the lower side, constructed across the slope. Diversions are used for one or more or the following purposes:

- To divert water away from active gully heads in order to stop erosion;
- To reduce the length of slopes to supplement erosion-resistant crops or contour stripcropping on land continuously managed in crop strips;
- To break up concentrations of water on long, gentle slopes and on undulating or warped land surfaces generally considered too flat or irregular for terracing;
- To direct water away from farm buildings and other improvements;

- To collect or direct water for water-spreading systems;
- To increase or decrease the drainage area above farm ponds;
- To protect terrace systems by diverting headwater from the top terrace where topography or land ownership prevents terracing the land above;
- To intercept sidehill surface or sub-surface flow;
- To protect flatlands from sidehill runoff;
- To protect lowlands subject to flood or sediment damage by diverting flood flows from small side tributaries.

Gully Treatment is the stabilization of active gullies by vegetative or structural measures or a combination thereof.

Gullies can be prevented by such measures as increasing the absorptive capacity of the soil, protecting the land surface and natural drainageways from erosion, and by conducting surface runoff water from fields at a non-erosive velocity through properly prepared and maintained waterways.

Besides ruining fertile land, gullies interfere with farm operations, undermine farm improvements, encroach on public highways, endanger livestock, and often mar the beauty and lower the market value of a farm. Materials eroded from gullies reduce the capacity of reservoirs, natural streams, and drainage channels, and cover bottom lands with a deposit of infertile soil.

Ponds and Reservoirs are bodies of water created by constructing a dam or embankment across a watercourse or by excavating a pit or dugout.

Farm ponds and reservoirs may be divided into two general types: embankment ponds and excavated ponds. An embankment pond is a body of water created by constructing a dam across the stream or watercourse. These ponds usually are built in areas where land slopes range from gentle to moderately steep and where stream valleys are sufficiently depressed to permit the storage of water to a considerable depth. An excavated pond is a body of water created by excavating a pit or dugout. These usually are constructed in relatively level areas. The fact that their capacity is obtained almost entirely by excavation limits their use to locations where only a small supply of water is required.

Ponds are also built in gentle to moderately sloping areas where capacity is obtained by both excavation and the construction of a dam. For the purpose of classification, there are considered to be embankment-type ponds if the depth of the water impounded against the embankment exceeds one meter.

Spring and Wells. A spring is a natural outflow of water from the ground surface, usually from a definite opening. A

seep is similar to a spring but differs in that it has no definite opening.

A water well is a vertical excavation of small diameter made for the purpose of obtaining water from the openings in the rocks and voids in the soil which it penetrates.

Dikes and Levees are embankments of earth or other suitable materials constructed to protect land against overflows from lakes, streams and tide, and to protect flatland areas from spreading surface waters.

Surface Drainage. Agricultural drainage is the removal of excess water from the land surface, or ground water from below the land surface, to create more favorable conditions for plant growth. Surface drainage removes excess precipitation from the land surface at a rate which will prevent long periods of ponding or flooding without excessive erosion so that pasture, hay and cultivated crops will have the best possible moisture conditions. Subsurface drainage lowers the water table so that it will not interfere with root growth and development and promotes leaching to maintain the proper salt balance in the soil.

Irrigation is the application of water to land to eliminate the moisture limitation to crop production. The practice includes the development of the water supply, the conveyance system, the method of application and the waste water disposal system, along with the necessary management to achieve the intended purpose.

Streambank Protection. Stabilizing and protecting banks of streams or excavated channels against scour and erosion is done by vegetative or structural means, alone or in combination. This does not include protection of lake fronts or stream banks in tidal areas.

Deep Tillage (Sub-soiling). This practice includes those operations performed for the purpose of breaking a hardpan, plowsole, or other restricting layers beneath the soil surface to improve infiltration capability of the sub-soil or to provide better plant root penetration. It is usually done with an implement having a shank or tooth long enough to reach through the barrier zone.

Water Spreading. Facilities for redirecting excess water flows from gullies, stream courses, and small catchments are installed to spread the waters over a larger land area and thereby provide more percolation into the groundwater reservoir. Small dams with contour dikes, levees, or channels are usually employed for this purpose.

Subsurface Dams. These consist of cutoff walls built up from the surface of bedrock layers in stream channels. Their function is to trap sediment loads behind them on the upstream side. The heavier particles consisting mostly of sand or small gravel settle out behind the dam as the energy level of flowing water is reduced due to the braking effect of the cutoff wall, while the streamflow carrying suspended silt and clay particles of colloid size is passed over the wall. The entrapped sediment load then becomes a miniature water holding acquifer which serves as an underground reservoir. The acquifer can be tapped to provide small amounts of water for livestock, irrigation or domestic use. As they become filled up, the cutoff walls can be raised in successive steps to enlarge the water storage acquifer.

Sub-Project. For purposes of this project, a sub-project is defined as an area that measures approximately 16 kilometers by 16 kilometers in the overall pilot area.

## GENERAL WORK PLAN FOR SOIL AND WATER CONSERVATION ACTIVITIES

During the first year when the technician trainees begin their training, only a few soil and water conservation activities will be carried out under the ASAL Development project: (a) some activities will be started on the 350 acre Demonstration Farm at the Better Living Institute (BLI) near Kitui town, partly to train the initial classes of persons who will become soil and water conservation technicians, and (b) the first technicians trained will go to a pre-selected area (16 kilometers square) within the pilot area to begin a program.

Before being posted, the soil and water conservation technician trainees will be given three months of training at the BLI and the Demonstration Farm. This will be a combination of classroom instruction and practical application on the Demonstration Farm under the supervision of the BLI staff and the foreign technical advisors. After completing the three months of formal training, the technicians to be posted in the pilot area will be given an additional three months of on-the-job training, initially under the supervisory guidance of the foreign technical advisors, and later, under the advisors as well as the District Soil and Water Conservation Officers after they have had sufficient training and experience.

After the on-the-job training, the soil and water conservation technicians will be given continuing technical guidance and counseling as needed, initially by the team of foreign technical advisors, and later, by a combination of the foreign technical advisors and the more highly trained district level staff. Until the technicians gain both competence and confidence, they will need help in making judgements concerning which practices (from among the array of about twenty structural, mechanical and vegetative practices) are the most appropriate

for a particular situation.

It will take about three to four years to complete the range of soil and water conservation activities on the Demonstration Farm, using the BLI trainees to help design and supervise the installations as part of their training. By the fourth year, each of the 55 sub-locations in the pilot area is scheduled to have a trained soil and water conservation technician. Between years 1 and 4, the pace of activities will build up together with the number of technicians who have been trained and posted in the pilot area.

It is assumed that an average land treatment project within a sub-catchment area will consist of the following:

| Practice | Length (meters) | Unit Labor Cost (K. Sh./m) | Total Labor Cost (K. Sh.) |
|---|---|---|---|
| Cut-offs | 2,000 | 2.5 | 5,000 |
| Terracing | 2,000 | 3.3 | 6,000 |
| Countour strips | 1,500 | 2.0 | 3,000 |
| Gully control | 225 | 3.0 | 675 |
| Grassed waterway outlets | 300 | 4.0 | 1,200 |
| Streambank protection | 1,000 | 3.0 | 3,000 |
| | | | 19,475 |

It is assumed that one soil and water conservation technician with reasonable mobility (bicycle or motorcycle) can supervise the technical lay-out and the guidance of alignment on three projects simultaneously. It is further assumed that each project will take six months to complete on the average, so that each technician can oversee six projects per year. A summary of estimated numbers of land treatment projects per year and the associated labor costs follows:

Number of Land Treatment Projects and Labor Cost

| | Year 1 | 2 | 3 | 4 | 5 | Total |
|---|---|---|---|---|---|---|
| Trained technicians posted in pilot area | 1 | 8 | 20 | 55 | 55 | - |
| Soil and water conservation projects | 6 | 48 | 240 | 330 | 330 | 954 |
| Labor cost for projects (K. Sh. 000) | 115 | 935 | 4675 | 6425 | 6425 | 18575 |

In addition to the land treatment measures described above to protect farm land, other special activities will be carried out, building up in year 3 or 4 to about the following:

| Activity | Units per Year |
|---|---|
| Sub-surface dams | 20 |
| Small-scale irrigation | 10 |
| Farm ponds | 10 |
| Range seeding | 300 ha. |
| Structure protection | 1,000 m. |

It is expected that the 55 technicians together with the District Officers will be able to supervise these special activities in addition to the land treatment projects.

Finally, provision is made for a heavy labor input during years 1 and 2 for planting seedlings in eight Forest Department tree nurseries under the supervision of Forest Department staff, and a small labor input during years 3, 4, and 5 for transplanting the seedlings for application in soil and water conservation in the pilot area.

The labor supply for carrying out the conservation works is expected to be ample within or near each community in which works are carried out. It is anticipated that self-help groups will be used to mobilize the labor. Self-help groups average about 20 persons; an average of 4 groups, or 80 laborers, will be used on each land treatment project. The number of laborers used on the special activities will vary by activity, but availability is not expected to be a constraint.

For labor for the special activities and the nursery work, a total of 10 million Kenyan Shillings is allocated. Adding this to the K. Sh. 18,575,000 for labor for the land treatment projects gives a total labor cost of K. Sh. 28,575,000, or $3.81 million equivalent.

# HAND TOOLS AND AGRICULTURAL IMPLEMENTS

## Background

It is estimated that 66 percent of the farms (40 percent of the cultivated land) in Kitui District are tilled entirely by hand. That portion of the land which is not tilled by hand is nearly all plowed by oxen, although there are a few tractors in Kitui District. The oxen-drawn implement commonly used is a 9-inch moldboard plow. While use of the moldboard plow contributes greatly to the timeliness of plant preparation, the implement has some serious disadvantages. First, it is not possible to use it before the rains start because the oxen are unable to pull it. Plowing must be postponed until after the soil has been softened by the rains and, as a result, a week or more of growing time is wasted. Second, the moldboard plow, which was developed in more humid regions, completely inverts the plow slice and covers all plant residue, leaving the bare soil exposed to wind and water. In short, it speeds up the soil erosion process.

Weeding is another important operation in crop production. Weeds take water and nutrients from the crop and the resulting yield reductions can be large. Weeding is done entirely by hand in Kitui District. The labor requirement is high, but can be reduced substantially if an oxen-drawn tool for weeding is used. However, the change will not be easy to make. The present practice is to broadcast together the seeds of several crops. Mixed cropping is probably a sound practice in a high risk area since some production is almost certain, even in a bad year. The practice of broadcast planting, however, is not compatible with the use of animal-drawn cultivators for weeding. The latter can be used only when the plants are grown in rows. While mixed cropping in rows is possible, a considerable education campaign would be required to establish the practice.

## Improved Implements

Implements better adapted than the moldboard plow to seed bed preparation on dryland soil have been in use in the Great Plains area of the United States and elsewhere for many years. While there are many variations, the implements all consist of tools which lift and break the soil without inverting it. They may or may not produce ridging. They only partly cover the residue from the last crop and other plants. The soil surface is left rough and cloddy, partly covered with plant trash. In this condition, the soil is permeable to rainfall. Evaporation from the soil is lowered and moisture accumulation is high. The dangers of both wind and water erosion are reduced.

In more recent years, there have been extensive experiments

and testing done in Kenya and elsewhere to produce animal-drawn adaptations of the implements described above. The Head of the Department of Agricultural Engineering, University of Nairobi, is conducting research at the Katumani Research Station on an oxen-drawn toolbar equipped with a narrow lister (middle buster) for primary tillage and a cultivator for mechanical weeding. The soil engaging tool is similar to the India desi plow and is mounted on the Sine hoe toolbar, manufactured in France and modified by SISCOMA in Senegal.

The Agricultural Equipment Improvement Project of the Ministry of Agriculture, in collaboration with the FAO, has developed at Nakuru a less expensive version of the Sine hoe concept by basing the design upon the traditional one-handle ard. The ard type toolbar with facilities for mounting either a small lister or a cultivator appears to have great promise as a versatile, low-cost, oxen-powered implement for small scale farmers in the ASALs. The Agricultural Equipment Improvement Project is now conducting testing at Siakego near Embu. Enough evidence has accumulated in Kenya and elsewhere to justify more extensive testing and demonstration on farmers' fields.

A Program for Testing and Demonstrating Improved Implements

This project provides for the manufacture in Kenya and the distribution for testing and demonstration,mainly in Kitui District, of oxen-drawn implements based on the ard-type Sine hoe. It also provides for the testing of hand tools of improved design and better quality, and for an economic analysis of their cost compared to the commonly used models.

This activity is properly an integral part of the soil and water conservation component proposed for Kitui District, because the most immediate result of the use of the improved tillage implements is a seedbed characterized by better water retention and less erodability. Over and above the immediate result, the implements will contribute to a lower labor requirement and to increased agricultural production, and thus to an improved standard of living for the people.

The activity is divided into two phases: (1) the manufacture, testing and demonstration of a few prototype improved implements, and (2) about one year later, the production and distribution of the improved implements on a larger scale.

Phase 1

Animal Drawn Implements. Under the guidance of an engineer experienced in the small lot manufacture of simple agricultural implements, orders will be placed under an AID-financed contract

with one or more Kenyan manufacturers for approximately 25 skid type simple units and 5 wheel type toolbars, all to be oxen-drawn. The ard-type toolbar developed by the MOA-FAO Agricultural Equipment Improvement Project could be the design for the 25 simple units, and the 5 wheeled toolbars could be an adaptation of the Nolle Polycoulter developed in France. Both units will include a complement of tools to be mounted on the bar. Each of the 5 wheeled units will also include a cart box. It is estimated that the simple units can be manufactured and delivered to Kitui District for not more than 500 shillings each. The wheeled units are estimated to cost about 3,500 shillings. The prototype implements may cost slightly more because of the very small quantities.

The wheeled toolbar is both more technically advanced and considerably more expensive. However, it has the unique advantage of being useful for transport when a box is added. Such a cart could be used to haul water, produce, wood, etc., and might be a source of additional income for the farmer during the off season. Its practicability is worth testing. In addition to tillage implements, provision is being made under the project for the manufacture and testing of animal-drawn equipment which is supportive of the soil and water conservation component; i.e., slip scrapers and scarifying chisel tools.

A few components such as cultivator shovels and tillage tool points may need to be imported, but Kenyan manufacturers appear to be able to obtain raw materials such as steel and wood without difficulty. It will be essential to place firm orders so that the manufacturer can order his materials. It is also important to pay the manufacturer promptly upon delivery. Small manufacturers cannot afford to have their limited capital tied up for very long.

Kenyan manufacturers have had experience in similar fabrication jobs. Ideal Casement in Nairobi has been building animal-drawn moldboard plows as well as cultivators. The approximately 500 oxen-drawn plows sold to farmers in Kitui District through the Kyeso Agricultural Improvement Scheme were all manufactured in Kenya, principally by Ideal Casement. Alfdin Blacksmith and Sons on Varma Road in Nairobi has been building moldboard plows, ox carts and pushcarts. In Nakuru, J.O. Opande Agricultural Implements Manufacturing has built some prototypes for the MOA-FAO project.

The implement engineer will be responsible for preparing the procurement specifications for the prototypes, arranging for their distribution and drawing up an outline of the information to be derived from a year of testing and observation. The 30 prototype implements will be distributed in order to provide an opportunity for both evaluation and demonstration. The evaluation will provide information on how well the models perform and point out minor modifications which might be desirable before larger quantities are

ordered. Both models will be furnished to the Katumani Research Station for testing by the Agricultural Engineering Department, University of Nairobi; to the FAO testing area at Siakego; to the Agricultural Engineering Department at Egerton College; and to the Better Living Institute at Kitui. The remainder will be distributed to carefullly chosen farmers or farmers' groups and possibly to training and demonstration facilities in Kitui District.

Each recipient of an implement must collect and supply certain information regarding the performance of the implement. Although experiment stations will be able to provide more exact data than farmers, farmers can be expected to make observations the stations may overlook. A schedule detailing the exact information to be supplied will be drawn up by the engineer assisted by the soil and water conservation staff prior to distribution of the implements. The information sought will include the following:

- Can the oxen pull the implement when the soil is dry?
- Will the implement stay in the ground?
- Is the hitching arrangement and the line of draft correct for the size of oxen and method of hitching used by the farmers?
- Are the wearing quality and life of the soil-engaging parts of the unit satisfactory?
- How many days does it take to prepare a hectare?
- What conclusions can be drawn about soil moisture, soil tilth, timeliness in planting, water infiltration and erosion?
- What conclusions can be drawn about crop yields and economic return?
- Are there suggestions for modification, improvement or simplification?

  Do women use the equipment? Why or why not?
- What is the cart box used for?

Hand Tools. The term "hand tools" refers to the variety of hand operated devices used on the farm to increase hand labor efficiency and utility. The hand tools commonly in use are of poor quality. They are poorly balanced, the hoes turn on the handles, and they wear down rapidly. At least some people have been exposed to what seems to be better tools, e.g., the hoes used in road maintenance. The mystery is why these apparently better tools are not more commonly used. There are three possibilities:

1) the apparently better tools are not really better suited

for farm use;

2) the better quality tools are too costly for the farmer, either in terms of original investment or per unit of useful life; or

3) the better quality tools are simply not available to the farmer, due to market protection measures or for other reasons.

To test these and any other factors which might appear to influence the farmer's choice of hand tools, this project will provide $20,000 for the manufacture of improved hand tools in Kenya and, if need be, the importation of a limited number of hand tools from the U.S. or other countries. These tools will provide the raw material for experiments to be conducted jointly by the implement engineer and the agricultural economist on the Soil and Water Conservation technical assistance team. The advice of a rural sociologist and the experience of someone knowledgeable about industry and trade patterns in Kenya will also be required.

Role of the Implement Engineer. The implement engineer is the key person in the testing process described above for prototype animal-drawn tools and improved hand tools. It is preferable that he have an engineering degree. He/she could have been a farmer or an artisan in a relevant trade. This person needs to understand the use of implements from the viewpoint of the farmer, i.e., what he or, more probably, she is trying to accomplish with the tools, and the limitations of time, energy, cost, etc., which come into play. The implement engineer will have had at least two years experience in developing countries working with equipment for small farms. Finally, he/she needs to understand small lot manufacturing and the extent of the capabilities possessed by village artisans. He/she will be assigned for four years. He will live in Nairobi for the first 2-3 months, in Kitui thereafter. While in Nairobi, he will work closely with the Machinery Mechanization Branch of the Land Development Division in the Department of Agriculture.

After information along the above lines have been compiled for one full year and analyzed, decisions can be made regarding design changes in the models to be procurred for Phase 2.

Along with the testing described above, a thorough study will be made by the engineer and the agricultural economist of possible marketing channels, need for an availability of maintenance facilities, and the need for an availability of credit. The results of these studies should lead to a final decision on the

number of skid type units to be manufactured in each year of Phase 2, the methods of distribution, and any other services for which arrangements will need to be made. Subject to changes suggested by experience and testing, Phase 2 will have the following dimensions.

Phase 2

Ordering the Oxen-Drawn Tools. Based on field tests and possible modifications in design during Phase I, prototype designs will have been prepared for manufacturing implements and tools during Phase II. The budget provides for the manufacture in Kenya of 2,000 skid type toolbars with attachments for tillage tools and cultivators. In consultation with Kenyan counterparts and team colleagues, the implement engineer will decide on the size of the first order. Orders should be large enough to be attractive to manufacturers, but small enough to accommodate further design changes if needed.

The use of the implements and tools in parts of Kitui District outside the project area and in other ASAL areas will be encouraged by providing information and by helping others to place orders with manufacturers.

Quantities needed will have been determined at the district level by the District Development Committee and the engineer. The engineer will provide the contractor with recommendations, general guidelines, and appropriate engineering specifications for tools and implements to be manufactured. The engineer will also furnish a list of approved potential manufacturers, whose facilities have been visited and inspected and whose capabilities have been determined. The contractor will enter into contractual agreements with the manufacturers. The engineer, in consultation with the contractor, will be responsible for accepting delivery of the product for warehouse storage, for distribution, and for follow-up evaluation.

Especially in Phase 2, the tenders must give adequate specifications for steel quality and weight, bolts, wood, paint costs and extra parts.

Distribution Strategy. It is anticipated that the first order will consist of 500 simple toolbars and attachments. Part of this production could go directly to the groups participating in the soil and water conservation component of this project.

Registered women's groups and self-help groups engaged in communal fields in Kitui District, especially in locations outside the core Soil and Water Conservation Project area, will be given a set of hand tools and a simple toolbar unit. The aim is to broaden

the geographic area of demonstration to encourage adoption and distribution of the equipment. Two hundred simple toolbar units will be set aside for this purpose out of the first 500 units that are manufactured. One simple toolbar unit will be given for demonstration use to each self-help or women's group throughout Kitui District whose members have jointly cultivated and grown crops on at least one acre of land the previous year.

It is within the project scope for the principals of rural schools in Kitui District to receive a set of equipment to use on the school acreage with student participation.

In all cases, the District Agricultural Extension Officers in consultation with the DDC, will be directly involved with the distribution of equipment and with the training of farmers in its use. Annual evaluations similar to the one conducted in Phase 1 will be made during the life of the project to determine the uses and benefits of this equipment.

The hand tools and implements will ultimately be distributed by direct sales to the public. The items will be available for sale through farm input store facilities that are operated by the farmer cooperatives. The Ministry of Cooperative Development (MOCD) will arrange for stores in Kitui District to merchandize the tools and equipment. The MOCD plans to continue the Farm Input Supply Scheme (FISS) which is sponsored and assisted by the Nordic Project in Kenya.

Publication of Extension Materials as a Training Resource. The budget provides for extension materials (such as illustrations. posters, small bulletins, pamphlets, etc.); updating selected MOA extension handbooks to make the information more specific for use in the ASAL areas; and purchasing visual aids such as flannel boards and flip charts.

Upgrading of Repair Capabilities in the Private Sector. There are local traditional ironworks (blacksmiths) throughout Kitui District. The Pre-Investment Study (Report No. 6, p. 200) identified nine of these units. There are repair services for trucks and cars in Mwingi and Kitui town. A small training program will be considered at the BLI to provide suitable training to the artisans. The curriculum will be developed by the engineer and will emphasize small equipment repair.

Grants for Training in Appropriate Technology Outside Kenya. Considerable research into developing technology suitable for smallholder farmers in ASALs is going on outside of Kenya: at ICRISAT near Hyderbad, India; at IITA in Ibadan, Nigeria; at Abdu Bellow University in Katta, Nigeria; and in other countries, such as Israel and Botswana. Funds will be provided so that some

college and university faculty working on agricultural mechanization research, as well as some extension personnel working in Kitui District, may visit appropriate institutions to study methods of farming semi-arid land. Training grants averaging $3,000 each will be made to two persons for each year of the project. The implement engineer will accompany the study tour to major centers of activity like Nigeria, India, or Israel.

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# ECONOMIC ANALYSIS

## A. Introduction

The importance of ASALs in Kenya's development strategy and USAID/Kenya's development assistance strategy is detailed in the GOK's Development Plan 1979-1983 and the USAID/Kenya FY 1981 Country Development Strategy Statement (CDSS). This annex summarizes the arguments presented in these two documents to establish the economic context for the analysis which follows. The analysis does not include a macroeconomic review of the Kenyan economy, which is readily available in other documents 1/, but rather analyzes Kitui District and the small holder ASAL farmers within Kenya's overall macroeconomic setting.

Given the planning, training and experimental/demonstration characteristics of this project, a highly quantitative cost-benefit analysis is not feasible. Rather, the economic analysis focuses on the cost effectiveness (least cost) aspects of the project and the potential benefits which would develop if components funded in the project are expanded throughout the ASALs. The economic analysis is similar to that applied to a research activity. It considers the recurrent cost implications of the project and, in that context, reviews the GOK's current and future fiscal structure in order to assess whether or not funding problems are likely to impede the implementation of the project.

Each compoent is examined individually in terms of cost-effectiveness, potential for future benefits, impact ( or potential future impact) on the beneficiaries, and attendant recurrent cost concerns. The linkages among components of the project are examined as well as the linkages between this project and other on-going or planned complementary projects.

## B. ASAL Development Strategy: GOK

### 1. Development Plan 1979-1983

The main theme of the Development Plan 1979-1983 is the alleviation of poverty and the provision of basic human needs to all Kenyans. Set in a rural development context, the Plan aims at increasing income earning opportunities, improving the equitable distribution of income, addressing malnutrition, and upgrading living standards. GOK expenditures during the Plan period are projected at $11 billion (constant 1978/79 prices) with the budget increasing at the annual rate of 6.2 percent per annum during

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1/ See USAID/Kenya CDSS, pp. 10-13; IBRD, Kenya: Economic Memorandum, March 1979.

the Plan period. USAID/Kenya and the IBRD have reviewed the Plan[2/] and while there are questions as to whether or not particular GDP growth rates and import levels can be achieved, both reviews conclude that the Plan strategy is sound and consistent with the poverty alleviation objective.

The allocation of budget resources in the current Plan compared to the levels in the 1973-1978 Plan, reflects a significant increase in defense expenditures. Defense rose from a level of 5.0 percent of total planned expenditures during 1973-1978 to a level of 9.8 percent of the planned 1978-1983 budget. At the same time economic services, as a percentage of total expenditures, declined from 39 percent to 38 percent, while social services fell from 28 percent to 22.7 percent. These shifts in budget allocations are due to the very rapid increase in defense expeditures experienced in 1977 and 1978. During the Plan period, however, incremental GOK expenditures will be channeled toward economic and social services. For example, while the total budget is increasing at the annual rate of 6.2 percent, the Ministry of Agriculture's expenditures are planned to rise at the rate of 16.8 percent per year, Housing and Social Services at 12.6 percent, Health at 9.6 percent, Works at 8.6 percent, Cooperative Development at 7.8 percent, and Education at 7.6 percent. During the same period, defense expenditures will decline by 0.1 percent per year.

Foreign assistance is estimated to increase by 17 percent per year during the Plan period, representing 15 percent of all ministry expenditures. Major foreign assistance inputs are anticipated for the Ministry of Works (45 percent of total budgeted expenditures), Agriculture (33 percent), Water (33 percent), and Cooperative Development (42 percent).

2. Agricultural Development Strategy

The agricultural sector is central to Kenya's poverty alleviation development program. In order to achieve increased agricultural growth, rising agricultural incomes, improved balance of payments, additional agricultural income, and an improved conservation of natural resources, the Plan sets forth an agricultural development strategy which includes:

- more intensive land use and development;
- development of appropriate technology;
- development of smallholder agriculture;
- development of arid and semi-arid lands;
- agricultural development biased toward poverty alleviation;

2/ IBRD, Kenya Economic Memorandum, March 1979. USAID/Kenya, Kenya Development Plan 1979-1983: Summary Review and Analysis, April 1979.

- improved market incentives for agricultural produce; and
- increased access to land and to land-based employment.

The Plan assumes that the agricultural population will increase at the rate of 2.5 percent per year with rural to urban migration absorbing approximately 1.0 percent of the annual increase. Specific annual targets of the plan include:

| | 1978-1983 |
|---|---|
| a. Agricultural production | |
| - incremental production | 4.7% |
| - incremental production per capita | 2.2% |
| b. Agricultural Income | |
| - incremental income | 4.5% |
| - incremental income per capita | 2.0% |
| c. Value of Agricultural Production | |
| - incremental value (current prices) | 10.9% |
| - incremental value per capita | 8.4% |
| d. Employment | |
| - incremental rural employment | 3.0% |
| - incremental agricultural employment | 2.7% |
| e. Nutrition | |
| - per capita calorie availability | 7.6% |
| - per capita protein availability | 6.2% |

3. ASAL Development Strategy

Within the context of rural development programs, the Plan states that:

> The development of arid and semi-arid lands will also receive special attention from Government during the Fourth Plan Period.... Because of the complexity of the problems - economic, environmental, and social - our approach to their development must be integrated, requiring a high degree of co-ordination among Ministries. The Ministry of Agriculture will play an important role in developing programmes and in establishing co-ordinated procedures. While planning will proceed on the basis of regional analysis considering watershed and agro-climatic areas, implementation will be on a district basis, relying on established administrative systems and ensuring local-level participation in assessing needs and priorities.[3/]

3/ Development Plan, p. 14.

With specific regard to arid and semi-arid land development, the Plan sets forth an action plan.

> Arid and Semi-arid Lands Development Programme is a new high priority activity of the Government and the Ministry of Agriculture. The objective is to urgently develop these areas by means and techniques that will preserve and make more productive the basic semi-arid and arid environments. These areas incorporate 80 per cent of Kenya's land area, 50 per cent of its livestock, and 20 per cent of its population. They face major problems of increasing population pressure on a fragile ecology which has led to significant resource degradation and low, risky income opportunities with a widespread increase of poverty. They have received limited benefits from past development programmes. The semi-arid and arid areas will receive major attention in the Plan to deal with the twin problems of the alleviation of poverty, and the rehabilitation of land and water resources for sustained development in these areas. The programme will contribute to national development by avoiding the extensive need for famine relief, with considerable revenue savings, and by encouraging, through increased productivity, the integration of the areas into the national market economy....
>
> An integrated approach to area development for the arid and semi-arid lands will be based on several pre-project components. A report of an Inter-ministerial Task Force is being prepared giving a long-term framework for development of these areas including a statement of objectives, a development strategy, a set of priorities and programmes and an organizational framework. Recently, a Pre-investment Resource Inventory and Project Identification Study of Machakos, Kitui, Baringo and parts of Embu was completed. /AID activity/. This inventory and quantification of dryland areas resources is to be used in the design of integrated regional projects. The Dry Land Farming Research and Development Project /AID activity/ will develop suitable methods for integrated dryland mixed farming involving the production of annual crops, of perennial crops, and livestock. The objective is to develop farming systems for medium and low potential areas which allow reliable production for household needs and market sales of the rapidly growing population in these areas....
>
> The Machakos Integrated Development Project is the first integrated project to be implemented. /EEC funded/. It concerns all aspects of economic and social development with an emphasis on agriculture.... The project is expected to cost K£4.7 million in public funds over a 4 year period....

Other development projects in arid and semi-arid areas will follow. Some projects will be on a district, and some on a functional basis. Areas to be included are Baringo, Kitui, /AID activity/ and the drier parts of Embu, Kirinyaga, Meru and Murang'a Districts, all of North-Eastern Province, Isiolo, Kajiado, Laikipia, Marsabit, Samburu, Turkana and West Pokot Districts, and the dry areas (zones IV, V and VI) of Elgeyo Marakwet, Nakuru, Narok, South Nyanza and Tana River Districts and the dry areas of Coast Province.

Programmes in these areas will be backed up by common services for planning pre-investment studies and research, co-ordinated by the Inter-ministerial Committee for Arid and Semi-arid Lands and administered through the existing Kenyan administrative structures with the Ministry of Agriculture taking a major role. There will be a common evaluation system for all projects. Different aid donors will support particular functional or regional programmes, but this flow of foreign aid will be carefully regulated to ensure that it is consistent with the overall policies and organizational systems of the Kenya Government.[4/]

C. ASAL Development Strategy: USAID/Kenya

The FY 1981 CDSS identifies two geographic target areas for AID and sets forth a development assistance strategy in which the ASALs play a central role. Portions of the CDSS are highlighted below:

1. Target Areas

Two geographic areas have been relatively deprived of essential economic and social services: the arid and semi-arid areas and Western Kenya.

These areas comprise 79 percent of Kenya's land surface and 60 percent of the population. The median smallholder household income in these areas is below the national level.

| | Percent National Population | Percent National Land Area | Household Median Income | Median Holding |
|---|---|---|---|---|
| Arid and Semi-Arid Areas | 20% | 73% | $212[5/] | 1.9 ha.[5/] |
| Western Kenya | 40% | 6% | $280 | 1.4 ha. |
| National Smallholder | 79% | n/a | $364 | 2.3 ha. |

4/ Ibid., pp. 253-55

5/ Data for smallholder only, excludes pastoralist income and holding data.

The Arid and Semi-Arid lands of Kenya[6/] have not received a proportionate share of public investment but their economic potential is limited, their population is small and their technical and social development problems are considerable. The ASAL farmers depend more on off-farm and non-agricultural income for survival than the average smallholder farmer. Operating farm surplus provides only 26 percent of their total household income (national average 57 percent) with off-farm employment (casual and regular) providing 31 percent and non-farm operating surplus contributing another 25 percent. Productivity (total production over total inputs) is well below the average at 2.7 compared to the national smallholder average of 4.6. Limited smallholder productivity and income levels are compounded by deficient access to social and economic services as detailed below.

DISTANCE OF RURAL HOUSEHOLDS FROM SOCIAL AMENITIES - 1975

(Percentage of Households)

| More than four miles from: | Primary School | Health Center | Market | Bus Route |
|---|---|---|---|---|
| ASAL Smallholder (Eastern Province) | 6 | 70 | 43 | 44 |
| National Smallholder Average | 2 | 50 | 25 | 23 |

2. Strategy

a. Overview. This strategy is oriented toward increasing equity by assisting those rural areas which have not shared equally in Kenya's development thus far. Inequity is manifested primarily in terms of differences in income and level of GOK development and social services. Basically, there are two causes underlining the lack of equitable growth. One, the quality of the natural resource base, applies primarily to ASAL areas. The other, which concerns ethnic conflicts and politics, applies to several areas, primarily western Kenya where the natural resource base should have led to more equitable growth.

b. Agriculture. The Mission's strategy is primarily concerned with increasing rural incomes by alleviating the constraints to increase agricultural production, rural employment and marketing. The difficulties and risks associated with land use intensification in the ASALs are considerable. A thorough review of world-wide experience in dryland agriculture and fragile environments forms part of this

6/ North Eastern Province, most of Eastern and Rift Valley Provinces, and Tana River District in Coast Province. The area within the Tana River Irrigation Project (a large multi-donor scheme) is not included.

strategy. Environmental degradation is already serious in many ASAL areas. The Mission will look to the experience of other countries' dryland agriculture and livestock efforts such as those conducted in Israel, the AID-sponsored dryland wheat program in Turkey, experience in the Southwest of the U.S. and Australia's experience. In addition, the strategy assumes that because of the very complex production, cultural and environmental problems encountered in Kenya's ASALs, the Mission will be undertaking a task the fruits of which will ripen in the 1985-1990 time frame.

Because of the high risk and meager knowledge base, the Mission's strategy for ASAL areas follows a dual path of research and action-oriented programs. Initially the balance between the two paths is skewed to favor research, expanding the data base (particularly in hydrology), and pilot projects. Later, a major shift toward larger action-oriented investments will occur. Within the context of action programs, there is initially an emphasis on investments where the risk of serious error is low, the knowledge base is sound, and the activities "free standing", implying that they have a development rationale not dependent on a complex set of other interventions.

c. Employment. Increased employment in rural areas is a key element in the strategy. Farm development programs must be supplemented by employment creation in other parts of the rural sector. While labor-intensive crops and production techniques are emphasized, they need to be complemented by employing farm laborers in soil conservation, drainage and water resource management schemes, reforestation, alternate energy efforts and other rural works during non-agricultural seasons.

d. Marketing. Because farmers who have emerged from subsistence are particularly responsive to agricultural price fluctuations, an emphasis on market incentives and efficiency is especially important. Particularly in ASAL areas, the Mission's strategy includes a focus on marketing including macro constraints, such as the GOK's pricing policies,storage capacity to minimize post-harvest losses, rural access roads which facilitate transport of produce and livestock, and access to inputs to reduce the cost of marketing.

## D. Background Data: Kitui District and the Smallholder

Kitui District comprises 4.4 percent of Kenya's land surface in the following agricultural production categories: high potential land (2.9 percent of Kitui and 1 percent of the national total); medium potential land (49.8 percent of Kitui and 36 percent of the national total); and, low potential land (47.5 percent of Kitui and 2.6 percent of the national total).

Kitui District's 1977 population of 430,552 is about 3 percent of the Kenyan national total. The district contains 6.2 percent (237,600 head) of Kenya's total cattle population and 13.1 percent (672,300 head) of Kenya's total sheep and goat population.

Data are generally aggregated at the provincial level, not the district level. Some data are available by agro-ecological zone. In order to identify major economic characteristics of the typical smallholder in Kitui District, data from the agro-ecological zone labled "Lower Cotton Zone East of Rift Valley" (hereafter referred to as "Lower Cotton") is utilized. This zone includes all of Kitui District, the eastern portions of Machakos District, and the lower zones in Embu and Meru districts. The zone corresponds well with the areas included in the Pre-Investment Study (615-0164) and provides information which offers a fair picture of Kitui District. The Lower Cotton Zone contains 141,528 households (as of 1974/75) or about 945,000 individuals. Half of the zone's population resides in Kitui District. This zone includes 9.5 percent of Kenya's smallholder households (defined in terms of land holdings of less than 20 hectares).

Table 1 illustrates the smallholder income distribution in the lower Cotton Zone compared to the national smallholder. The Lower Cotton Zone's median annual household income is about Shs. 1,750 ($210) while the national median is approximately Shs. 2,6000 ($315).7/

TABLE 1

Percentage Distribution of Holdings by Household Income Group 1974-1975

| Income Range | Lower Cotton Zone East of Rift | | All Smallholders | |
|---|---|---|---|---|
| K. Sh. | Percent | Cumulative % a/ | Percent | Cumulative % a/ |
| Less than 0 | 10.98 | 10.98 | 6.67 | 6.67 |
| 0-999 | 10.32 | 21.30 | 11.80 | 18.47 |
| 1000-1999 | 38.49 | 59.79 | 22.44 | 40.91 |
| 2000-2999 | 17.93 | 77.72 | 13.82 | 54.73 |
| 3000-3999 | 8.17 | 85.89 | 11.73 | 66.46 |
| 4000-5999 | 4.96 | 90.85 | 13.52 | 79.98 |
| 6000-7999 | 3.10 | 93.95 | 7.95 | 87.93 |
| 8000 and over | 6.06 | 100.00 | 12.08 | 100.00 |

Source: Integrated Rural Survey, Basic Report, Table 8.3

a/ Does not add to 100 percent due to rounding.

7/ For 1974/75 data the exchange rate is K. Sh. 8.23 = $1.00.

Table 2 indicates the distribution of land holdings in the Lower Cotton Zone and for smallholders nationally. The median size holding is 1.67 hectares in the national sample and 1.83 hectares in the Lower Cotton Zone. The zone's larger holding size does not, however, adequately compensate for the zone's lower agricultural potential.

TABLE 2

Percentage Distribution of Holdings by Holding Size Group 1974-75

| Size of Holdings | Lower Cotton Zone East of Rift | | All Smallholders | |
|---|---|---|---|---|
| Hectares | Percent | Cumulative % a/ | Percent | Cumulative % a/ |
| Below 0.5 | 4.34 | 4.34 | 13.91 | 31.91 |
| 0.5 - 09 | 10.64 | 14.98 | 17.92 | 31.83 |
| 1.0 - 1.9 | 37.81 | 52.79 | 26.99 | 58.82 |
| 2.0 - 2.9 | 19.20 | 71.99 | 15.11 | 73.93 |
| 3.0 - 3.9 | 10.26 | 82.25 | 8.89 | 82.82 |
| 4.0 - 4.9 | 5.69 | 87.94 | 7.22 | 90.04 |
| 5.0 - 7.9 | 9.47 | 97.41 | 6.50 | 96.54 |
| 8.0 and over | 2.60 | 100.00 | 3.46 | 100.00 |

Source: Integrated Rural Survey, Basic Report, Table 7.3, p. 45.

a/ Does not add to 100 due to rounding.

Table 3 compares the basic income and production characteristics of the smallholder in the Lower Cotton Zone with the "poor" smallholder (income less than K. Sh. 3,000 per annum) and the "prosperous" smallholder (income above K. Sh. 3,000 per annum).

Part 1 of Table 3 identifies sources of income. In the Lower Cotton Zone off-farm employment (regular and casual) accounts for 31.5 percent of total household income compared to only 21.7 to 24.2 percent for the other three groups. Similarly, on-farm income accounts for only 26.1 percent of total income in the Lower Cotton Zone compared with 40.9 to 56.8 percent for the other three groups. This table underscores the importance of off-farm income and non-agricultural on-farm income for the zone's holders.

Part 2 of the table compares consumption patterns among smallholder groups and indicates that in the Lower Cotton Zone own-production only accounts for 31.3 percent of total consumption, slightly less than for the poor smallholders and well below the national average.

Part 3 of the table provides data on farm inputs. In the Lower Cotton Zone purchased inputs account for only 30 percent of total farm inputs compared with 32 to 36 percent for the other smallholder categories. In the Lower Cotton Zone smallholder farmers generally provide

a much higher share of inputs from on-farm sources(relying less upon purchased inputs) than do other smallholders. At the same time, farmers do purchase inputs, especially seeds (K.Sh. 58), machinery contracts (K.Sh. 49), but little fertilizer (K. Sh. 1), and no sprays.

Table 4 reinforces the income-source data presented in Table 3 and indicates the large number of males from the area included in the Pre-Investment Study who work in off-farm occupations.

TABLE 4
TYPE OF FARM ACTIVITIES AND PERSON ENGAGED
(Numbers Reporting)

| Activity Reported | Head | Wife | Son | Daughter |
|---|---|---|---|---|
| Working in Town | 310 | 11 | 285 | 35 |
| Teaching | 52 | 6 | 35 | 5 |
| Selling Food | 29 | 62 | 1 | 0 |
| Handicrafts | 34 | 54 | 14 | 10 |
| Shopkeeping | 56 | 9 | 12 | 2 |
| Trading | 41 | 14 | 10 | 2 |
| Other Sales Activities | 97 | 154 | 22 | 11 |
| Sale of Land | 4 | 0 | 2 | 1 |
| Work on Another Farm | 71 | 96 | 66 | 57 |
| All Other | 163 | 14 | 33 | 4 |
| TOTAL | 887 | 420 | 480 | 127 |

Source: Pre-Investment Study

Table 5 details crop production in the area covered by the Marginal Lands Pre-Investment Study, and illustrates the importance of maize and legumes in the smallholder's production package. The IRS data indicate a low adoption rate for hybrid maize for the Lower Cotton Zone, indicating that considerable production increases could be generated if a suitable hybrid were adopted by the zone's smallholders.

TABLE 3. Smallholder Income/Production Patterns

| | Project Zone a/ | Poor Smallholders (Nationally) b/ | National Average | Prosperous Smallholders (Nationally) c/ |
|---|---|---|---|---|
| 1. Source of Income (Share) | | | | |
| Farm Surplus | 26.1% | 40.9% | 56.8% | 54.8% |
| Non-farm Surplus | 24.7 | 12.2 | 9.7 | 9.9 |
| Reg. Employment | 15.5 | 8.1 | 15.5 | 17.2 |
| Casual Employment | 16.0 | 16.1 | 9.6 | 4.5 |
| Remittances | 18.4 | 19.9 | 8.9 | 6.5 |
| Other | 2.3 | 2.8 | 2.[illegible] | 7.1 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |
| Average Annual Household Income (1974/75) K.Shs. | 2,479 | 1,542 | 1,926 | |
| $ | 301 | 187 | 477 | |
| 2. Consumption Pattern | | | | |
| a. (% of Total Consumption) | | | | |
| Own Produce | 31.3% | 33.8% | 37.6% | 40.7% |
| Food Purchases | 43.9 | 44.4 | 37.6 | 41.5 |
| Non-food Purchases | 24.8 | 21.8 | 14.8 | 17.8 |
| b. Average Annual Household Consumption K.Shs. | 2,788 | 2,166 | 3,450 | 4,850 |
| c. Own Food Production Consumed at home as % of Total own Food Production | 41.7 | 42.6 | 50.0 | 52.1 |

a/ "Lower Cotton East of Rift", IRS Survey Data
b/ Annual Household Income K.Shs.0-3,000 ($0-$365)
c/ Annual Household Income K.Shs.3,000-10,000 ($365-$1,200)

Source: GOK, IRS, 1974/75.

3. Farm Inputs (K.Shs./yr.)

| | | | | |
|---|---|---|---|---|
| a. Purchased Inputs (K.Shs.) | | | | |
| Seed | 58 | 37 | 59 | 83 |
| Fertilizer | 1 | 13 | 42 | 62 |
| Other | 56 | 31 | 84 | 121 |
| Total | 115 | 81 | 185 | 266 |
| (% Inputs) | (30%) | (36%) | (32%) | (36%) |
| b. Total Livestock Expenses | 21 | 20 | 56 | 91 |
| (% Inputs) | (6%) | (9%) | (10%) | (12%) |
| c. Total Wage Inputs | 87 | 58 | 161 | 223 |
| (% Inputs) | (23%) | (25%) | (28%) | (31%) |
| d. Own Produced Inputs | 143 | 39 | 84 | 127 |
| (% Inputs | (38%) | (17%) | (15%) | (17%) |
| e. Other | 14 | 30 | 93 | 24 |
| (% Inputs) | (3%) | (13%) | (15%) | (4%) |
| f. Total Inputs | 380 | 228 | 579 | 731 |

TABLE 5
PERCENTAGE OF HOLDINGS REPORTING CROPS

| Crops | MLPIS Team Survey 1977 % | IRS 1974-75 Lower Cotton East Rift % | ATAC 1975-76 Survey Eastern Province % |
|---|---|---|---|
| Maize - local<br>Maize - hybrid | 87.8 | 97<br>12 | 96 |
| Beans | 67.6 | 66 | 95 |
| Cow peas | 79.6 | NR[a/] | NR |
| Millet | 38.8 | 10[b/] | 12[b/] |
| Pigeon peas | 47.5 | NR | NR |
| Sorghum | 36.5 | 15 | NR |
| Cassava | 5.2 | NR | 7 |
| Castor | 16.4 | NR | NR |
| Cotton | 10.3 | 4 | 9 |
| Sisal | 8.8 | NR | NR |
| Sunflower | 13.1 | NR | NR |

a/ Not reported.

b/ The IRS Survey reports finger millet while the Pre-Investment Study and the ATAC Survey report millet without regard to type.

Source: Pre-Investment Study.

## E. Project Analysis

### 1. Overview

The preceeding sections describe the GOK's ASAL development strategy, in the context of overall development objectives, and USAID/Kenya's development assistance strategy which emphasizes increased involvement with ASAL activities. The background data highlight some of the basic economic characteristics of the smallholders in Kitui District, indicating among other things, the importance of off-farm employment and the regular purchases of production inputs.

Based on an analysis of ASAL development problems and the identification of a long-range action plan, specific activities have been identified for AID financing. Each component is reviewed in terms of its contribution to ASAL development, its priority within the ASAL development strategy, the potential benefits, and the expected impact on the project's beneficiaries.

The overall thrust of the development assistance activity is: (a) to establish planning and data gathering capabilities within the GOK, and (b) to test soil and water conservation technologies for potential future widespread replication. The project represents a movement from the reconnaissance-level survey of the Pre-Investment Study (615-0164) to the institution building and technology testing activities of this project which are required prior to launching into full-scale production-orientated activities planned for FY 1981 under ASAL-Phase II (615-0186). The following economic analysis adopts a methodology similar to that applied to research activities. Benefits are evaluated on a with and without basis to determine whether or not the activity will: (a) eventually yield a net change in agricultural production and/or living standards, and (b) reach the beneficiary group.

2. Component 1: Planning for ASAL Development

a. Rationale. This component focuses on improving institutional planning capabilities, developing human resources and supporting and strengthening the planning units within the MOA and MEPCA. Because the component does not generate any identifiable income stream or quantifiable benefits, it does not lend itself to conventional cost/benefit analysis.

The ASAL Framework Document lists the key objectives of the ASAL Development Program as: (a) human resource development, (b) exploitation of production potentials, (c) conservation of natural resources, and (d) the integration of ASAL areas within the national economy. The GOK's analysis of ASAL development concludes that,

> In order to provide a standard basis for establishing priorities and procedures for proposals in ASAL areas it is essential that a common planning approach be established and subsequently followed. This should be flexible enough to incorporate new ideas and lessons from experience, but with various districts, ministries and donors involved. A commonly followed approach is considered of great importance. Bringing all the elements (GOK objectives) together into a planned and coordinated programme is a central strategy for ASAL development.... This will be achieved through a coordinated and integrated planning and implementation structure.[8]

8/ ASAL Framework Document, pp. 32, 17.

The need to plan the GOK's ASAL Development Program carefully is well established. The GOK anticipates major capital investments in ASAL activities over the 1979-1983 plan period. The Ministry of Agriculture alone will spend over $35 million on development activities which are ASAL specific and at least three times that amount will be spent on ASAL activities from functional accounts which are not ASAL specific; thus, total development expenditures are in the neighborhood of $140 million. This, combined with the relatively large number of donors planning to fund ASAL activities (The EEC, U.K., IBRD, and AID are in various stages of project implementation/design.), adds up to a major development program.

The GOK already has major planning units established within MOA and MEPCA to which AID is providing support under the Rural Planning Project (615-0162). These units will be enlarged to permit a significant increase in ASAL planning activities. Component 1 of the ASAL Development Project will assist the GOK undertake expanded ASAL planning responsibilities through the provision of technical assistance (8 person years at the headquarters level), short-term consultants for specific planning/design problems, and participant training so that the GOK eventually can staff fully the ASAL planning sections of the MOA and MEPCA. Given the magnitude of planning efforts required for the ASAL program, this proposed AID assistance is a cost-effective means for supporting the expansion of existing units.

The provision of one planner at the district level supports the GOK's intention to emphasize district level planning for the ASAL Development Program.

> Many of the specific programme activities need to be taken up on a localized area specific basis, in most cases using the district or contiguous districts as the organizational unit.....It is essential that the implementation of projects and programs incorporate specific efforts to strengthen both the planning and implementation capabilities of district level officers.9/

U.S. technical advisory services at the district level, combined with in-country in-service training programs for district level officers, will help the GOK realize its decentralized planning objective. AID assistance to support this effort represents a relatively inexpensive input but the minimum level considered necessary to make a significant impact on district planning capabilities.

b. Beneficiaries. Except for the GOK officials that are trained, this component does not by itself generate any direct benefits. Improved planning will result in the evolution of a sound

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9/ Ibid., p.28

ASAL development strategy and action plan. The intended and indirect beneficiaries of this component are the smallholder farmers and pastoralists of the ASAL areas.

Providing assistance to the district planning officers significantly increases the likelihood that ASAL development planning will reflect the needs of the ASAL areas and the people who live there, and that ASAL development projects will be implemented in accordance with those needs.

c. Recurrent Costs. The MOA and MEPCA have established and functioning units; ASAL planning represents an expansion of their existing duties and responsibilities. There will be some increase in headquarters staff assigned to ASAL planning (on the order six) but this does not represent a significant increase in the GOK's recurrent expenditures.

At the district level, additional staff will not be added; instead, the current staff will receive in-service training and existing positions will be filled with better qualified personnel who may now be assigned to non-ASAL areas. No measurable change in recurrent expenditures is anticipated.

3. Component 2: Data Collection and Analysis for ASAL Development

a. Rationale. (i) AID assistance to the ASAL Branch of the MOA will help the GOK provide relevant data required for proper planning, design, and implementation of ASAL activities.

> A prime requirement for planning is the collection and collation of basic data. The basic data essential for project planning should be assembled in the shortest possible time.....Particular emphasis will be given to the assembly and analysis of data which is immediately available with a view to discovering the production possibilities of the ASALs.10/

The economic analysis of this subcomponent rests on the technical determination of the types of data required and the phasing of data collection. It is anticipated that a major data gathering exercise will be mounted in order to fill existing data gaps and to permit regular monitoring and data gathering activities. Without quantifiable benefits, economic analysis cannot compare sub-component costs against anticipated benefits. Assistance to the ASAL Branch is necessary and the costs are reasonable, particularly for a major data gathering exercise that strengthens the data gathering institution.

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10/ Ibid., p. 32.

(ii) "Land use planning is an important tool for the development activities. Criteria need to be formulated for decision making on a range of issues concerning competing land use".11/ Aerial photography, remote sensing, and other mapping aids are essential tools for proper land use planning. In addition to assisting in land use planning, this subcomponent will support the GOK's land adjudication activities in Kitui District. Reliance upon the technology of Landsat and the use of aerial photography will permit a rapid and relatively inexpensive data gathering exercise. As project design and implementation moves forward in such areas as soil and water conservation, afforestation, rural road development, and crop and livestock production, detailed maps will be required. The costs associated with each item in this subcomponent are considered to be reasonable.

(iii) Feasibility and reconnaissance studies are necessary steps in the design of future year action-oriented development assistance activities. The FY 1981 ABS describes two large-scale ASAL development activities which are expected to follow from these feasibility studies: ASAL Development-Phase II (615-0186) at a projected cost of $15 million and Rural Road Network-ASAL (615-0191) at a projected cost of $10 million. In addition, it is anticipated that other donors will finance activities based on AID-financed feasibility studies. For example, the IBRD's activities in Baringo District are partially based on the AID-financed Pre-Investment Study (615-0164). The economic justification for feasibility studies lies in the projects that are designed and implemented as a result. The cost of each feasibility study is based on the required number of technician specialists and the estimated work time. The feasibility costs associated with each study are considered reasonable.

(b) Beneficiaries. The ultimate beneficiaries of this component are the smallholder farmers and pastoralists in ASAL areas for whom ASAL development activities will be investigated, designed, and implemented. This component does not by itself generate direct benefits for this group. Early benefits are likely to be the result of revised maps to assist the GOK accelerate already scheduled land adjudication. In all other respects this component's benefits are similar to those anticipated from the ASAL planning component: through proper planning and design, limited resources can be more efficiently allocated in order to increase benefits the smallholders will receive from the GOK's ASAL program. Without proper planning and design (supported by the requisite data) the GOK's ASAL Development Program will move forward more slowly and in an ad hoc manner.

(c) Recurrent Costs. The GOK's Development Plan 1979-1983 provides $3.5 million in development expenditures specifically for ASAL data gathering exercises and an estimated $6 million for ASAL data gathering included in funding for on-going planning and

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11/ Ibid., p. 22

monitoring units in the MOA and MEPCA. The GOK recognizes the need for a special effort in ASAL data gathering and has earmarked funds in the new Plan for such activities. The data gathering elements of this component are not likely to require unanticipated or unbudgeted expenditures for the GOK.

The feasibility studies will require some GOK supporting services but given the short-term nature of the studies no significant incremental GOK expenditures are expected. A more difficult problem concerns the GOK's ability to fund projects identified and designed as a result of the feasibility studies. The Development Plan provides funds for the implementation of activities not yet designed, including roads, soil and water conservation, and agricultural production projects. One of the responsibilities of the GOK's ASAL planning team is to coordinate potential project activities with available funding in order to insure that the development budget is not over subscribed by ASAL projects. The recurrent cost implications of each proposed activity must also be reviewed, and for those funded by AID, recurrent cost implications will be analyzed during project design.

4. Component 3: Soil and Water Conservation

(a) Rationale. The importance of soil and water conservation in the ASALs has been documented in numerous studies, including the Pre-Investment Study, the ASAL Framework Document, and the field observations of the Pacific Consultants' team. The GOK's primary objectives for the ASAL Development Program include the conservation of existing natural resources and the exploitation of the production potential of those resources.

Examination of the soil erosion maps in the Pre-Investment Study (Report No. 1) provides dramatic evidence of the erosion hazard in Kitui District. For the Machakos/Embu/Meru Area, it was estimated that soil erosion alone was reducing potential agricultural production by about K. Sh. 13 million ($2 million) or 3 percent, per year. The annual production reduction increased to 6 percent per year by the end of the century. While the estimated production losses are difficult to quantify accurately, they are substantial, and are occurring through declining soil fertility (topsoil losses and reliance upon shifting cultivation) and the reduced lifespan/efficiency of existing infrastructure (such as downstream water collection facilities, dams, wells, and roads).

The benefits of soil conservation include increased production levels through higher yields and larger areas under cultivation, higher livestock carrying capacity, and improved downstream availability of water. This project is a first step in the development of an area-wide soil

water conservation program. In a specific pilot area an array of soil conservation technologies will be tested and demonstrated, existing organizational units will be strengthened, and a major training program will be established for the field staff who will transfer technology to the smallholders.

This component will test various technologies in order to select those suitable for large scale replication, and economic efficiency will be one criterion by which the various technologies will be judged. Other criteria include adoption rates, administrative requirements, and technical support needs.

The economic profile data presented above identify the relatively low share of net farm surplus in overall household income in the Lower Cotton Zone. Farm income accounts for only 26 percent of total farm income compared to 57 percent for the national average and 41 percent for the national poor smallholders. Low levels of agricultural production have been identified in the Pre-Investment Study as a major factor explaining the farm income/household income ratio in the ASALs. While soil and water conservation activities can help arrest the decline in soil fertility, increased agricultural production depends on a series of other inputs as well, including improved crop types (being developed under the AID supported Drylands Food Crops Project (615-0180), and expanded and more efficient agricultural extension service (being addressed with the assistance of the Agricultural Systems Support Project (615-0169), research on range management and livestock development in ASALs (funded under the Agricultural Systems Support Project (615-0169), and agricultural credit and smallholder production services (assisted by ASL-I(615-0171), ASSP (615-0169) and the IBRD's Integrated Agricultural Development Project).

Handtools and tillage implements offer one possibility for combining soil conservation technologies with direct production technologies. The Pre-Investment Study (Report No. 3) identified the labor constraint at planting and weeding time as a significant factor in limiting the amount of land under cultivation. Testing and later introducing improved oxen-drawn plows may be able to help overcome the labor constraint and permit the smallholder farmers in ASALs to increase the area they cultivate and to do so using soil conserving technologies.

Studies on oxen-drawn plows in Kenya have indicated the labor saving potential in switching from hand cultivation. Adelham and Schmidt 12/ demonstrate that on a 6 acre farm (slightly larger than

12/ E. Adelhelm and H. Schmidt, "Economic Aspects of Ox-cultivation" in Workshop on Farm Equipment Innovations, Institute for Development Studies, University of Nairobi, Occasional Paper No. 16, 1975.

the median in the Lower Cotton Zone), labor requirements can be reduced from 2,244 hours to 1,685 hours by using oxen and improved plows, thereby permitting cultivation to increase from 6 acres to slightly over 8 acres. From the model farm budget tables contained in the Adelhelm and Schmidt report, one can calculate the additional net farm income associated with the increased cultivation making allowances for the purchase price of the oxen, plow, and harness; grazing requirements of the oxen; and the opportunity cost of labor. The calculations are summarized here to indicate the range of potential benefits which might arise from the pilot activities. The Adelhelm and Schmidt data show that with oxen net farm income increases from K. Sh. 2,032 on 6 cultivated acres to K. Sh. 2,363 on 8.25 cultivated acres, or a 16 percent increase. The pilot activity will examine the potential economic benefits derived from the increased use of oxen cultivation along with estimates of the range of potential soil conservation benefits.

The costs associated with this component are reasonable for the testing/demonstration/training program. Sufficient inputs have been provided to insure that the necessary (but not excessive) level of testing can be carried out and that identified technologies can be disseminated to the smallholder farmers in Kitui District. Success of this component is a necessary pre-condition for a major district wide (perhaps multi-district) soil and water conservation program funded under a follow-on AID project or under other donor projects. At that stage the economic return to specific soil and water conservation technologies must be fully assessed based on the experiences of the pilot activity.

(b) Beneficiaries. The direct beneficiaries of this component are the soil conservation technicians trained under the project. The intended beneficiaries are the smallholder farmers who eventually adopt the soil and water conservation technologies and the tillage implements being tested under this component. Training of soil conservation technicians helps to assure that technologies will be disseminated. The inputs included in this component, combined with the district level planning assistance provided under Component 1, will significantly increase the likelihood that soil conservation technologies will be developed and selected which optimize the adoption rate (spread effect), the economic benefits, and the response to local needs.

(c) Recurrent Costs. In the 1979-1983 Development Plan the GOK has earmarked over $16 million during the plan period specifically for soil and water conservation works, mostly in the ASALs. While there are recurrent costs associated with this component, mostly in the form of additional soil conservation staff hired, the real recurrent cost question concerns follow-on activities. The testing/demonstration component has been designed to develop technologies and delivery systems which can be implemented on a wide-scale with the

minimum recurrent cost requirements and within the budget allocations earmarked in the Plan. The expansion of soil and water conservation activities in ASAL areas does not represent an unplanned or unbudgeted activitiy for the GOK but rather is consistent with the policy, programs, and budgets detailed in the Development Plan, reflected in the 1979/80 Budget, and outlined in the ASAL Framework Document.

ANNEX H

# SOCIAL SOUNDNESS ANALYSIS

## 1. Overview of the ASALs

Approximately eighty-two percent of Kenya's total land area is classified as arid or semi-arid, and its inhabitants account for an estimated sixteen and one-half percent of the nation's 1979 population. According to the classification system used by the GOK,[1/] ASAL is comprised of:

Zone IV: Semi-arid with a moisture index of 30-42 and a mean annual rainfall generally between 500-800 mm.

Zone V: Arid, with a moisture index of 42-51 and mean annual rainfall usually between 300-500 mm.

Zone VI: Very arid, with a moisture index of 51-57 and a mean annual rainfall around 200-350.

Zone IV contains 10 percent of Kenya's total land mass; Zone V, 49 percent; and Zone VI, 23 percent.

The ecological zones cut across district boundaries, although some districts are entirely or almost completely arid/or semi-arid. Map 1 shows districts with arid and/or semi-arid land, and reveals that in the northern and eastern sections of the country over 50 percent of the land falls within the ASAL zones.

Estimates of the 1979 population of the arid and semi-arid land in each of the ASAL districts show 512,000 in category A districts; 712,000 in category B districts; 1,018,000 in category C districts. The ASAL population is heterogeneous in terms of land use as well as ethnic composition. One finds nomads, semi-sedentary pastoralists, mixed pastoralists (pastoralists engaged in some mixed farming), ranchers and cultivators. The major ethnic groups in the ASALs (over 50,000 persons reside there) are Kamba, Turkana, Somali, Kikuyu, Embu, Meru, Mijikenda, Taita, Tugen/Cheranganyi, Elgeyo and Marakwet.

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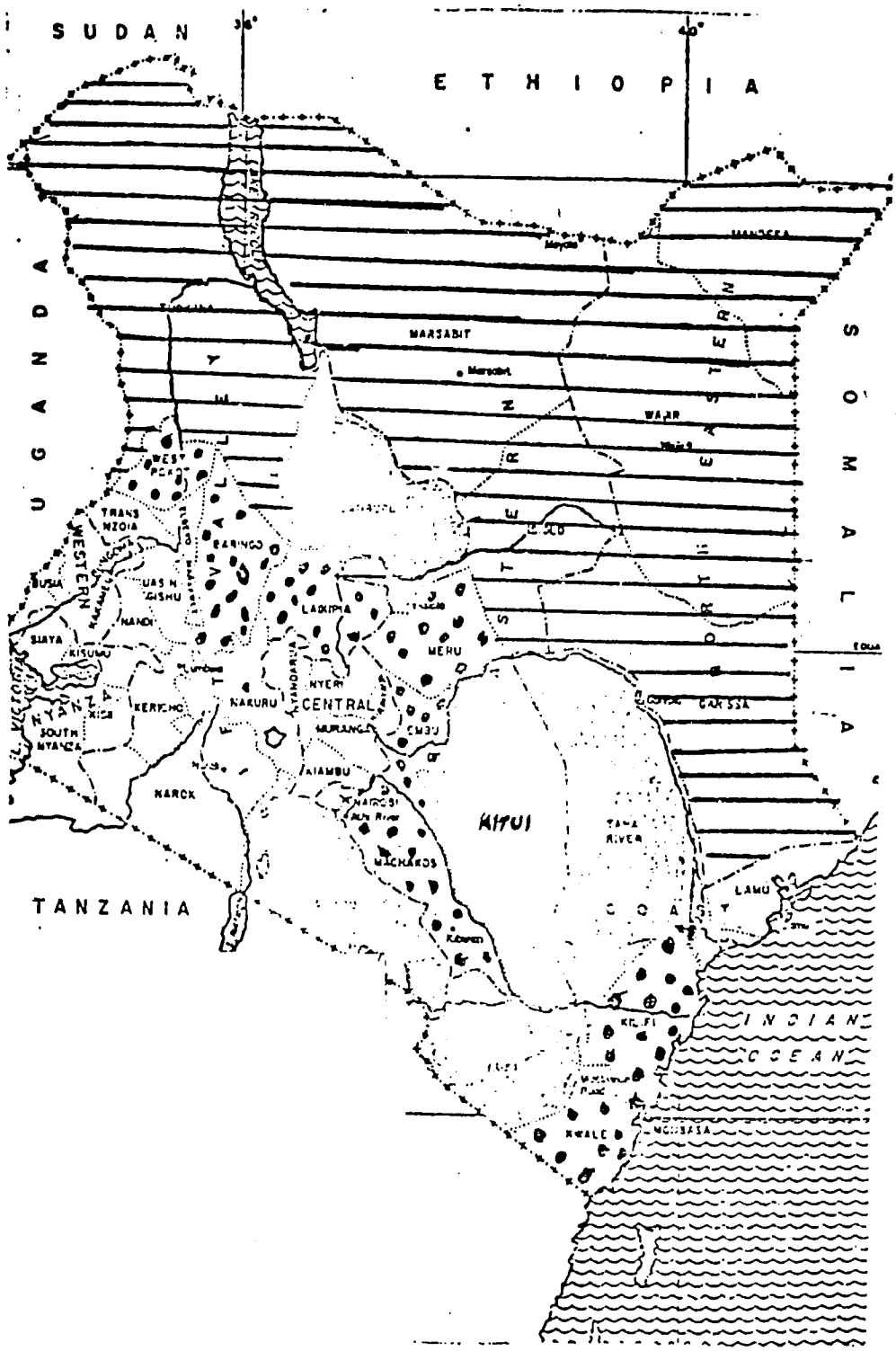
1/ This classification system is based only on monthly rainfall and evaporation rates. The GOK is currently re-evaluating its land classification system, and definitions of arid and semi-arid lands are likely to be further detailed.

MAP 1. ASAL Districts, Kenya




Category A: Completely or nearly completely in Zones V and VI.

Category B: More than 85% of the land in Zones IV, V, and VI.

Category C: More than 50% of the land in Zones IV and V.

Some ASAL areas are undergoing extremely high population growth rates because of: (a) migration from high potential zones undergoing population pressure; (b) internal movement within arid or semi-arid areas due to the carrying capacities being reached or exceeded; (c) establishment of settlement or irrigation schemes; and (d) sub-division of large scale farms. The demand for cultivation and grazing land contributes to illegal settlement (squatting), one type of which is found on special reserves of state land and on the margins of game parks; of land owned by pastoral tribes; and of large-scale ranches and farms in the ASAL.2/

Migrants often apply technologies inappropriate to their newly acquired land, leading to further deterioration of the fragile ecosystem. Land devastation, declining crop yields and deteriorating farm systems diminish the quality and quantity of food produced. Furthermore, some traditional adaptive mechanisms, such as migration with herds and shifting cultivation, are impeded by the increased human population and land tenure reform. Off-farm employment is one of the ways by which many families bridge the perennial food shortages.

Drought is common in the ASALs. Technologies and practices employed affect the extent to which low levels of rainfall and evaporation rates impact on crop yields. Regional drought in the ASALs, lasting one or two seasons, can be expected to impact on local maize growers once every three or four years, and on Katumani (drought resistant) maize growers once every eight years. Millet, which is more resistant to drought than local maize, fails on an average of once in five years in areas like northern Kitui.3/

ASAL inhabitants live in a dynamic and fluid environment which incorporates complex values, beliefs and adjustment mechanisms to stress conditions. People view their economic functions as complementary to social ones, since survival in such a harsh environment depends at least partially on traditional social insurance systems. For nomads this entails communal rights to limited resources

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2/ P. Mbithi and C. Barnes, The Spontaneous Settlement Problem in Kenya, Nairobi, 1975

3/ P. M. Mbithi and B. Wisner, "Drought and Famine in Kenya", IDS Discussion Paper No. 144, Nairobi, 1972, pp. 4, 8.

such as salt licks, watering places and grazing land. Among agriculturalists the social system includes common rights to drinking water sites, cooperative work parties, and irrigation water taboos. Many practices are "hedges" against drought, such as intercropping, crop and livestock mixtures, and cattle camps. A study conducted by B. Wisner in Eastern Province among average and poor farmers identified adjustments to drought practiced by half or more of the sample. While the repertoire of drought adjustment is narrow, it spans the full range of functional types of practices. Information is not available, however, on the extent to which these adjustments are used, e.g., only one small plot may be devoted to a drought resistant crop.

TOP TEN ADJUSTMENTS TO DROUGHT IN EASTERN KENYA BY FUNCTIONAL TYPE

| Desired Result/Type | Adjustment | % Practicing |
|---|---|---|
| Affect or know rainfall source | Pray | 93 |
| Increase moisture | Plant before 1st rain | 80 |
| | Plant dry | 71 |
| | Plant with 1st rain | 59 |
| Reduce moisture need | Plant drought resistant crops | 72 |
| | Weed more | 64 |
| Diversify | Seek wage work nearby | 60 |
| Distribute or share loss | Ask help from kinsman | 66 |
| Bear the loss | Buy food | 96 |
| | Sell cattle | 53 |

Source: B. Wisner, "The Human Ecology of Drought in Eastern Kenya", Ph.D. dissertation, Clark University, 1977, p. 122.

There are some possible contradictions among the top ten adjustments. The five agronomic adjustments demand an increase in labor. Family labor is relatively constant and poor farmers usually do not have enough spare cash to hire labor. Even the use of communal working parties usually requires provision of food and drink for participants. It is also important to note that laborers are likely to be living and working at a caloric deficit during this period.4/

The choice of possible adjustments to drought involves constraints, as shown in the following table based on research by B. Wisner. He found that social inappropriateness is relatively unimportant in comparison with the more extreme environmental and economic circumstances and perceived infeasibility; the latter seems

4/ B. Wisner, "The Human Ecology of Drought in Eastern Kenya", Ph.D. disseration, Clark University, 1977, p. 122.

associated with measures that require contact with bureaucratic institutions concerning credit or marketing and the government.

CONSTRAINTS ON CHOICE OF ADJUSTMENT

| Adjustment | Per Cent Used (a) | Per Cent Positively Evaluated (b) | (b-a) | Type of Primary Constraint |
|---|---|---|---|---|
| Irrigate | 16 | 67 | 51 | Environment |
| Loan | 15 | 57 | 42 | Feasibility |
| Government help | 21 | 62 | 41 | Feasibility |
| Coop help | 14 | 51 | 37 | Feasibility |
| Farm low, wet places | 48 | 74 | 26 | Environment |
| Move cattle | 36 | 59 | 23 | Economic |
| Dig ridges | 33 | 53 | 20 | Environment |
| Seek wage afar | 40 | 55 | 15 | Economic |
| Sell cattle | 53 | 68 | 15 | Economic |
| Hunt for fish | 26 | 40 | 14 | Environment |
| Seek wage nearby | 60 | 74 | 14 | Economic |
| Send child to kinsman | 17 | 27 | 10 | Social |
| Collect bush food | 36 | 46 | 10 | Environment |
| Weed more | 64 | 74 | 10 | Economic |
| Move to kinsman's farm | 47 | 55 | 8 | Social |
| Kin help | 66 | 74 | 8 | Social |
| Drought-resistant crop | 72 | 78 | 6 | Economic |

Source: B. Wisner, op. cit., p. 127.

The degree of suffering during drought is manifest by the level of human malnutrition and in the depletion of livestock herds. In two arid sites B. Wisner found 30 percent of the children under three years old measured 70 percent or less of the standard weight for their age group. In comparison, in three semi-arid sites, 18 percent of the children were in this category. A standard measure of 70 percent or below indicates moderate to severe protein energy malnutrition (PEM). Some of this malnutrition is caused by forced selling or death of milk cows, which results in reduced herd size. Also there is a high death rate among calves, 2 out of 3 compared to a normal 1 out of 4. It takes several years, especially for poorer households, to rebuild their herds. Even during non-drought periods a significant level of PEM is found in Eastern Province children, as shown in the table below:

| | Eastern Province* | | National Average | |
|---|---|---|---|---|
| | 1977 | 1978 | 1977 | 1978** |
| Weight-Age less than 80% | 41 | 26 | 33 | 23 |
| Height-Age less than 90% | 38 | 29 | 29 | 21 |
| Weight-Height less than 90% | 32 | 28 | 29 | 26 |

*Sample does not include Isiolo and Marsabit Districts.
**Preliminary findings.

Source: Integrated Rural Survey, Central Bureau of Statistics, Ministry of Economic Planning and Community Affairs, GOK.

In an ethnic breakdown of the 1977 data, 45 percent of the Kamba children in Machakos and Kitui districts had a height to age measure below 90 percent of the standard, indicating a significant degree of long-term malnutrition. The differences between the 1977 and 1978 studies may be attributable to enlargement of the sample to include children 6 to 60 months whereas the earlier study covered ages 12 to 48 months. Also, during the 19 months between the study periods, Eastern Province experienced exceptionally good rains.

Off-farm income generating activities vary among households, according to the seasons, and regionally. The livestock herders in the arid zones of northern Kenya have little opportunity to diversify and seek seasonal or semi-permanent jobs. Few opportunities exist within their areas, and lack of education and social network ties outside the region prevent migration in search of work. In other ASAL regions access to non-farm employment is an extremely important supplement to farm income especially for poorer households. Research conducted by Diana Hunt in Mbere Division, Embu District, Eastern Province (which is mainly in an arid area) indicates that 70 percent of the adult men and women engaged in off-farm income producing activities at certain times of the year, while the other adult men had full-time off-farm occupations, two-thirds of which were outside the division.5/ Casual income generating activities include collecting and selling firewood and thatching grass, and making and selling charcoal, both of which have a detrimental effect on the environment. Hunt's study of household incomes (excluding remittances) showed that in a 12 month period. 58 percent of the total income was obtained in kind and 42 percent in cash. Thirty-seven percent of the total income was derived from activities other than crop and livestock. Furthermore, half of the families' income was spent on food.

Baed on an analysis of the responses of relatively poor and

5/ Diana Hunt, "Growth versus Equity: An Examination of the Distribution of Economic Status and Opportunity in Mbere, Eastern Kenya", IDS Occasional Paper No. 11, Nairobi, 1975, and "Resource Use in a Medium Potential Area: The Mbere Rural Economy", IDS Working Paper No. 180, Nairobi, 1975.

relatively wealthy farmers to agricultural and livestock innovations recommended by the government extension service, Hunt concluded that only the relatively wealthy farmers can be expected to supply the necessary resources for, and carry the risks of, innovations. The recommended practices studied included planting of Katumani maize (combined with use of fertilizer and spraying), Mexican 142 pea beans, pigeon peas, castor, green grams and cotton; planting all crops early and in pure stand; cultivating crops intensively; using artificial insemination for cattle; and dipping cattle once a week. Hunt showed that most of the recommended innovations are vulnerable to weather conditions so that a farmer adopting these on a permanent basis must have sufficient resources to enable the farm family to survive periodic failures. Many farmers had tried some of the practices but had discontinued them. Hunt suggested that poorer households in areas such as Mbere are characterized by having access to as much land as they can cultivate (prior to land adjudication), often relatively little labor and no capital. (The labor shortage may be the result of the opportunity to earn a steady and higher income from off-farm employment.) In comparison, the rich households have access to as much land as they want (prior to land adjudication), an ample adult labor force, and access to working capital for purchase of inputs and hire of additional labor.

From the data presented, it is apparent that access to seasonal off-farm employment contributes significantly to the maintenance of families; malnutrition can be significantly high among children and probably adults thus affecting efficiency and performance; many so-called solutions for the ASALs in reality involve such risk and sometimes labor inputs that the poorer farmers are unable to adopt them; farmers tend to be positively disposed to various drought adjustments but environmental and economic factors and perception of infeasibility restrict them. Overall, social constraints play a minor role in people's degree of willingness to innovate in order to meet their basic needs.

## II. Kitui District

### A. Socio-Cultural Feasibility

1. Demographic Features. The district is composed almost entirely of Kamba, a Bantu-speaking group, who combine agricultural production with livestock raising. The population distribution is influenced by several physical factors, most significantly the availability of surface water, soil fertility and rainfall. The highest concentration of population (based on 1979 census data) is in the relatively well-endowed highlands of Central Division, where the density reaches 242 persons per square km. in some areas, although the divisional average is 42, mainly because portions of Yatta and Yatta B2 locations are under ranching schemes. Central Division accounts for about 33 percent of the district's population,

but only 8 percent of its land area. A further 40 percent of the district's population inhabits Northern Division which contains about 30 percent of the district's land. In the latter division, population densities vary from 3 to 200, with an overall average of 15. A shift in distribution toward Central Division may be revealed in the forthcoming 1979 census and certainly an increase in population densities may be expected.

The 1969 census recorded a total district population of 342,953. Based on a national growth rate of 3.5 percent compounded annually, the district is projected to contain 446,000 in 1978. Figured on the same basis, the 1983 population is projected to be 530,000.[6]

The district's age composition in 1969 was:

| | |
|---|---|
| Under 5 years | 19% |
| Under 15 years | 48% |
| 15 - 60 | 45% |
| over 60 | 7% |

The dependency ratio (dependents are those under 15 years and those 60 and over) was 120. The dependency ratio, calculated on the basis of the above formula should be regarded cautiously since children between 7 - 15 usually contribute to the support of the household and people 60 and over often assist as well. At the same time, with increased access to education (sometimes at boarding schools) children and teenagers are becoming more of an economic burden because they contribute less to family labor and require more expenditure on education. (The section on women contains information on education levels.)

The availability of farm family labor is also affected by the significantly high rate at which males migrate to seek work or, to a lesser extent, further educational opportunities, mainly in Mombasa and Nairobi. The sex ratio, i.e., the number of males per 100 females, is 89 for Kitui District. The imbalance of males to females is particularly high in the critical age range of 20 - 49 years, as shown in the table below.

SEX RATIO MALE TO FEMALE BY AGE GROUP: KITUI DISTRICT

| Age: | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-39 | 40-49 | 50-59 | Over 60 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sex Ratio: | 101 | 102 | 107 | 97 | 69 | 58 | 67 | 75 | 87 | 100 |

Source: Kenya Census, 1969, Vol. 1, p. 118.

6/ Steven Fettner, et al., Planning Criteria for Rural Health Services, Nairobi, October 1978, p. 14, 18.

Data for the average size of household vary significantly. A study conducted in one site of Central Division found an average of 6.9 persons per household.7/ Another study carried out in two sites in Southern Division found an average of 6.3 people per household.8/ The Pre-Investment Study, aggregating information from numerous sites in both Kitui and Machakos districts, revealed farm families averaged 9.5 people, although half of the households had eight or less members. The latter study used the same definition of household as did the Central Division study.

2. Organization, Structure and Leadership. Akamba society is not rigid or highly structured. Traditionally it never had a centralized political organization. The basic unit was the homestead, a self governing entity with the male household head (the senior man) having control over its members. At the community level, maintenance of order and resolution of conflict was vested in an elders council and an inner council, which contained members of the two highest age-grades. These councils acted as arbitrators and decision-makers in community affairs.

The community was based on locality rather than kinship bonds. Members could be from more than one lineage or even clan. The kinship system, however, was important in dilineating responsibilities, rights and obligations. Rules of patriliny and patrilocality operated.

Customary work parties, all forms of which still function, provided mutual aid. These organizations, explained below, are claimed as the origin of modern self-help groups.9/

a. Mwilaso - a rotating work-group of usually two or three people, although in the past members numbered up to ten. Participants are friends, usually of the same age/sex category, but are not bound by kinship ties. Work is carried out on a reciprocal basis. This type of group is not common now.

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7/ Based on questionnaires from CARE-Kenya Survey carried out in Katothya, Kitui District. Grateful acknowledgement is extended to Martha Whiting, CARE-Kenya and Abigail Krystall, Bureau of Educational Research, Kenyatta College, for access to these.

8/ J.H. Munyao, et al., "Kitui Primary Health Care Program", Department of Community Health, University of Nairobi, August, 1976, p. 2.

9/ The following is based primarily on Martin J.D. Hill, "Self-help in Education and Development: A Social Anthropological Study in Kitui Kenya", Bureau of Educational Research Staff Paper, Nairobi, 1974.

b. Nduu - A small work-group of three to seven persons who are called by a friend to perform a task, for which food is usually given. Reciprocity is implied. This work-party has no permanent membership.

c. Mwethya - The entire neighborhood or part of it called to work. Women, men, boys or girls participate. Groups are often organized on a co-residential basis and are more formal than mwilaso and nduu.

Mwethya is closely intertwined with the social structure since it is based on co-residency which entails multi-complex relations between those living within a fairly well defined boundary. Furthermore, it is reinforced by sanctions, including implied reciprocity. Any member may call mwethya to work, and he or she provides the participants food and drink. (It is not payment since the amount given is not in direct relation to the work performed.) A 1973-74 study conducted in Central Division found that mwethya averaged 13 members, most often women. Only one-third of all households studied had used mwethya, though all worked for mwethya, except for a few progressives, idlers, isolates and those who worked only for cash. Among households not using mwethya several did not have sufficient food and cash to feed the group and others did not require this additional labor input.

Presently mwethya is undergoing changes due to stratification within society, technological innovations, and the idea-systems which accompany them. Adoption of modern agricultural methods, the value of maximizing labor efficiency, and calculation of labor and food in monetary terms may result in hired casual labor being cheaper and more effective than mwethya. In fact, the number of mwethya is said to be decreasing. Except where the administrative village coincides with mwethya, the solidarity of the neighborhood is weak, and mwethya is actually becoming work parties of selected friends and neighbors, with the sanctions of friendship. Another modification is mwethya working for cash in lieu of food for someone who is not usually a member of their group. Martin Hill claims that in spite of its decreasing use and modifications in function and membership that:

> Women's mwethya will however, continue as long as male labor-migration and children's education have left them the only segment of the population not otherwise employed. Traditional female solidarity is further re-inforced by the sharing of new responsibilities and difficulties forced on them by these factors.10/

Since mwethya is the main basis of village self-help groups, it is important to understand the shift from communal parties performing agricultural and other economic tasks to their working on modern development projects. Basically, the shift resulted from a reform in colonial policy of forced labor. Communal labor forced to

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10/ Ibid., p. 3.

work within the location on tasks designated by the chief or other government officers was a common feature during the colonial period. Until the late 1940s, the tasks were usually constructing and maintaining access roads, working on chiefs' camps and clearing bush. After World War II work centered on water supplies, schools, health facilities and soil conservation. The forced labor, which sometimes resulted in deaths, was hated by the people. As a result of politics in Kitui the government made concessions. Some of the lesser communal tasks were abolished, and dam work was paid for, usually by providing food to the workers and placing money into the Locational Development Fund administered by the chief. Soil conservation was still to be carried out by communal labor if paid labor was unobtainable. These measures were not fully implemented and communal forced labor continued until 1960. After that time, work on dams, schools and dispensaries was deemed the responsibility of self-help groups. The self-help group idea, the motto of community development work after 1946 in Kenya, was advocated in Kitui in the late 1950s by a Kitui Kamba appointed as Community Development Officer (CDO).11/He encouraged self-help groups to become involved in community projects by donating labor, and also to participate in activities such as women's groups and adult literacy classes. Although groups were set up in most of the district, by 1960 political opposition halted them: the distinction between self-help labor inputs and forced labor was unclear. Even though self-help labor was to be voluntary, in fact chiefs often made it compulsory, which eventually led to an outright strike or boycott of work.

After independence, with President Kenyatta's emphasis on self-help efforts, the community development staff began reviving self-help groups. Each had an elected committee usually of 12 members with chiefs and sub-chiefs as ex-officio members. A new set of sanctions was introduced: if one failed to work, a fine of Shs. 2/- was imposed, and if it was not paid, one's property (for example, a chicken) was confiscated. Money went into the group treasury.

Ideally, the self-help group elects its own committee, chooses its own projects, decides on money to collect and applies sanctions. In fact, projects are sometimes conceived and initiated by aspiring politicians or district administrators. Of course, to maintain momentum local support has to be gained. Self-help groups provide unskilled labor usually during the dry season and are the basis for collecting the amount of money decided on by the project committee. A flat rate fee is imposed on the community to obtain money for the project.

11/ It is interesting to note that the U.S. financed his salary,

About 2,000 self-help groups are registered in Kitui District, with a smaller number of groups active at any given time. Their activities span a wide-range, from constructing wells and dams to building dispensaries. While the work groups are primarily composed of women, leadership at the local level contains both men and women. Self-help leadership is a political asset and an inevitable step for aspiring middle-level leaders. Leadership is highly competitive since it is seen as bringing rewards, both tangible and intangible.

Self-help activities have played a significant role in Kenya's development. In poor areas like Kitui, however, the people do not have large financial resources to contribute to projects nor much influence to draw large donations from outsiders. Presently, some Rural Development Funds, made available from the Ministry of Economic Planning and Community Affairs to the District Development Committee, are used to provide material support for self-help activities.

With regard to intra-district equity, self-help projects benefit most those who are able to use them, that is, the more progressive inhabitants. Many of these people are also project leaders who probably make an extra contribution in terms of stimuli and organization. The poorer members of society continue to give labor and cash to self-help efforts, which is an indication that they perceive themselves or their families as beneficiaries of the activities.

Self-help groups, working about three days a week approximately two months during the dry season, have been carrying out soil and water conservation work. Recently through the Rural Development Fund and CARE-Kenya, tools were purchased to distribute to some of these groups. Also, money was allocated from the Rural Development Fund to pay laborers in economically depressed areas. The group received payment for three days work a week and individuals were paid for any additional work. Payment for this type of work has stopped however, due to limited funds.

The project design team has studied the position of self-help groups with regard to their providing labor for the soil and water conservation component of the project. While it is not desirable to disrupt the traditional system of donation of labor to such activities, a year-round labor force will not be forthcoming without a cash incentive. The method of payment used under the Rural Development Fund has not been subject to an evaluation, but it also may not be desirable when sustained labor inputs are required. In any event, payment to the group rather than individuals may have a negative impact in the long term since, in principle, self-help labor is a contribution toward a development activity which has been identified and selected by the participants. A simple method of recruiting and paying individual laborers through contractors may be more sound,

although this might discourage self-help groups in on-project areas from continuing soil and water conservation activities. Further investigation concerning the recruitment of labor to carry out soil and water conservation activities without adversely affecting the self-help groups will be the responsibility of a sociologist who will base his/her recommendations on experiences in Machakos District as well as on information obtained in Kitui District.

3. Local Participation. As explained above, local participation in planning and implementation occurs in the self-help group activities. Local participation is also a guiding principle in the GOK's effort to decentralize planning. District Development Committees (DDCs) consist of district level GOK officers, members of Parliament, representatives of the County Council and other key district organizations, and other residents. The DDC is charged with district planning, reviewing the implementation of activities of the various ministries, and allocating Rural Development Funds. There are also divisional level and sometimes locational level development committees composed of GOK staff, chiefs, or sub-chiefs and local inhabitants. The effectiveness of these lower-level committees varies from place to place.

4. Land Tenure and Use. Formerly, when land was abundant in Kitui District, most sons would leave their father's household to establish their own on unoccupied lands. The youngest son, however, usually remained to inherit his father's land. Although all brothers had rights to their father's land, they usually did not exercise them. As land became scarcer, acquisition of new land was obtained by asking the "owner" for permission to settle, cultivate or both. The "price" for obtaining such rights was usually a goat, well within the means of everyone. Once a person established rights, he could not be evicted. If a person died in a homestead, a new one had to be located, though the previous one remained part of the family patriliny. Land once cultivated could always be claimed by the descendants of the original clearer of the land.

Although all land had specific claimants, livestock could be grazed on other people's land. This meant that a man who held little land could still have a large herd since he had access to other people's land for grazing. No private rights to water existed, although improvements made by an individual such as construction of a dam established rights for that person.

In more recent times, settlement and farming have been established in the western portion of the district. Population pressure as well as seasonal variations have led to keeping some animals near the homestead and sending the rest to the designated Eastern State Lands for grazing, returning only during the dry season when eastern water sources dry up.

Selling of land was stimulated during the 1969-1974 drought. Some poorer families were compelled to sell land in order to buy food, pay school fees and so forth. A 1974 study in Kanduti sub-location of Central Division provides some examples. The earliest and largest land buyer was a grain speculator who sold goods from his shop on credit to landowners (or essentially exchanged his goods for their land). In 1975, he sold 2,000 acres to elite persons from outside the location reaping a profit of 5,234 percent over 5 years. Another buyer from outside the location paid in food primarily from his shop, and goats when the price of the latter was low. Land buying has impacted on land use as well as land holding. Land is being purchased by outsiders who almost always obtain the relatively better agricultural land, even though many intend to use it for livestock production. Some sellers are slowly being pushed onto the poorer land formerly used only for grazing.13/

Since 1969/70 the district has been undergoing land adjudication. The process, begun in Central and Northern divisions, has resulted in 44,934 hectares being adjudicated as of June 1978. The number of cases contested appears to be "average" or not unreasonable.14/ For example, in April 1979, sixteen cases were filed for hearing by the local arbitration committees, and eight for the Arbitration Board.

Land tenure reform is a Kenya Government policy, the basis of which was established during the last decade of the colonial era. It involves three stages: (a) ascertainment of individual or group rights amounting to "ownership" over land within an area (adjudication), (b) aggregation of fragments into single units (consolidation) and (c) registration of units. Land reform is based on the premise that the traditional African land tenure system is inimical to proper land use and agricultural development because the structure of access to use rights encourages fragmentation thus diminishing returns to labor and time, and is conducive to incessant disputes thus causing a disincentive to long-term capital investment. It is assumed that individual proprietorship, giving security in possession, will generate industry and enterprise and enable farm planning. Land titles can be freely transferable or chargeable as security for credit.

Studies on the impact of land reform undertaken in areas

13/ G. Mutiso, "Kanduti: A Case Study", Working Paper No. 307, Institute for Development Studies, Nairobi, October 1977.

14/ Interview, Assistant Land Adjudication Officer, Kitui District, May 1979.

where this process began earlier than in Kitui District reveal that the results are not always as predicted. Farm credit and similar resource flows to agriculture have not occurred to the extent envisaged. Title deeds, while necessary, are not deemed sufficient for acquisition of bank and state institution loans. Secondly, agricultural land is being used to secure loans for commercial and other non-farm enterprises. The socio-political impact of tenure reform has been that:

> the narrow view taken of land rights made it virtually impossible to bring to the register all the multiple rights claimable under customary law ... Those who were most directly affected were people, such as women and children, both of whom had actual or potential rights of access to the use of the land, but were without the power of ultimate control over it.15/

Furthermore, since the new system confers powers only on registered holders, the effect is to create potential landlessness. The system limits the number of co-heirs to any parcel of land to five, and gives administrators and parastatal bodies power to control subdivision of land if the result would be to create units of sub-economic size. In actuality, this is largely ignored, and heirs divide land according to traditional laws. This is mainly farmers' perceptions of the nature of land rights and the power derived from these have not changed significantly except for the physical reality of the land adjudication process. The Land Control Boards which are responsible for granting consent to dispose registered land tend to ensure that traditional access rights and responsibilities are maintained. As a result, Okoth-Ogendo maintains, development of a land market has failed to materialize on any significant scale.16/

Other researchers such as J. Harmsworth, however, have found an active land market which often takes place outside the government structure. J. Harmsworth reports that many land transfers occur which are not registered. Furthermore, poorer people who are unaware of their rights do not consult the Land Control Board to bring grievances against a family member for selling land which they have rights to use.17/

The impact of land adjudication in Kitui District may differ somewhat from that in other districts, because the maps supplied

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15/ H.W.O. Okoth-Ogendo, "African Land Tenure Reform", in J. Heyer et al., Agricultural Development in Kenya, Nairobi, 1976

16/ Ibid., p. 174

17/ Personal Communication, June 6, 1979.

under the project will provide greater accuracy in determining boundaries. It is assumed that social network ties and custom will prevail so that access to key watering points will not be cut-off to neighbors by the owner of the land. Possession of title deeds will open up access to loans since these documents are necessary, though not sufficient, for obtaining loans. Also, land adjudication is considered a prerequisite to implementation of on-farm soil and water conservation measures, requiring a significant investment in labor. Land registration in itself is not expected to accelerate land selling since land tenure reform may substitute a new system for a traditional one under which permanent land transfers took place. To increase people's knowledge of their rights under the new system,however, an informational campaign should be initiated. This could be channeled through existing extension agents.

Except for the relatively highly populated areas in Kitui District, agricultural production has generally not been limited by land but by the availability of labor. In Central Division, with the highest population density, about one half of the farms are under 5 acres, one-fourth from 5 to 15 acres, and an additional one-fourth over 15 acres.18/ The average farm size is larger in the poorer ecological zones of the district. Most families rely on household labor sometimes supplemented by communal work parties. The main tools used are the digo jembe (a heavy, wide-bladed, hoe-like implement used for land preparation and deep cultivation) and the panga (a long, wide-bladed knife or machete). About 60 percent of the farmers have their land ploughed by oxen, although only 26 percent own ploughs.19/ Research on bean production in Central Division points out that a shortage of labor for seedbed preparation is one of the most significant constraints to expansion of bean cultivation, and recommends improved access to ox-ploughs to overcome this bottleneck. Through this project, availability of improved tillage implements as well as hand tools will increase labor efficiency and allow for expansion of crop acreage.

5. Health and Nutrition. Level of health and nutrition is closely related to productivity. Moreover, level of nutrition correlates with degree of poverty and access to appropriate foods and education.

Studies conducted in Kitui reveal that diseases associated with lack of potable water are the most common. Research in a

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18/ Siegfried Schonherr and Erastus Mbugua, "Bean Production in Kenya's Central and Eastern Provinces", IDS Occasional Paper No. 23, Nairobi 1976, p. 34.

19/ Pre-Investment Study, Report No. 2, p. 81.

Central Division site revealed that during the previous week 22 percent of the households reported at least one member having scabies or other skin or scalp problems.20/ In a Southern Division study, this type of ailment was found to be the most common problem among adults (56 percent of the complaints) and was also prevalent among children under 5 years.21/ Stomach problems or diarrhea had inflicted at least one household member during the previous week in 46 percent of the households in the Central Division study. The occurrence of these problems was reported to be less in the research conducted in Southern Division. The latter study which was more comprehensive on health matters than the former, found chronic cough the second most common ailment in children both under and over five. Fever was the most common ailment among children under five.

Data from these field surveys tend to support information gathered at district health units concerning outpatient illnesses, although the rank order is not the same. Outpatients are most commonly treated for malaria, diseases of the skin (including ulcers), acute respiratory infections, and diarrheal diseases. These four health problems account for approximately 53 percent of the cases, of which malaria constitutes almost half.22/

Food utilization was assessed in the Southern Division study during August-Spetember 1977, a dry season that followed a relatively good rainy season. Respondents from two sites were asked to name the type of food and frequency by which it was eaten during the previous day. The only significant difference found between the two study sites was in the use of fats/oils: the mean frequency rate per household per day was 1.04 compared with 0.30, the former being a site 3-5 kms. away from a hospital where cooking oil was provided at clinics for undernourished children. The information reveals that households tend to have only two meals per day, consisting primarily of cereals and legumes. Milk is seldom consumed and animal protein is rarely served.

Food given to children under 5 years was the same in the two sites, except that fats/oils were higher in the site closest to the hospital. Breast milk was given to children in the youngest age groups. Millet and sorghum were served, usually three times a day, accompanied by legumes, mainly cow peas, at least once a day.

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20/ CARE-Kenya Study, op. cit.

21/ J.H. Munyao, et al., "Kitui Primary Health Care Programme", Dept. of Community Health, University of Nairobi, August 1976.

22/ Pre-Investment Study, Report No. 7, p. 234-237, January-June statistics.

Sometimes fruits, mainly wild ones, were added to a porridge or eaten alone.

Data concerning the nutritional status of children indicate a prevalence of mild to moderate cases of Protein Energy Malnutrition (PEM). PEM in dramatic form causes kwashiokor, marasmus and combinations of the two. Moderate PEM reduces resistance to disease and infection which further lowers nutritional status. The Southern Kitui study revealed that 30 percent of the children measured 60-80 percent standard weight. However, the study found no cases of kwashiokor or marasmus. Children underweight were mainly those over 12 months old. This is partially the result of continuing breast feeding, often for two years or longer, without providing the necessary supplemental foods. Mothers may believe breast milk supplies more of the needs of infants over one year than it actually does, or possibly less food is available in households in which nursing continues well past the first year. Both an increase in the availability of food and an educational program are probably required to improve child nutrition.

NUTRITIONAL STATUS OF CHILDREN UNDER 5 YEARS

Kawelu and Kivyuni, Southern Division, Kitui District

| Age Group in Months | Weight 80% Harvard Std. no edema | Weight 60-80% no edema | (Percentage) Weight 60-80% edema + |
|---|---|---|---|
| 0-11 | 17 | 1 | — |
| 12-23 | 14 | 8 | — |
| 24-35 | 13 | 11 | — |
| 36-47 | 17 | 6 | — |
| 48-59 | 9 | 4 | — |
| Total | 70 | 30 | — |

Adopted from J.H. Munyao, op. cit., p. 12.

An earlier nutritional study was carried out in three northern Kitui sites by B. Wisner in 1971 after the areas had undergone a least four seasons of drought, but during which time some famine relief was available. His study shows the existence of a weak association between labor availability within the family farm and nutritional status. Wisner found that nutritional status when related to labor dependency ratio had a 0.2 significance level, that is, twenty percent of the cases seemed to show this association was likely to occur by chance.

NUTRITION STATUS: HIGH VERSUS LOW LABOR DEPENDENCY RATIOS[a/] FOR NORTHERN KITUI

| | Percentage Children Below 80% Threshold (W-H) |
|---|---|
| Children from homes with labor dependency Ratio less than 1 | 35 |
| Children from homes with labor dependency Ratio greater than 1 | 17 |
| Total number households: 47 | |

Adopted from B. Wisner, op. cit., p. 301.

a/ The labor dependency ratio was derived by calculating the labor each family member contributes in terms of "man - equivalents" (ME) on the basis of age. For example, a family composed of one man 65 years old, one adult man and his wife, a 10-year old child and an infant scored: $\frac{1}{2} + 1 + 1 + \frac{1}{2} + 0 = 3$ ME. The ratio of ME to dependants would therefore be 3:2 or 1.5.

Nutrition and health data for Kitui District imply that an overall attack on the sources of poverty and an extensive preventative health care program need to be undertaken to reach the greatest number of poor households. An effort in this direction would emcompass increasing incomes and food production, providing educational information and improving the sanitary environment. The ASAL Development Project will help achieve the objectives by improving crop yields through better soil and water conservation measures, providing access to casual employment, increasing the availability of fruit trees, increasing the amount of land under cultivation and/or reducing labor requirements through the introduction of more appropriate hand tools and tillage equipment. The experts provided under the project will need to keep nutritional considerations in mind. The project includes funds for carrying out feasibility studies on livestock and poultry, labor-intensive rural access roads, seed multiplication and rural water supplies. Furthermore, USAID/Kenya is considering a project proposal concerning nutritional impact and household technologies in Kitui District. This project is designed to help registered women's groups as well as self-help groups, which are composed mainly of women from poorer households. The household technologies focus on food preparation and processing and food and water storage. The proposed project will include an educational component addressing dietary practices. Thus, while this ASAL Development Project includes activities which will improve the health and nutrition of Kitui residents, additional AID projects will expand the scope of the effort.

B. Women in Kitui District

The largest segment of the district's population is women (as detailed in the section on demographic features) and about 59 percent of the farms are operated solely by women.23/ This does not mean however that those women are the major decision-makers on agricultural and other matters, but rather that they assume the day-to-day responsibility for their homestead. The high incidence of male absenteeism, whether husbands or unmarried sons, robs the households of potential labor. No data are available on remittances to the district, but as in other parts of Kenya, it may be assumed that many Kitui migrants regularly send money back to their families, some occasionally do so, and others have virtually abandoned their responsibilities.

Women have been disadvantaged in receiving formal education, thus limiting their employment opportunities primarily to agriculture, trading and other informal sector activities. Females do have access to training in a variety of subjects at the Better Living Institute. In 1978, 39 percent of 1,491 attending were women. The table below sets forth categories of participants, subjects taught, numbers of courses held for each group, and the percentage of women participants.

Recruitment of women farmers to attend agricultural courses is extremely good; Kitui probably has one of the best records in Kenya for giving agricultural or related training to women. The data also indicate that women are activly engaged in trading and as leaders of self-help groups, but few are cooperative members and none serve as agricultural extension agents in the district.

The lack of formal education is high among district inhabitants based on the 1969 census. Since the census was taken, however, Kenya has initiated free primary education, so the proportion of both males and females in the younger age group has probably increased substantially. The table below (on education) shows that overall females are less educated than males. The percentage of both males and females having no education, however, is higher in Kitui than the Kenya average. The discrepancy between male and female educational levels increases with age. While young girls may attend primary school, parents are more likely to allocate money to pay secondary school fees for their sons than their daughters. Young girls are also frequently needed to assist with household and farming tasks. Besides, it is perceived that boys are more likely in the long term to lend assistance to the parents and younger children since the daughter leaves her natal homestead upon marriage. Among those girls who do attend secondary school, there is a large drop-out rate due to pregnancy.

23/ Pre-Investment Study, Report No. 2, p. 81.

ATTENDANCE AT THE BETTER LIVING INSTITUTE (1978)

| Group | Subject (s) | Courses | % Women Participants |
|---|---|---|---|
| Women Group Leaders | Leadership | 2 | 100 |
| Farmers | Ox Farming, Water & Soil conservation, Farm Management, 4K Clubs, Family Planning, Better Farming | 10 | 51 |
| 4K Club Members | Agriculture | 2 | 45 |
| Traders | Trading | 1 | 45 |
| Self-help Group Leaders | Leadership | 4 | 40 |
| Teachers, Instructors | Family Planning, 4K Organizations, Nursery Teaching, Better Farming & Soil Conservation | 5 | 37 |
| Interchurch or Catholic Members, Supervisors | Literacy Project Leadership, Literacy Project Organization Development Education, NCCK, Gen. Meeting | 8 | 22 |
| Chiefs, Agric. Staff and Community | Agricultural Development | 1 | 14 |
| Cooperative Members | Loan Policy Communications | 2 | 0 |
| Committee Members (not specified) | Committee Activities | 1 | 0 |
| Clerks | Accounts | 1 | 0 |
| Agricultural Staff | Soil Conservation | 1 | 0 |

Source: Adapted from Better Living Institute, Kitui: Annual Report, 1978, Appendix II.

The Akamba place a high value on marriage, as do other tribes in Kenya. Women join their husband's extended family unit upon marriage. Until bearing a child a woman is supposed to serve as an apprentice to the husband's mother. Usually, after bearing her first child the wife receives a piece of land to cultivate for herself.24/

24/ Leslie C. Redlech, "The Role of Women in the Kamba Household", Dept. of Sociology Occasional Paper, University of Nairobi, Dec. 1971, p. 2.

The Kamba consider a marriage in which there are no children as incomplete. A woman who cannot bear children is not respected by many, while others are sympathetic toward her. If a woman dies shortly after marriage or before becoming pregnant, bridewealth is to be returned. However, if a woman produces children and they all die, bridewealth is not returned when she dies, since it is understood that the marriage was complete, i.e., the woman performed her responsibility. Having no sons is a sign of social incompleteness, whereas having many children including sons has traditionally accorded parents a high social status. Children tend to be regarded as providing social and economic security; they are to take care of the parents when the latter are ill and aged. Traditionally, the belief is held that God determines how many children a woman should have. Such values and beliefs, however, are slowly changing among the young and highly educated.[25/]

PER CENT OF PEOPLE EDUCATED IN KITUI DISTRICT, BY SEX, AGE, AND LEVEL OF EDUCATION, 1979

| Level of Education | Total | | 0-14 | | 15-24 | | 25 and Over | |
|---|---|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female | Male | Female |
| None | 36.60* | 47.46* | 20.97* | 21.17* | 2.87* | 6.39* | 12.76* | 19.90* |
| St. I-IV | 5.49 | 3.38 | 2.79 | 2.13 | 1.79 | 0.94 | 0.91 | 0.30 |
| St. V-VIII | 4.42 | 1.96 | 0.36 | 0.24 | 2.70 | 1.42 | 1.36 | 0.30 |
| Form I, II | 0.39 | 0.15 | ... | .... | 0.22 | 0.09 | 0.17 | 0.06 |
| Form III, IV | 0.13 | 0.03 | .... | .... | 0.07 | 0.03 | 0.06 | 0.01 |
| Form V + | 0.04 | 0.01 | .... | .... | 0.01 | .... | 0.03 | 0.01 |
| Per Cent Interviewed: | 47.06 | 52.98* | 24.12 | 23.54 | 7.66 | 8.86 | 15.29 | 20.58* |

* Denotes above Kenya average.

Source: Henry Remple, "An Analysis of the Information on Inter-District Migration Provided in the 1969 Kenya Census", IDS Discussion Paper 244, Nairobi, 1977, p. 34.

Polygamy has been common, but its frequency is slowly diminishing. In polygamous households the basic unit is a woman and her children, each unit with its houses and gardens. In some cases co-wives do not inhabit the same compound, but are spread over a wide area.

25/ T.B. Kabwegyere "Determinants of Fertility: A discussion of Change in the Family Among the Akamba of Kenya", Dept. of Sociology Staff Seminar No. 19, University of Nairobi, June 1976, p. 3-5.

Women have rights to their husband's land, but not ultimate authority over that which they receive. A polygamous husband usually divides his land among his wives. In principal, each should obtain an equal portion. As the sons mature, they have claim on the land allocated to their mother. If, for example, the first wife has only two sons and the second wife has five, then the latter's sons may appeal to elders at the family, village or clan level to gain some of the land allocated to the sons of the first wife.

If a husband dies before his sons are old enough to establish their own household, the wife maintains the land until they do. Or, if there are no sons, a wife still maintains rights to the land as long as she resides there and does not remarry. A woman loses usufructurary rights to her deceased husband's land if she remarries outside his family or if she leaves the land.

With the current land tenure reform being implemented in Kitui District, some widows have land registered in their names. Also, wealthy women can purchase land in their own names. For the majority of women who are neither widows nor wealthy, however, it results in their not having control over the land, although their traditional rights to use it may by upheld by the Land Control Board if a male member tries to dispose of the land.

Traditionally a woman had no rights to her father's land. Nevertheless, a woman who was separated, divorced, or widowed might return to her natal homestead and, upon consent of her father or brothers, be allocated land, but she could easily be dispossessed of it. A few extraordinary women, however, have successfully been able to appeal their cases to elders to keep the land allotted to them inspite of their brothers' attempts to evict them.26/

The traditional division of labor between men and women has tended to change as women frequently are forced to do male jobs, due to the lack of male labor. Women may be found clearing fields, tending cattle, applying fertilizer and plowing, all tasks which society traditionally places on men. Women also carry out the responsibilities traditionally allocated to them such as planting, hoeing, weeding, and harvesting crops; seed selection, storage and treatment; food processing and preparation; fetching water and firewood; grinding grain; making beer, honey, pottery and baskets; milking cows; and conducting certain rituals.27/ Their work day tends to be about 15 hours.

A study carried out in Katothya, Central Division, located

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26/ Mutiso, op. cit., p. 11-12.

27/ Redlech, op. cit., p. 5-6.

thrity miles from Kitui town provides further information on the allocation of women's time.[28] Prior to the initiation of a water project, women spent an average of five hours each day to walk an average of six kms. to obtain water from rivers and streams. As a result of building a water catchment, the average distance is now 2-3 kms. However, the total time needed to collect water has not decreased, mainly because the time required to wait in line at the single communal water point has increased. During the rainy season when the follow-up study was conducted, women reported making fewer trips for water; it is not known, however, whether or not alternative sources were used.

During the dry season and especially during drought periods, it is not uncommon for women to walk 15 kms. to fetch water. Enterprising women will begin their trek about 3 a.m. in order to reduce the amount of time spent at the water source. Otherwise, when river bottom wells are used, women have to wait for the water level to revitalize after the previous drawer has finished.

The Katothya study also provides information on the amount of time women spend on other tasks. Of course, this varies with the seasons, but for certain tasks it remains relatively constant. On the average women spend at least 5 hours a day collecting water, between 2 to 2 and 3/4 hours cooking, and about 3/4 hour collecting firewood. The women belong to households where an average of 6.9 people live and eat together, and the average farm is 5.7 acres. Virtually all of the women work on maize and millet fields and almost all cultivate sorghum and beans. About half of them also cultivate cow peas. During the agricultural season, women tend to spend 17 hours a week weeding and an average of one hour a day guarding fields from monkeys. The majority of the women care for animals and poultry, which absorbs about eight hours a week. Almost half the women do not market items frequently; the others usually go once a week for an average of five hours. The women also participate in self-help projects, but this is usually limited to the dry season.

Only about one-fourth of the women in the sample reported attending educational programs or meetings held by health, agricultural or community development staff. All of these women attended at least one meeting held by an agricultural officer and many also went to a meeting held by a community development assistant. In response to the question, if you had more time what would you like to do to take care of your homes, farms or children, the most common reply was to improve or extend their farming. Women also tended to emphasize greater participation in groups and improved hygiene of children. Below are a few examples of their responses:

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28/ Martha Whiting and Abigail Krystall, "The Impact of Rural Water Supply Project on Women", Care-Kenya.

"I would terrace my farm and introduce crop-rotation, which my husband has been insisting on for a long time. I would also wash my clothes and the children's more often than I do these days."

"I would plant vegetables and green grams for sale. I would spend more time with my children and wash them more regularly than I nowadays do."

I would be harvesting my green grams and peas in time before they split and scatter all over the garden. I would wash my children's clothes more often."

Also the women spoke of wanting to join groups for joint farm work. One mentioned promoting cooperative farming and having a business which would generate income to enable the members to operate more self-help social projects. The responses reveal awareness about hygiene and a strong desire to improve the standard of living. Ideas and motivation are not lacking, but frequently time and technical knowledge are.

C. Spread Effects: The Diffusion of Innovations

The methods, techniques, tools and equipment that are used under this project are expected to impact positively on people in a significant portion of Kenya's ASALs. The hand tools that are proven successful under the project are likely to be adopted by Kitui farmers. Information about their utility will be obtained from the Kitui cooperative store, agricultural extension agents, neighbors, kin and friends. A small portion of farmers will observe them at the BLI. Also, information on successfully tested tillage equipment and hand tools is expected to be disseminated to similar ecological zones in Eastern Province and beyond. Within the province information will mainly be passed by provincial officers. Since this component will be carried out in close liaison with the Agricultural Engineering Department, University of Nairobi, information will also be channeled through its faculty and students. The most important information to be disseminated concerns how the new tools and equipment differ from those currently in use. This will be contained in published extension materials which will be distributed throughout Kitui District as well as to extension agents in similar ASAL districts. Arrangements could be made with the Ministry of Cooperative Development to distribute the tools and equipment through the Farm Input Supply Scheme (FISS) inside as well as outside of Kitui District, and with the Kenya Farmers Cooperative Union to ASAL districts not served by the FISS. Once a level of awareness is created by the means mentioned above, it can be expected that most farmers will purchase the tillage equipment.

Under the soil and water conservation component, the demonstrations at the BLI will be observed by farmers, church leaders and government staff. It is intended that the practices demonstrated will be replicable in other parts of Kitui District as well as in similar ASAL areas. There is also the likelihood that the recommended techniques will be taught at the Ukamba Agricultural Institute, a combined Machakos and Kitui district training center for young school-leavers being established on a self-help basis.

The certificate level holders to be trained at the BLI in soil and water conservation principles and practices will be drawn primarily from the existing agriculture staff in several ASAL districts. These persons will encourage better soil and water conservation planning as well as adoption of improved practices in the districts where they are posted. The implementation strategy used in Kitui District may not be employed in other districts. Nevertheless, individuals may undertake conservation on their own land and the districts may use existing Rural Development Funds to employ laborers and purchase materials. It is expected that the training will enable the technicians to improve the quality of on-going soil and water conservation measures, and, if the necessary materials and equipment are available, to encourage adoption of new techniques. Care should be taken to ensure access by other districts to materials and equipment needed for implementation of soil and water conservation measures. Data from the Eastern Province study by B. Wisner, mentioned previously, show wide-spread farmer acceptance of certain practices. What is needed is improvement in the quality of existing practices and expansion in the number of techniques.

Other project components call for advisors and the training of Kenyan officers and staff to help the GOK identify, plan and implement viable ASAL projects and programs. These people have a major responsibility for the transfer of knowledge and technologies in the ASALs. The overseas traing will expose participants to new ideas and innovations, some of which are likely to be applicable in the Kenyan ASAL context. Further, certain training will focus on upgrading the skill base of Kenyans to enable them to deal with ASAL problems. Experience gained will be used on the job as well as disseminated informally.

D. Social Consequences and Benefit Incidence

1. Access to Resources and Opportunities. The project goal is to improve the quality of life of rural poor people in the ASALs, especially Kitui District, through soil and water conservation activities, appropriate farm technology and decentralized planning. In Kitui District farmers will receive training in improved and expanded soil and water conservation techniques. Since the work will mainly be carried out on a water catchment basis, all inhabitants

within the area will be able to benefit (although those with larger farms will have more land terraced, than those with smaller plots). Indirect benefits will accrue to those owning land downstream in the form of reduced sedimentation damages and better control of floods. The method of drawing up and approving soil and water conservation work plans (see 4 below) will help to mitigate against work being done that benefits only wealthier and more influential households.

Kitui farmers will have access to improved hand tools and equipment as a direct result of the project. The strategy is aimed at reaching the rural poor. In Phase I, oxen-drawn implements will be tested on a sample of farms, including those of poorer farmers. In Phase II, about 200 toolbar units will be distributed for demonstration purposes to self-help or women's groups throughout the district which have jointly cultivated at least one acre of land the previous year. These self-help groups are comprised mainly of women from poorer households. The component also calls for testing of improved hand tools, which will benefit poorer farmers.

The ultimate distribution of hand tools and implements will probably be through cooperative stores and on a cash-sale basis to ono-members. (The cooperative movement is weak in the district, and presently has less than 3,000 members.) It is expected that the hand tools will be low-cost and thus within the budget of poorer households; most households will also be able to afford the tillage implements. Evaluation of the distribution and acquisition of hand tools will verify the socio-economic status of the beneficiaries.

Through the provision of aerial photographs, the land reform process will be accelerated in Kitui District. An indirect benefit will be access to credit by registered land owners. Although a title deed is not deemed sufficient for acquisition of a loan, it is required. Presently Kitui traders and farmers are disadvantaged in relation to many other Kenyan inhabitants since without a title deed they do not have access to loans available through various institutions and organizations.

The project will also indirectly benefit thousands of ASAL inhabitants through training given to key persons. Approximately 170 certificate level holders, many of whom will be technical assistants in the Ministry of Agriculture (MOA), will receive a three month course in soil and water conservation principles and practices. It is expected that many of the trainees will be recruited from Kitui and other ASAL districts. At present relatively few women serve as MOA technical assistants whose responsibility includes soil and water conservation, but when possible an effort will be made to recruit women for the courses. The training received will improve the planning and implementation of conservation activities in several ASAL districts. It is assumed that the trained technicians will promote

improved techniques for carrying out on-going soil and water conservation work. Attention needs to be given to ensuring the availability of materials and equipment required for implementing the recommended practices.

The project also contains an element for training outside of Kenya. The direct beneficiaries will be primarily from GOK. An estimated 20 government employees will receive long-term education in specialized fields such as hydrology and soil and water conservation. Recipients of short term training will include an estimated 6 persons on study tours to learn more about agricultural mechanization and 14 persons receiving practical training in land use management. Currently few women are employed in units from which candidates will be selected; however, when possible they will be included among the candidates to receive training. The knowledge and skills obtained by the trainees will help them to be more effective in their work, the results of which affect thousands of rural Kenyans.

2. Employment. Under the soil and water conservation component for Kitui District, labor-intensive methods will be used which will increase employment opportunities for residents in Central Division and portions of Northern Division. The opportunity for casual employment will attract the uneducated and school drop-outs, women as well as men. The exact method for recruitment and payment will be finalized by the technical assistance team in consultation with the district staff.

Criteria will be used which will help ensure that (a) an optimal amount of labor can be secured; (b) the laborers perceive that they derive benefits from their input; (c) on-going soil and water conservation efforts by self-help groups in non-project locations of Kitui are not discouraged; (d) women as well as men are recruited; and (e) minimal management and supervision are needed.

3. Rural Displacement, Migration and Urbanization. Many of the arid and semi-arid areas are experiencing great pressure on their fragile ecosystems from both natural population increases, and intra- and inter-district migration. The project will positively impact on increasing the carrying capacity in several ASAL districts. While this is expected to decrease the rate of migration from these areas, it may also influence the rate of immigration from medium and high potential areas undergoing extreme population pressure.

In Kitui District, particularly Central Divsion and portions of Northern Division, the project is expected to diminish the normal rate of migration which is usually toward urban areas. It will also improve the possibility for greater crop output both for consumption and sale through the introduction of improved soil and water conservation measures and tillage equipment. Immigration of non-Kambas and

rural displacement are not anticipated as an outcome of the project in Kitui District.

4. Changes in Power and Participation. The project supports the GOK's policy of decentralization to the district level. The District Development Committee will be responsible for approving major project decisions, while key members will be responsible for project implementation. The soil and water conservation work plans will be made by respresentatives of local residents and forwarded through committees which have local representation. The opportunities created for casual employment and other benefits to be received by Kitui District inhabitants from the project support the GOK policy of focusing on the relatively neglected ASAL districts and on reaching the rural poor.

# IMPLEMENTATION SCHEDULES

## ALL COMPONENTS

| Date of Action | |
|---|---|
| **1979** | |
| June | - Project paper submitted. |
| Aug. | - Project approved. |
| Nov. | - GOK issues RFP's to provide technical assistance to MOA and SK. |
| Dec. | - Initial CP's satisfied. |
| **1980** | |
| March | - GOK selects TA contractors. |
| April | - TA contracts executed. |

## COMPONENT NO. 1

### Planning

| | |
|---|---|
| **1980** | |
| April | - GOK contractor nominates additional planners for RPS and Kitui. |
| " | - GOK contractor nominates planner for DPD. |
| May | - GOK approves above nominations. |
| " | - Counterparts in place in RPS and DPD. |
| June | - Two planners arrive for assignment in RPS and DPD |
| July | - Planner arrives for assignment at Kitui. |
| **1981** | |
| March | - Mission evaluation. |
| **1982** | |
| March | - External evaluation; decisions made regarding second tours. |
| June | - Planners start home leave. |
| Aug. | - Planners return for second tour. |
| **1983** | |
| March | - Mission evaluation. |
| **1984** | |
| July | - Final evaluation (external). |
| Aug. | - Planners depart. |

## COMPONENT NO. 2

### Assistance to ASALB

| Date of Action | |
|---|---|
| **1980** | |
| April | - TA contract executed. |
| April-May | - Contractor nominates and GOK approves 2-year experts. |
| June | - Administrative member of team arrives. |
| " | - Stipulated ASALB staff in place. |
| " | - Project commodities ordered. |
| June-Aug | - Other team members arrive. |
| July-Aug. | - Training schedule developed to cover 5-person years of training between mid-1980 and mid-1984. |
| **1981** | |
| March | - Mission evaluation. |
| **1982** | |
| March | - External evaluation, decision made regarding 2nd tours. |
| June-Aug. | - Team members depart. |
| Aug.-Oct. | - If approved, soil and water engineer and soil surveyors return. |
| " | - Decisions made regarding continued use of consulting agronomist. |
| | (Note: Money not now in project for use of agronomist beyond second year.) |
| **1983** | |
| March | - Mission evaluation. |
| **1984** | |
| July-Aug. | - Final evaluation (external). |
| Aug.-Oct. | - Soil and water engineer and soil surveyors depart. |

### Aerial Photography

| | |
|---|---|
| **1980** | |
| Jan. | - TA contract executed. |
| " | - Technical expert nominated and approved. |
| Feb. | - Technical expert arrives. |
| Mar. | - Scope of work developed for contract to fly designated area to produce photos and maps. |
| Apr. | - Issue RFP's. |
| June. | - Select contractor. |
| " | - Execute contract. |
| July. | - Start overflights (if weather permits). |

| Date of Action | |
|---|---|
| **1981** | |
| Oct. | - Complete overflights. |
| March | - Mission evaluation. |
| Mar.-June | - Delivery of photos and maps as specified in contract. |
| " | - Technical expert monitors quality of product. |
| Mar.-Dec. | - Technical expert designs courses at Polytechnic and works on modernizing data bank. |
| **1982** | |
| Jan.-Mar. | - Technical expert continues above. |
| March | - External evaluation - technical expert assists. |
| " | - Technical expert completes tasks. |
| " | - Technical expert departs. |

## Landsat Imagery

The timing for executing the Landsat imagery sub-component will be decided upon by USAID. Because of the interrelationship between this sub-component and the aerial photography sub-component, the timing will need to be closely coordinated.

## Feasibility Studies

### Agricultural Research (Kibwezi)

| | |
|---|---|
| **1980** | |
| Jan. | - PIO/T issued. |
| Feb. | - AID/GOK invite proposals for Phase 1. and Phase 2 studies. |
| May | - Contractor selected. |
| June | - Contract negotiated. |
| July | - Contract signed. |
| Aug. | - Team arrives for Phase 1. |
| Oct. | - Phase 1 report completed. |
| Nov. | - GOK/AID decision to proceed with Phase 2. |
| **1981** | |
| Jan. | - Team for Phase 2 arrives. |
| Apr. | - Phase 2 report completed. |

### Rural Access Roads

| | |
|---|---|
| **1980** | |
| Aug. | - PIO/T issued. |
| Dec. | - AID/W negotiates IQC contract. |
| **1981** | |
| Jan | - Team begins study. |
| March | - Team completes report. |

| Date of Action | Water Resource Development in Kitui District |
|---|---|
| **1981** | |
| Nov. | - Issue PIO/T. |
| **1982** | |
| Jan. | - AID/GOK invite proposals. |
| Apr. | - Contractor selected. |
| May | - Contract negotiated. |
| June | - Contract signed. |
| July | - Team begins study. |
| Nov. | - Team completes report. |

Seed Production

| | |
|---|---|
| **1980** | |
| Feb. | - Issue PIO/T. |
| March | - AID/W negotiates IQC contract. |
| Apr. | - Team begins study. |
| July | - Team completes report. |

Afforestation and Tree Nurseries

| | |
|---|---|
| **1980** | |
| Jan. | - Issue PIO/T. |
| Feb. | - AID/W negotiates IQC contract. |
| March | - Team begins study. |
| June | - Team completes report. |

COMPONENT NO. 3

Soil and Water Conservation

| | |
|---|---|
| **1979** | |
| Sept. | - Pro-Ag signed. |
| Oct. | - GOK issues RFP for construction contract (housing). |
| **1980** | |
| Jan. | - GOK selects construction contractor; begins construction. |
| " | - Orders placed for vehicles, tractors, and commodities. |
| July | - TA Team leader and agricultural economist arrive. |
| " | - Five houses completed. |
| " | - Counterparts identified. |
| " | - Three vehicles available. |
| Aug. | - Two houses completed. |
| Sept. | - Conservation engineer, soil scientist, forage crops specialist and farm mech. advisors arrive; hydrologist consultant arrives for 3 months. |

| Date of Action | |
|---|---|
| **1980** | |
| Oct. | - Four vehicles arrive. |
| " | - First training program begins. |
| **1981** | |
| Jan. | - Extension agronomist arrives. |
| " | - Commodities arrive; tractors and truck arrive. |
| March | - Mission evaluation. |
| " | - Second training program underway. |
| July | - Hydrologist returns for 3 month assignment. |
| " | - Third training program, successive training sessions continued every 4 months through life of project. |
| **1982** | |
| Mar. | - External evaluation. |
| Sept. | - Forage crops specialist completes assignment. |
| **1983** | |
| March | - Mission evaluation. |
| **1984** | |
| Jan. | - Cost sharing consultant arrives for 3 month assignment. |
| July | - Agric. economist completes assignment. |
| " | - Final evaluation (external). |
| Sept. | - Conservation engineer, soil scientist, farm mech. advisor complete assignments. |
| Dec. | - Team leader and extension agronomist complete assignments. |

AID 1020-79 (7-71)
SUPPLEMENT 1

# PROJECT DESIGN SUMMARY
## LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

ANNEX J

Life of Project:
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: JUNE 28, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Program or Sector Goal: The broader objective to which this project contributes: | Measures of Goal Achievement: | | Assumptions for achieving goal targets: |
| Improve the quality of life of rural poor people living in Kenya's arid and semi-arid lands, especially Kitui District, through soil and water conservation activities, appropriate farm technology, and decentralized planning. | Household incomes in rural areas, stratified by economic class.<br><br>Per capita food production/ consumption | Baseline data will be obtained early in the project on a stratified sample survey basis with assistance of a Sociologist and the Agricultural Economist on the Kitui Soil and Water Conservation team; comparable data will be obtained near the end of the project life for comparative purposes. | Government policy on development of Arid and Semi-Arid Lands continues to be accorded high priority.<br><br>USAID and GOK provide financial, technical and other support in timely manner.<br><br>Well qualified U.S. technical assistance is available in the quantity and duration specified.<br><br>Bilateral relationships remain cordial. |

AID 1330-28 (7-71)
SUPPLEMENT 1

# PROJECT DESIGN SUMMARY
## LOGICAL FRAMEWORK

Life of Project: J-2
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: JUNE 28, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Project Purpose: | Conditions that will indicate purpose has been achieved: End of project status. | | Assumptions for achieving purpose: |
| i) Establish a basis for launching an accelerated national development program in arid and semi-arid lands through:<br><br>(a) enhanced administrative, planning and technical competence, and<br><br>(b) testing and proving an array of activities in soil and water conservation and tillage methods. | A tested and proved set of technologies and a delivery system will exist for farming systems (soil and water conservation and tillage methods) ready for accelerated application in ASAL areas.<br><br>A functioning in-service training program will exist for training technicians in improved farming systems. | A joint GOK/USAID comprehensive review of the project and its accomplishments will take place near the end of project life. | Qualified Kenyan training candidates are available and nominated for training abroad.<br><br>GOK will support project; collaborate as proposed.<br><br>GOK will provide counterpart technicians on a timely basis. |
| ) Preserve and improve the agricultural production base in the pilot area in Kitui District. | A data base and data system adequate for planning and project development will exist.<br><br>A balanced staff of planners will be in position in Kitui District as well as in certain ministries equipped with techniques for planning ASAL development. | | GOK will assign trained Kenyans to ASAL project activities on return from training.<br><br>Abnormal climate-related disasters do not occur.<br><br>GOK supplies personnel and administrative support for proposed in-service training program at the Better Living Institute in Kitui.<br><br>GOK makes facilities of Better Living Institute available to Project for training purposes.<br><br>Adequate logistical support is provided by GOK. |

AID 1020-79 (7-71)
SUPPLEMENT 1

# PROJECT DESIGN SUMMARY
## LOGICAL FRAMEWORK

Life of Project: J-3
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: JUNE 28, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Outputs: | Magnitude of Outputs: | | Assumptions for achieving outputs: |
| | Component 1: Planning | | |
| 1. National annual planning documents containing general ASAL development plans. | 1. At least one each year | 1. Published plan documents of the GOK | GOK makes available specified number of trainees for training. |
| 2. National annual planning documents containing agricultural development plans for ASALs. | 2. At least one each year | 2. Published plan documents of the GOK | Budget resources are made available to Project Management in adequate and timely manner. |
| 3. District annual development planning documents for Kitui District. | 3. At least one each year | 3. Published plan documents of Kitui District Government | Commodity requirements are met in timely manner. |
| 4. Planning officers trained in improved techniques of planning. | 4. Nine person years. | 4. Participant training records of USAID | Delivery system for technical services to farmers meets requirements of project operations proposed. |
| | Component 2: Data Collection | | Land adjudication status-quo does not significantly hamper farmers' acceptance and adoption of recommended farming or land development measures. |
| 1. Improved data base for ASAL development planning. | 1. (a) 25% of ASAL area covered by inventory of resources by ASALB<br>(b) Aerial photos for all of Kitui District<br>(c) Orthophoto maps for 400,000 hectares in Kitui District<br>(d) Landsat imagery for all of Kitui District for 2 consecutive years. | 1. (a) Records in ASAL Branch MOA.<br>(b) Records in office of Survey of Kenya.<br>(c) Records in office of Survey of Kenya.<br>(d) Records in office of Survey of Kenya. | Normal farm credit system for supplying farming inputs is in place and functional.<br>Technical assistance personnel are assigned on schedule.<br>Counterparts are assigned on schedule. |
| 2. Feasibility studies completed. | 2. 8 to 10 studies during project life. | 2. From reports available in USAID files. | Labor is available for project works. |

AID 1020-28 (7-71)
SUPPLEMENT 1

# PROJECT DESIGN SUMMARY
## LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: JUNE 28, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Outputs: | Magnitude of Outputs:<br>Component 3: Soil and Water Conservation | | Assumptions for achieving outputs: |
| 1. Soil Conservation Technicians each with six months of intensive training. | 1. Sixty per year after first year. | 1. Training records of BLI at Kitui. | |
| 2. Conservation Officers with advanced training abroad. | 2. Eight during life of project. | 2. Participant training records of USAID. | |
| 3. Improved farming systems (soil and water conservation and tillage practices). | 3. Ha/yr land under treatment: (1982 / 1983 / 1984)<br>conservation 600 1800 5000<br>tillage 60 80 500 | 3. (a) Reports filed by field technicians<br>(b) District annual report for S & W cons. | |
| 4. Farmers trained to use the improved farming systems. | 4. Farmers:<br>Thru BLI 240 560 1120<br>Trained on site 500 1000 2000 | 4. Annual report of BLI and reports filed by field technicians. | |
| 5. Improved soil moisture conditions. | 5. % reduction on treated areas of water lost due to run-off 50 | 5. (a) Periodic sampling of soil moisture by field technicians in the fields and compare observed differences between treated and untreated areas.<br>(b) Remote sensing, multispectral techniques.<br>(c) Reports filed by field technicians in the fields and compare observed differences between treated and untreated areas. | |
| 6. Enhanced usable water supplies. | 6. % increase in water for all purposes in treated areas. 20 | 6. (a) Periodic sampling of soil moisture by field technicians in the fields and compare observed differences between treated and untreated areas. | |

AID 1020-76 (7-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: June 28, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)



| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Outputs: | Magnitude of Outputs: Component 3: Soil and Water Conservation 1982 1983 1984 | 6. (b) Remote sensing, multispectral techniques. (c) Reports filed by field technicians. (d) Annual district conservation report showing number of water retentions built and volume storage. | Assumptions for achieving outputs: |
| 7. Reduction in the rate of loss of the soil. | 7. Reduce the rate of top-soil loss in tons/ha/yr on treated areas from existing 20 to 80 to maximum of 20 | 7. The "Soil loss equation" formula developed in the Pre-Investment Study, to be administered by research personnel. | |
| 8. Reduction in siltation/sedimentation rate. | 8. % reduction in treated areas in siltation/sedimentation rate 50 | 8. Field technicians make visual estimates and file reports. (More sophisticated techniques are available, but may not be practical to use for this project.) | |
| 9. Increased production of forage | 9. % farmland in treated areas harvesting forage from contour grass strips 15 25 30 | 9. Reports filed by field technicians. | |
| 10. Improved tillage practices | 10. % farmland in treated areas benefitting from use of crop residues and minimum tillage 5 15 25 | 10. Reports filed by field technicians. | |
| 11. Improved physical environment for human habitation. | 11. % farms in treated areas on which useful trees planted 5 15 25 | 11. (a) Reports filed by field technicians (b) District annual S & W Conservation Report. | |

AID 1020-23 (7-71)
SUPPLEMENT 1

# PROJECT DESIGN SUMMARY
## LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: JUNE 28, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)

PAGE 3

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Inputs: | Implementation Target (Type and Quantity) | | Assumptions for providing inputs: |
| | **Component 1: Planning** | | |
| . Technical advisory services to the MOA and MEPCA in Central Government and to DDO in Kitui District. | 1. 12 advisor years, 3 each year for 4 years. | 1. Contractor reports and USAID records. | Funds are made available: budget is is released. |
| . Short-term consultant services to the MOA and MEPCA. | 2. 12 advisor months during life of project. | 2. USAID records. | Strikes or other unforeseen events do not occur to inordinately delay delivery of vehicles and commodities to project. |
| . Long-term training for personnel in MOA and MEPCA. | 3. 9 person years. | 3. Participant training records of USAID. | |
| . Counterparts for all technical advisors. | 4. 3 full-time counterparts | 3. Check with advisors and GOK agencies involved. | Inflation rates do not accelerate excessively beyond predicted estimates causing large budgetary short-falls. |
| . Office space and equipment: secretarial clerical and transport support. | | | Training slots are available and U.S. universities accept Kenyan applications for enrollment. |
| | **Component 2: Data Collection** | | |
| . Technical advisory services to the ASAL Branch, MOA | 1. 17 advisor years. | 1. Contractor reports and USAID records. | |
| . technical advisory services to the Survey of Kenya. | 2. 2 advisor years. | 2. Contractor reports and USAID records. | |
| . Short-term consultant services to the Survey of Kenya and the ASAL Branch. | 3. 6 person months during life of project. | 3. USAID records. | |
| . Feasibility Studies. | 4. 8 to 10 | 4. USAID records. | |
| . Landsat imagery | 5. All of Kitui District | 5. Contractor reports and records of SK. | |
| . Aerial photographs | 6. All of Kitui District | 6. Contractor reports and records of SK. | |

AID [illegible]
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1984
Total U.S. Funding $13,000,000
Date Prepared: JUNE 26, 1979

Project Title & Number: ARID AND SEMI-ARID LANDS DEVELOPMENT (615-0172)

PAGE 5

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS |
|---|---|---|---|
| Inputs: | Implementation Target (Type and Quantity) | | Assumptions for providing inputs: |
| 7. Commodities in support of ASAL Branch. | 7. $25,000 | 7. Records of ASAL Branch | |
| 8. Local services in support of ASAL Branch. | 8. $50,000 | 8. Records of ASAL Branch | |
| 9. Long-term and short-term training for personnel in ASAL Branch. | 9. 5 person years | 9. Participant training records of USAID | |
| 10. Counterparts for all technical advisors. | 10. 6 counterparts | 10. Check with advisors and GOK agencies involved. | |
| 11. Office space and equipment secretarial, clerical and transport service. | | | |
| | Component 3: Soil and Water Conservation | | |
| 1. Technical advisory services to the District Commissioner/District Development Committee, Kitui District. | 1. 25 person years | 1. Contractor reports and USAID records. | |
| 2. Short-term consultants | 2. 14 person months | 2. USAID records. | |
| 3. Local-hire support | 3. $208,000 | 3. Contractor reports and financial records. | |
| 4. Long-term training for soil and water conservation personnel of MOA assigned to Kitui District. | 4. 12 person years | 4. Participant training records of USAID. | |
| 5. Commodities in support of soil and water conservation activities in Kitui District. | 5. $1 million | 5. Contractor reports and financial records. | |
| 6. Travel for selected counterparts and technical advisors to international centers. | 6. 6 counterparts; 1 advisor | 6. Contractor reports and financial records. | |
| 7. Labor for installing soil and water conservation structures and practices. | 7. 3.6 million person days during life of project | 7. (a) Contractor reports (b) Financial records of Kitui Government. | |
| 8. Counterparts to work with the technical advisory team. | 8. 10 counterparts | 8. Check with advisor and with MOA, GOK. | |

ANNEX K

# JOB DESCRIPTIONS

This annex contains the following job descriptions:


## Component 1: Planning

| | Page |
|---|---|
| A. Planning Advisor to RPS | K-2 |
| B. Planning Advisor to DPD, MOA | K-2 |
| C. Planning Advisor in Kitui | K-3 |

## Component 2: Data collection and Analysis

ASAL Branch

| | |
|---|---|
| A. Soil and Water Engineer | K-4 |
| B. Soil Surveyors | K-4 |

Survey of Kenya

| | |
|---|---|
| A. Aerial Photography Specialist | K-5 |

## Component 3: Soil and Water Conservation

| | |
|---|---|
| A. Land Use Planner | K-5 |
| B. Soil and Water Conservation Engineer | K-6 |
| C. Soil Scientist | K-7 |
| D. Extension Agrommist | K-7 |
| F. Agricultural Economist | K-8 |
| H. Forage Crop Specialist | K-9 |
| I. Hand Tool and Implement Engineer. | K-10 |

ASAL Planning Advisor to the Rural Planning Section, MEPCA

Qualifications: Ph.D. in economics with some study and experience in planning. Previous LDC experience is desirable.

Duties: This advisor will work with the Kenyan economist/planners in this section who have been assigned to ASAL planning and, along with them, will provide support and assistance to the ASAL Central Coordinating Committee (composed of senior personnel from MEPCA and operating ministries). This advisor's work will involve assisting his/her Kenyan counterparts to integrate plans horizontally (across various ministries) and vertically (from the district level to the national level). This advisor will liaise closely with the Harvard contract advisors in this section and with the American ASAL Advisor in the Project Preparation Section of the Development Planning Division, MOA.

The Planning Advisor will be posted in Nairobi.

ASAL Planning Advisor to the Project Preparation Section, Development Planning Division, MOA

Qualifications: Ph.D. in some aspect of agriculture and familiarity with agricultural economics. Previous study and experience in planning, and experience with arid and semi-arid lands. Previous LDC experience desirable.

Duties: This advisor will work closely with the Kenyan planners in this section who will be assigned to ASAL planning. He/she will assist the Kenyan planners to develop sectoral plans for the Ministry of Agriculture and for those ministries closely involved with agriculture in ASAL development (e.g., Water Development, Natural Resources, and Works) and to integrate those plans into a workable unit. This advisor will liaise with the advisor in MEPCA who will also work on ASAL planning.

The Planning Advisor will be posted in Nairobi.

Planning Advisor in Kitui

Qualifications: M.A. or Ph.D. in sociology, economics, political science or related fields with some study and/or experience in planning. Previous experience in Kenya (or another LDC) is very desirable.

Duties: This person will work closely with the District Development Officer (DDO), the District Development Committee, and District technical officers such as the District Agricultural Officer to assist them in the coordination, preparation, timeliness, and quality of district planning documents (e.g., Annual Work Plans and the District Development Plan) that reflect the perceived needs of the local people. This advisor will, along with the D.D.O., liaise with planning colleagues at the provincial and national levels in an effort to refine and expedite the process. This advisor will also work closely with the AID-financed technical team in Kitui and the American ASAL advisors in the central government(MOA and MEPCA).

The Planning Advisor will be posted in Kitui town.

## Soil and Water Engineer

Qualifications: The Soil and Water Engineer should have at least a B.S. degree in Engineering, and preferably an M.S. degree. Professional experience should have been in applying engineering principles to soil and water conservation in the macro sense; i.e., in large-scale watershed studies or soil and water resource inventories over a large area.

Duties: The Soil and Water Engineer will be responsible to the Head of the ASAL Branch in the MOA, and will serve as a working member of the Branch. He will work directly with the member of the Branch whose skills are in hydrogeology. The work will be about 60% in the field helping to inventory the resources in arid and semi-arid lands in Kenya.

The Engineer will be posted in Nairobi.

## Soil Surveyor

Qualifications: The Soil Surveyors should have at least an M.S. degree or equivalent in Agronomy with an emphasis on soils and soil classification, preferably tropical soils. Experience should include having had responsibility for conducting soil surveys in arid and semi-arid lands; ideally, they should have had at least two years of such experience in developing countries.

Duties: The two Soil Surveyors will be responsible to the Head of the ASAL Branch, MOA, and will serve as working members of the Branch. They will work in close association with the two Kenyan soil surveyors in the Branch and will be responsible for surveying (inventorying) and classifying the soils in the arid and semi-arid lands of Kenya. They should expect to spend three-fourths of the time in the field.

The Soil Surveyors will be posted in Nairobi.

## Aerial Photography Specialist

Qualifications: The Aerial Photography Specialist should have an advanced degree in one of the agricultural sciences having special relavance to arid and semi-arid lands; e.g., Range Management, Range Ecology, Soil Science, or Environmental Studies. In addition, he should have specialized in using the various techniques of aerial photography as tools in inventorying, analysis and monitoring of resources. Experience in the production and use of orthophoto maps is of special importance.

Duties: The Aerial Photography Specialist will assist the Director of the Survey of Kenya in the negotiation of the procurement contract for aerial photos of Kitui District, providing detailed specifications for photos for the different uses. He will design training courses in the production and use of orthophoto maps for the Polytechnic to use with students preparing to join the Survey of Kenya. Finally, he will design a modern data bank system for the Survey of Kenya.

The Aerial Photography Specialist will be posted in Nairobi.

## Land Use Planner

Qualifications: The Land Use Planner should have an advanced degree or the equivalent in soil and water conservation or a closely related field. He should have had at least 10 years experience in both macro and micro level planning of soil and water conservation activities; at least 2 years of the experience should have been in a developing country, preferably in arid and semi-arid areas.

Duties: The Land Use Planner will serve as Team Leader for the soil and water conservation component of the project. He will collaborate with the Kenyan project leader counterpart to develop annual work plans plus an implementation plan for the life of the project. He will collaborate with the Kenyan counterpart on the day-to-day managing of the technical aspects of the project. He will represent the team at meetings with the District Development Committee in Kitui and the USAID project manager. He will be responsible for administering and supervising all matters pertaining to the technical assistance team.

The Land Use Planner will be posted in Kitui town.

Soil and Water Conservation Engineer

Qualifications: B.Sc. in agricultural or civil engineering and the ability to apply engineering practices and techniques to the agricultural aspects of land and water use, the construction of water control structures and the use of farm machinery. Experience working with farm groups, preferably in East Africa, is important.

Duties: The soil and water conservation engineer will provide professional and technical advice on engineering work related to arresting soil erosion in Kitui District. The soil and water conservation engineer, along with his Kenyan counterpart, will be responsible for the installation of appropriate conservation practices in the pilot area.

The engineer will provide the project team leader, the DDC, and local farmers with: advice on the technical and economic results to be achieved from the development of land and water resources through installation of soil and water conservation practices, development of animal traction and farm implements, and the economic feasibility of their accomplishment; advice on the engineering methods, tools, and equipment required in development of land and water resources through installation of soil and water conservation practices such as terracing, farm ponds, contour farming, protected waterways, etc.; and advice on procedures for performing investigative surveys, planning and designing structures for soil and water control, and training methods for engineering related activities.

The Engineer will be posted in Kitui town.

Soil Scientist

Qualifications: M.Sc. or preferably a Ph.D in Soil Science. Candidate must be competent and experienced in the identification, classification and production capability of tropical soils.

Duties: The soil scientist will have primary concern for identification and evaluation of existing soils mapping and land use classification in Kitui District. This person will serve as a project link to the activities in aerial photography and mapping.

The soil scientist will be a technical resource of the extension agronomist, the soil and water conservation engineer and the agriculture engineer in all matters of land use, afforestation, cropping systems, fertilizer recommendations and development of the Better Living Institute farm as a center for training in agricultural practices.

It will also be important for the soil scientist to cooperate with the monitoring and assessment of environmental effects of the project that impact on the soil and water resources.

The soil scientist will be posted in Kitui town.

Extension Agronomist

Qualifications: M.Sc. or higher degree in agronomy with emphasis on production under dry land conditions. It is preferred that the candidate have extensive experience with production of cereal and legume crops under semi-arid conditions in tropical soils.

Duties: The extension agronomist will help define cropping systems that are suited for Kitui District.

The extension agronomist will lead the initial efforts to design and install applied research tests and demonstrations for a variety of cropping systems at the Better Living Institute and cropping demonstrations and trials for vegetative conservation practices in project sub-locations. He will

help design and schedule field days and provide leadership to develop curricula and training for trainers and field staff who are concerned with extension.

The extension agronomist will be stationed in Kitui town.

## Agricultural Economist

Qualifications: The Agricultural Economist should have at least an M.S. degree or equivalent, with emphasis on micro economics; i.e., farm management, farm budgeting, and costs and returns of alternative investment opportunities in the farm enterprise. Experience should include at least two years in a developing country, ideally in arid or semi-arid conditions, and should include designing and using questionnaires in the field to gather pertinent data for analytical purposes.

Duties: Under the guidance of the Soil and Water Conservation team leader, the Agricultural Economist will take the lead in obtaining sufficient data on a systematic basis so that rigorous benefit/cost analyses can be done on various soil and water conservation practices, from the standpoint of both individual small farmers and of society as a whole. The Agricultural Economist will also be the team member mainly responsible for on-going evaluation of soil and water conservation activities in the sense that he will be the team's principal repository of data on which scheduled formal USAID Mission and external evaluations will be based.

The Agricultural Economist will liaise with the Planning Advisor assigned to work with the District Development officer in Kitui, and will assist with analyses that will be useful in the district planning process, especially as these relate to soil and water conservation practices and programs.

The Agricultural Economist will be stationed in Kitui town.

## Forage Crop Specialist

Qualifications: The Forage Crop Specialist should have at least an M.S. degree or equivalent in Agronomy with an emphasis on grasses, legumes and other crops used for forage. He should have had at least 5 years of experience in selecting and testing a wide range of forage crops and species for their adaptability and usefulness for both their production of forage and their efficiency in holding soil in place in areas that are subject to erosion. Ideally, part of the experience will have been in semi-arid lands in developing countries.

Duties: The Forage Crop Specialist will be responsible, along with Kenyan counterparts, for developing and carrying out a plan to test and introduce improved species or varieties of forage in the pilot soil and water conservation project area in Kitui District, with the dual objective of forage production for livestock and soil conservation. The Forage Crop Specialist will work especially closely with the Extension Advisor, who will be instrumental in helping to assist farmers to obtain appropriate forage seeds and use them in soil conservation applications.

The Forage Crop Specialist will live in Kitui town.

## Hand Tool and Implement Engineer

Qualifications: B.Sc. or M.Sc. in agricultural engineering is desirable but not essential. Experience working with production and application of equipment for small farms and an understanding of the needs of smallholders is essential. Resourcefulness and initiative are two important qualities the engineer should have. Previous LDC experience is also important.

Duties: On his arrival the engineer will work closely with Kenyan centers of small mechanization to select equipment prototypes that will be manufactured in limited numbers, distributed, and field evaluated for on-farm suitability. The engineer will be responsible for final design specifications, for distribution and for evaluation of tools and equipment. He will make desired design improvements and recommendations for the quantity to be manufactured.

The engineer's responsibilities will also include providing the prototype design and overseeing limited manufacture of hand operated tools or equipment as well as oxen-drawn equipment for use in the conservation project.

With the agricultural economist, the engineer will make a thorough study of possible marketing channels for implements, need for and availability of maintenance facilities for implements, and the need for and availability of credit. The engineer, with the assistance of other contract team members and the staff of the Better Living Institute (BLI),will design a mini-course for local blacksmiths to teach small equipment repair.

The engineer will work for the first 2-3 months in Nairobi and thereafter will be posted to Kitui town.

# 5C(2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable generally to projects with FAA funds and project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Economic Support Fund.

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

## A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 653(b); Sec. 634A. (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)?

1. (a) Normal CN procedures will be followed
(b) Yes

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?

2. Yes. See relevant Sections in PP

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?

3. No further legislative action required.

4. FAA Sec. 611(b); FY 79 App. Act 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?

4. Water related activities are very small proportion of project; concerns of 611 (b) are addressed in Economic and Social Analyses.

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 and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

5. Yes. See Annex M of PP

6. FAA Sec. 209. 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.

6. Project is not susceptable of execution as a regional project. As noted in PP other donors are contributing significantly to development of ASALs in other parts of Kenya.

7. Project's objective is to foster improved agricultural methods in ASALs and to develop replicable systems which can be extended beyond the immediate project area.

7. FAA Sec. 601(a). 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.

8. Project will not have effect on U.S. trade. U.S. contractors will be used to provide TA under the project.

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).

The GOK will contribute $5,645,000, about 30% of total project costs, and about 75% of local currency costs.

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.

10. No.

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

11. Yes

11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

12. Not applicable

12. FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

## B. FUNDING CRITERIA FOR PROJECT

1. a. Project will research development problems in ASALs and will, on a pilot basis, utilize appropriate technological means to assess these in ASALs. Hand tools will be tested and developed under one project

1. Development Assistance Project Criteria

a. FAA Sec. 102(b); 111; 113; 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 and the use of appropriate

component which are most appropriate to Kenya ASALs. Further soil and water conservation techniques will be developed and extended to rural ASAL farmers.

technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (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; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

1.b. Research to be undertaken under the project is specifically designed to reach and benefit the rural poor - those living in ASALs. As PP demonstrates, farmers in ASALs have eeked out a marginal existence in the past. It is anticipated that new farming devices will improve productivity and will reduce the pace of erosion in ASALs. The smallholder will receive training from extension technician trained under the project in new and tested techniques throughout the project, feedback obtained from rural farmers concerning the effectiveness of the recommended technological packages will be incorporated into modifications of these applied technologies.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph 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;

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

(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:

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

(ii) to help alleviate energy problems;

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

(iv) reconstruction after natural or manmade disaster;

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

(vi) 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.

c. See previous page

c. [107] Is appropriate effort placed on use of appropriate technology?

The GOK will contribute 30% of total project costs.

d. FAA Sec. 110(a). Will the recipient country 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)?

e. No.

e. 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"?

f. ASALs, as demonstrated in PP, are of growing concern to GOK. This project works with existing GOK agencies and ministries to help build their capacity to meet perceived problems in the development of ASALs.

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 civil education and training in skills required for effective participation in governmental and political processes essential to self-government.

g. Yes: Purpose is to help farmers in ASALs increase and improve their technical capabilities, this enabling them to increase on-farm production and income.

g. FAA Sec. 122(b). 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?

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects.

Not applicable

b. 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 Economic Support Fund

a. FAA Sec. 531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102?

Not applicable

b. FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities?

ANNEX M

# KENYA ARID AND SEMI-ARID LAND DEVELOPMENT PROJECT

## 611 (e) CERTIFICATION

I, Glenwood P. Roane, the principal officer of the Agency for International Development in Kenya, having taken into account, among other things, the maintenance and utilization of projects in Kenya previously financed or assisted by the United States, and the demonstrated capacity and willingness of the Government of Kenya to provide budgetary support for recurrent and development costs incident to the agricultural sector, do hereby certify that in my judgement the Government of Kenya has shown both the financial and human resources capability to effectually maintain and utilize the assistance provided under the Arid and Semi-Arid Lands Development Project.

Glenwood P. Roane
Director

6/29/79
Date

ANNEX N

**OFFICE OF THE VICE-PRESIDENT AND MINISTRY OF FINANCE**

Telegraphic Address: "MAKAMU", Nairobi
Telephone: Nairobi 334433
When replying please quote
Ref. No. EPD/GD 11/043
and date

THE TREASURY
P.O. Box 30007, NAIROBI
KENYA

Date 28 July, 1979

Mr. Glenwood P. Roane,
Director,
USAID Mission to Kenya,
P.O. Box 30261,
NAIROBI

Dear Mr. Roane,

The Ministry of Finance of the Government of Kenya hereby formally requests A.I.D. assistance to implement the Arid and Semi-Arid Lands Development Project. The assistance requested, as detailed in the Project Paper for the Arid and Semi-Arid Lands Development Project, will be for advisory services and training for the Ministry of Economic Planning and Community Affairs, the Ministry of Agriculture, and the Survey of Kenya; for feasibility studies needed by the Ministries of Agriculture, Water Development, Natural Resources, and Works; for soil and water conservation activities in Kitui District; and for testing various hand tools and agricultural implements suitable under arid and semi-arid conditions. This assistance is judged necessary and important to facilitate the Planning and implementation of the Government's Arid and Semi-Arid Lands Development Program, which has high priority during the next Plan period (1979-83) and beyond. The areas of assistance proposed in the Project Paper are in accord with the views of the Government toward ASAL development. We understand that in the process of preparing the Project Agreement adjustments may be made in specific project activities to coincide with Government priorities and Ministerial needs. The office of the Attorney General is reviewing the Conditions and Covenants, and we will forward their response as soon as it is available.

..../2

Project costs, we understand, are currently being prepared by the USAID Mission and willbe completed soon. Preliminary estimates envision an overall program in the magnitude of $23,400,000 of which $17,600,000 will be provided by A.I.D. and $5,800,000 by the Government of Kenya. The A.I.D. amount consists entirely of grant funds.

The Government recognizes the recurrent cost implications of the proposed assistance. We anticipate continuing the ongoing Ministerial development activity in Kitui, including the financing of recurrent costs (subject to the approval of annual budgets). We will provide supporting services for the proposed assistance, and are confident that a mutually acceptable division of project related recurrent costs can be arranged on the basis of "additionality". The various Ministries cooperating in the project request that the proposal be submitted to your headquarters for its review and approval and urge that this be done promptly.

Yours, Sincerely

for: E.N. [illegible]go
PERMANENT SECRETARY TO THE TREASURY

ANNEX O

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

NAME OF COUNTRY: Kenya

NAME OF PROJECT: Arid and Semi-Arid Lands Development

NUMBER OF PROJECT: 615-0172

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to Kenya (the "Cooperating Country") of not to exceed Four Million One Hundred and Seventy Eight Thousand United States Dollars ($4,178,000) (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 will assist Kenya in its efforts to establish a basis for a national accelerated development program in arid and semi-arid lands (ASAL) through (a) enhanced administrative, planning and t chnical capabilities, and (b) testing and proving an array of activities in soil and water conservation and tillage methods. Additionally, the project will assist Kenya to improve and preserve the agricultural production base in portions of Kitui District. Assistance will be provided for three basic project components: (1) planning for ASAL development, (2) data collection, including feasibility and reconnaissance studies and mapping of certain ASALs, and (3) activities in soil and water conservation and development of hand tools and improved tillage implements. The project, generally, will finance technical assistance, participant training, commodities, construction and certain other costs.

I approve the total level of A.I.D. appropriated funding planned for the project of not to exceed Thirteen Million United States Dollars ($13,000,000), 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.

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 as stated in paragraph d. below, goods and services, except for ocean shipping, financed by A.I.D. under the project will have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Grant will be procured in the U.S., except as A.I.D. may otherwise agree in writing.

b. Conditions Precedent.

1. Prior to any disbursement, or the issuance of any commitment document under the Project Agreement, for the purpose of financing assistance for ASAL and Kitui District Planning, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that there are qualified counterparts in place for the project-financed long-term technical advisors provided under the Planning component for the project. This condition will apply separately to the Ministry of Economic Planning and Community Affairs and to the Ministry of Agriculture.

2. Prior to any disbursement, or the issuance of any commitment document, for the purpose of financing under the Project Agreement any contract for technical, construction or other services to be entered into by the Grantee, or for any contract for commodity procurement, where such procurement of goods or services exceeds $50,000, A.I.D. will approve each such contract and/or designs and specifications in writing. This requirement may be satisfied separately for each such contract action.

3. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing any soil conservation sub-project, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., a report describing the sub-project including a detailed description of the sub-project area, method of carrying out the work, cost estimates, accounting system, including copies of forms to be used

to account for cash disbursements through the District level, and environmental examination. Details of such report will be described more fully in Project Implementation Letters (PILs).

4. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing studies not identified in the project agreement's amplified description, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., study proposals describing, inter-alia, cost estimates for the study, manpower requirements, proposed course of action, and relationship between the particular study and the Grantee's ASAL Development Program. Specific content and form for these proposals will be addressed in PILs. This condition may be satisfied separately for each study.

5. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing construction at the Better Living Institute, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., final plans, specifications and cost estimates for such construction. This condition may be satisfied separately for each unit of construction.

6. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing procurement of animal drawn implements resulting from the project's first phase design and testing program, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., a plan describing the procedures for distribution of such implements including, inter-alia, marketing mechanisms to be utilized, credit facilities to be made available, criteria for farmer eligibility in the program, and, where applicable, extent of Grantee subsidies.

7. Prior to any disbursement, or the issuance of any commitment document under the Agreement, for the purpose of financing physical activities under the soil and water conservation component of the project, the Grantee will submit to A.I.D., in form and substance satisfactory to A.I.D., evidence that it has set aside, at its Better Living Institute, land and facilities adequate to serve as the project's water and soil conservation demonstration and training center.

c. Covenants.

1. The Grantee will covenant to continue the existing structure, or provide other adequate mechanisms, for administering ASAL development. The Grantee will keep A.I.D. advised in the event that the existing administrative structure, including the Inter-Ministerial Committee on ASALs, the ASAL Central Coordinating Committee, and the ASAL Core Technical Committee is altered.

2. The Grantee will covenant to provide, in addition to the counterparts mentioned in the initial condition precedent, qualified counterparts for project-financed technical advisors in accordance with the schedule included as part of the project agreement's amplified description, which may be subsequently modified by the parties in Project Implementation Letters (PILs). Additionally, the Grantee will, unless the parties otherwise agree in writing, take such steps as may be necessary to establish the positions of forester and cartographer within the ASAL Branch of the Ministry of Agriculture.

3. The Grantee will covenant to take all necessary steps to assure that the Survey of Kenya deploys the resources necessary for aerial photography and mapping of Kitui District so that photography and mapping are completed by June 1981, or such later date as A.I.D. may agree in writing.

4. The Grantee will covenant to provide, on a timely basis, approximately 20-30 certificate level graduates to receive basic training in soil and water conservation principles and practices at the project's facility at the Better Living Institute. Timing for these institutional courses will be generally described in the project agreement's amplified project description and will be more specifically defined in subsequent PILs.

5. The Grantee will covenant to make available, upon completion of training, means of transportation, motorized or other, to persons successfully completing project training at the Better Living Institute. This covenant applies only to those technicians posted to a position of responsibility for soil and water conservation in Kitui District.

6. The Grantee will covenant to make available on a timely basis qualified individuals to undertake participant training funded under the project. Such participants will be made available in accordance with the general time frame indicated in the project agreement's amplified project description, and which will be described in greater detail in subsequent PILs. Except as A.I.D. otherwise agrees in writing, the participants will be returned to such positions within the Government, commensurate with the nature and level of training received, as may be agreed to by the parties.

7. The Grantee will covenant to have an independent Chartered Accounting firm undertake annual audits for the soil and water conservation component, particularly the accounting and use of project commodities and the cash disbursement system for labor.

8. The Grantee will covenant to prepare in form and substance satisfactory to A.I.D., periodic training plans for participant training financed under the project. The content of these plans and their timing will be the subject of subsequent PILs.

9. The Grantee (subject to the approval of annual budgets) will covenant to finance a significant portion of the recurrent costs associated with the project, including the soil and water conservation activities in Kitui District. Details of such financing will be described more fully in the PILs.

d. Waivers.

As justified in Annex Q of the Project Paper, the following waivers to A.I.D. regulations are hereby approved.

1. The requirement set forth in Handbook 1, Supplement B limiting procurement of services under grant-financed projects to firms of U.S. and Cooperating Country nationality is waived to permit procurement of aerial photography services from firms of A.I.D. Geographic Code 935 nationality. It is hereby determined that the interests of the United States are best served by permitting the procurement of services from Free World countries other than the Cooperating Country and countries included in Code 941.

2. The requirement under Handbook 1, Supplement B that commodities procured with grant funds have their source and origin in the U.S. and the Cooperating Country is waived to permit the procurement of eight project vehicles, at an approximate cost of $150,000, which have as their source and origin countries included in A.I.D. Geographic Code 935. It is hereby determined that exclusion of procurement of the project vehicles from free world countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and the objectives of the foreign assistance program, and that special circumstances exist which justify waiver of the requirement of Section 636(i) of the Act.

Date: Aug 27, 79

Douglas J. Bennet, Jr.
Administrator

USAID DISTR(9/27)
ACTION: PROG
(DUE:10/3)
INFO:DIR;A/DIR;TSS;
CONT;CHRON;RF

# TELEGRAM

PRM - 1
X- BUD - 1

ACTION: AID
INFO: AMB DCM ECON ADM

UNCLASSIFIED
Classification

27 SEP 77 02:06

R 262022Z SEP 77
FM SECSTATE WASHDC
TO AMEMBASSY NAIROBI 2272/2273/2274
BT
UNCLAS STATE 230962

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: KENYA PID REVIEWS FY 79 ABS

1. KENYA PID REVIEWS HELD JUNE 14 (ASL II, RURAL HEALTH, HUMAN RESOURCES) AND JUNE 16 (MARGINAL/SEMI-ARID LANDS.)

2. ALL PIDS, EXCEPT HUMAN RESOURCES, APPROVED.

3. FOLLOWING ARE SPECIFIC COMMENTS RELATIVE TO THE STUDIES LEADING TO, AND THE EVENTUAL PROJECT PAPERS.

A. BENEFICIARY INCIDENCE NEEDS BE ANALYZED AND MAJOR PROJECT EMPHASIS NEEDS BE IN RURAL POOR CATEGORY.

B. ANALYSIS NEEDS BE MADE OF GOK PLANS FOR FINANCING RECURRENT COSTS ASSOCIATED WITH UNDERTAKING AND CONTINUATION OF DEVELOPMENT PROJECTS TO FLOW FROM PIDS. SPECIFICALLY, AND PARTICULARLY IF AID IS TO CONSIDER SHARE OF RECURRENT COSTS DURING PROJECT IMPLEMENTATION, GOK PLANNING SHOULD CLEARLY SHOW INTENT TO ASSUME THESE COSTS AND MAINTAIN PROJECT MOMENTUM AS U.S. ASSISTANCE ELEMENT PHASES OUT.

C. GOK DEVELOPMENT PRIORITIES SHOULD BE SUCH THAT ADEQUATE RESOURCES (IN ADDITION TO RECURRENT SUPPORT NOTED ABOVE) ARE TO BE COMMITTED IN SUPPORT OF EACH PROJECT. THIS COMMITMENT INCLUDES CRITICAL MANPOWER COMPONENT WHICH SHOULD SHOW BOTH ADEQUATE NUMBERS OF PERSONNEL AVAILABLE AND THAT PERSONNEL ARE/WILL BE ADEQUATELY TRAINED FOR POSITIONS THEY WILL OCCUPY.

D. CONSIDERATION OF EFFORTS AND INTENTIONS OF OTHER DONORS WILL BE IMPORTANT IN MOVING TOWARD INTENDED NEW AID INTERVENTIONS.

E. ENVIRONMENTAL/SOCIAL IMPACT - NEW PID GUIDELINES

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OPTIONAL FORM 161
(Formerly FS-112)
January 19

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REQUIRE INITIAL ENVIRONMENTAL EXAMINATION (IEE) BE SUBMITTED WITH PID. THIS REQUIREMENT EXISTS AND SERVES AS BASIS FOR DETERMINATION OF WHETHER OR NOT TO REQUIRE ENVIRONMENTAL IMPACT STATEMENT (EIS) OR ENVIRONMENTAL ASSESSMENT (EA). THEREFORE, REQUEST MISSION SUBMIT IEE FOR EACH OF THREE APPROVED PIDS ASAP AND, IN ANY CASE, PRIOR TO DECEMBER 1, 1977. OF COURSE, CONTINUING INTEGRATION OF ENVIRONMENTAL CONCERNS IN THE PP DESIGN PROCESS SHOULD ALSO BE PURSUED.

F. THE TWO-PAPER SYSTEM (PID, PP) IS INTENDED TO INCREASE FIELD RESPONSIBILITY FOR PROJECT DESIGN AND DECREASE THE PAPERWORK REQUISITE FOR PROJECT APPROVAL FULL AND FREQUENT INFORMAL FIELD-AID/W INTERCHANGE OF INFORMATION DURING PP PREPARATION IS ESSENTIAL TO AVOID SERIOUS DELAYS OR AID/W DISAPPROVAL OF PP. CONCERNING THREE KENYA PIDS, PROJECT PLANNING INITIATIVES NATURALLY NEED BE SUCCESSFULLY ACCOMPLISHED PRIOR TO PROCEEDING WITH THE PP. IT IS SUGGESTED THAT STUDIES LEADING TO PP(S) COULD PRESENT OPPORTUNITY FOR MISSION TO INITIATE MID-STREAM REVIEW(S) OF PROBABLE PARTICULAR CONTENT OF PP(S). REQUEST MISSION'S THOUGHTS RE THIS APPROACH TO SOLIDIFYING PROJECTS NOW ILLUSTRATIVELY SKETCHED IN PIDS.

4. COMMENT ON EACH PID FOLLOWS:

A. ASLI II

1. GENERAL: REVIEW OF THIS PID ACKNOWLEDGED THAT ACTUAL ELEMENTS OF ASL II IN EITHER FY 78 OR 79 WILL BE DETERMINED AS STUDIES NOW UNDERWAY OR SOON TO BEGIN ARE CONCLUDED. REVIEW COMMENTARY THEREFORE DEALT PRIMARILY WITH ADVISABLE AREAS OF EMPHASIS OF THESE STUDIES.

2. CREDIT COMPONENT: IT IS ANTICIPATED THAT THE RESULTS OF THE EVALUATION OF ASL I WILL BE MOST USEFUL IN ARRIVING AT THE CONTENT OF THE CREDIT ELEMENT OF AN ASL II. IT EXPECTED THAT FOLLOWING ASPECTS OF THIS EVALUATION WOULD BE ESPECIALLY SIGNIFICANT IN PREPARATION OF PP.

- PORTFOLIO ANALYSIS WITH BREAKDOWN BY CLASS OF BORROWER (I.E. LARGE, MEDIUM AND SMALL LANDHOLDERS), AND TYPE OF CROP.

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- SIZE OF REFLOWS BY CLASS OF BORROWER WITH SPECIAL ATTENTION TO DISTRIBUTION OF REFLOWS BETWEEN ASL I'S CLASS B AND CLASS C FARMERS.

- ANALYSIS OF SMALL LANDHOLDERS EFFECTIVE DEMAND FOR CREDIT AND PROJECTION OF FUTURE DEMAND

- AGING OF DELINQUENT LOANS IN EACH OF THE THREE CATEGORIES.

- ESTIMATED RATE OF DECAPITALIZATION.

3. AGRICULTURE MANPOWER COMPONENT AND AGRICULTURE RESEARCH COMPONENTS: IT ANTICIPATED THAT LINKAGE TO RURAL POOR OF AID ASSISTANCE WILL BE OF SPECIAL IMPORTANCE, IN THESE TWO BROAD CATEGORIES, ALTHOUGH NOT EASILY MEASURED. FOR THIS REASON, I.E. QUANTIFICATION DIFFICULTY, GOK POLICY CONSIDERATIONS INCLUDING EITHER REDIRECTION OR MORE DEFINITIVE DIRECTION OF AGRICULTURE MANPOWER AND RESEARCH PROGRAMS TO RURAL POOR POPULATION WILL BE IMPORTANT ELEMENT PP ANALYSIS. RECURRENT BUDGET IMPLICATIONS ALSO EXPECTED TO BE IMPORTANT MISSION CONSIDERATION IN PREPARING PP.

B. RURAL HEALTH DELIVERY

- LOOK FORWARD TO COMPLETION OF SECTOR ASSESSMENT FOR THE FY 78 DAP PARTICULARLY IN TERMS OF POSSIBLE RURAL HEALTH ASSISTANCE SUPPORTIVE OF GOK HEALTH STRATEGY AND OTHER DONOR ACTIVITIES.

- WOULD ANTICIPATE SPECIAL PP CONSIDERATION OF OVERALL GOK RURAL HEALTH PLANNING AND OBJECTIVES, INCLUDING MANPOWER, RECURRENT AND DEVELOPMENT BUDGET RESOURCES, AND RESEARCH.

- BELIEVE MULTI-DONOR EVALUATION OF THE FAMILY PLANNING PROJECT INDICATING THE POSSIBILITY ABSORBING THIS ACTIVITY INTO A BORADER RURAL HEALTH PROJECT WILL BE IMPORTANT.

- ALSO OF IMPORTANCE WILL BE AN ANALYSIS OF THE RELATIONSHIP OF THIS PROPOSED PROJECT TO OTHER U.S. FINANCED HEALTH ACTIVITIES IN KENYA, I.E. IEF, AMPF CODEL (PROPOSAL), POPULATION STUDIES AND RESEARCH

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CENTER.

C.A. MARGINAL/SEMI-ARID LANDS: IT UNDERSTOOD THAT MORE SPECIFIC CONTENT OF PP(S) IS TO FOLLOW FROM CID STUDIES FOLLOWING, HOWEVER, SHOULD BE CONSIDERED IN TERMS CONTENT OF EVENTUAL PPS.

- ANTICIPATE THAT AID FINANCED ACTIVITIES WILL FLOW FROM A RELATIVELY BROAD RANGE RESOURCE PLANNING AND MANAGEMENT PROGRAM FOR AREAS NOW OR TO BE INVESTIGATED BY CID TEAM.

- SOCIOLOGICAL ANALYSIS SHOULD BE SIGNIFICANT ASPECT PP(S) INCLUDING, FOR EXAMPLE, PRESENT AND ANTICIPATED MIGRATION PATTERNS, IMPACT OF INCREASED INCOMES AND LAND UNDER CULTIVATION, AND CHANGING FAMILY PATTERNS.

- BELIEVE MATTER OF LAND TENURE (E.G. REDISTRIBUTION OF PUBLIC LANDS, AND PERHAPS IN-MIGRATION OF RURAL POPULATION) WILL BE IMPORTANT ASPECT IN ARRIVING AT PP PROPOSALS.

- GIVEN PROBABILITY OF A FRAGILE SOCIO/ECONOMIC/PHYSICAL ENVIRONMENT IN ARID AREAS, PP WILL REQUIRE AN ENVIRONMENTAL ASSESSMENT PER A.I.D. REGULATION 16.

- SMALL FARMER CREDIT ASPECT OF PROJECT MAY PRESENT DIFFICULTY GIVEN PROBABILITY OF LOW CROP YIELDS, THE POSSIBLE NEED FOR HIGHLY SUBSIDIZED SMALL PRODUCER PROGRAMS IN EARLY YEARS OF PROJECT, AND PROBABILITY OF HEAVY INITIAL EMPHASIS ON TRANS-FARM BOUNDARY INFRASTRUCTURE INVESTMENT NEEDS WHICH PERHAPS FIRST WILL BE AIMED AT STABILIZING DEGRADATION RATHER THAN INCREASING PRODUCTIVE CAPACITY.

- IN CONNECTION TECHNICAL ASSISTANCE ASPECT OF PP(S) CONSIDERATION SUGGESTED FOR INCLUSION OF HORTI-CULTURALIST TO INVESTIGATE AND DEVELOP BOTH OPERATIONAL

AND RESEARCH PROGRAMS ON APPROPRIATE NEW OR IMPROVED PLANT TYPES FOR ARID AREAS. RE ANIMALS, IT SUGGESTED THAT INQUIRY BE MADE INTO APPROPRIATENESS RESEARCH AND UTILIZATION GUINEA FOWL, AND OF COURSE SMALL RUMINANT (GOAT/SHEEP) POSSIBILITIES. ALSO SUGGESTED THAT IT MIGHT BE ADVISABLE EMPHASIZE IMPROVEMENT OF ANIMAL NUTRITION RATHER OR SIMULTANEOUS WITH INTRODUCTION OF

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ADDITIONAL ANIMALS EITHER EXISTING OR NEW VARIETIES.
- MALI RURAL WORKS PP POUCHED TO MISSION AS ONE POTENTIAL MODEL/OUTLINE FOR PROPOSED MARGINAL LANDS PROJECT.

D. HUMAN RESOURCES: KENYA PID CONSIDERED SIMULTANEOUSLY WITH SIMILAR BROAD-BREADTH TRAINING PROJECTS FROM ELSEWHERE. CONCLUSION OF REVIEW OF PROPOSALS IN PRINCIPAL WAS THAT AFRICA REGIONAL MANPOWER DEVELOPMENT PROJECT COULD SUFFICE TO SATISFY TRAINING NEEDS NOT DIRECTLY FUNDABLE BY BILATERAL PROJECTS. POUCHING SEPARATELY USAID/TANZANIA FY 77 TRAINING PLAN FOR AMDP WHICH SHOULD BE USEFUL IN DEVELOPING KENYA SUBMISSION.

5. OTHER ITEMS TO BE CONSIDERED/ADDRESSED.

A. PID APPROVAL OF A PROPOSED PROJECT BY AA/AFR DOES NOT REPRESENT AGENCY COMMITMENT TO UNDERTAKE THE PROJECT.

B. SEPARATE GUIDANCE BEING PREPARED FOR CONGRESSIONAL PRESENTATION. FIELD MISSIONS WILL HAVE A PRIMARY ROLE IN PREPARING THE CP ACTIVITY SHEETS. SINCE CP ACTIVITY SHEETS NOT LINKED TO PRPS, BECOMES PARTICULARLY IMPORTANT THAT PROJECT INPUTS, OUTPUTS, AND AID COST DATA BE CLEARLY DEFINED AS EARLY AND AS ACCURATELY AS POSSIBLE AND PREFERABLY BY NOVEMBER 1, 1977.

C. IN RESPONSE TO THIS CABLE, MISSION PROVIDE FOLLOWING TO AID/W:

1. NAME OF OFFICE(S) AND MEMBERS OF FIELD PROJECT COMMITTEE RESPONSIBLE FOR PROJECT DESIGN AND MANAGEMENT.

2. ANY CHANGES IN SCHEDULE AND DESIGN PROCEDURES FORESEEN FOR DEVELOPMENT OF PP.

3. WHEN PP PROPOSED FOR SUBMISSION. CHRISTOPHER

AGENCY FOR INTERNATIONAL DEVELOPMENT

# PROJECT IDENTIFICATION DOCUMENT FACESHEET

*To Be Completed By Originating Office*

1. TRANSACTION CODE: C (A = Add, C = Change, D = Delete)

PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER *(7 digits)*

6. BUREAU/OFFICE
A. Symbol
B. Code

7. PROJECT TITLE *(maximum 40 characters)*

8. PROPOSED NEXT DOCUMENT
A. 2 = PRP, 3 = PP
B. DATE MM YY

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION
a. INITIAL FY
b. FINAL FY

10. ESTIMATED COSTS
($000 or equivalent, $1 = )

| FUNDING SOURCE | | Life of Project |
|---|---|---|
| a. AID Appropriated | | |
| b. OTHER U.S. | 1. | |
| | 2. | |
| c. Host Country | | |
| d. Other Donor(s) | | |
| TOTAL | | |

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

| A. APPROPRIATION | B. PRIMARY PURPOSE CODE | PRIMARY TECH. CODE C. Grant | D. Loan | E. FIRST FY ____ F. Grant | G. Loan | LIFE OF PROJECT H. Grant | I. Loan |
|---|---|---|---|---|---|---|---|
| (1) | | | | | | | |
| (2) | | | | | | | |
| (3) | | | | | | | |
| (4) | | | | | | | |
| | | | TOTAL | | | | |

12. SECONDARY TECHNICAL CODES *(maximum six codes of three positions each)*

| 021 | 030 | 022 | 110 | 710 | 851 |
|---|---|---|---|---|---|

13. SPECIAL CONCERNS CODES *(maximum six codes of four positions each)*

| LAB | ENV | BWW | TECH | | |
|---|---|---|---|---|---|

14. SECONDARY PURPOSE CODE: 260

15. PROJECT GOAL *(maximum 240 characters)*

Improve the quality of life of rural poor people living in Kenya's arid and semi-arid lands, especially Kitui District, through soil and water conservation, appropriate farm technology, and decentralized planning.

16. PROJECT PURPOSE *(maximum 480 characters)*

17. PLANNING RESOURCE REQUIREMENTS *(staff/funds)*

18. ORIGINATING OFFICE CLEARANCE

Signature

Title

Date Signed MM DD YY

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution MM DD YY

AID 1330-2 (3-76)

## NATIONALITY WAIVER FOR SERVICES

A nationality waiver is requested for the procurement of aerial photography services from firms of Code 935 nationality. The life of project cost of these services is estimated to be $600,000.

The eligible source for goods and services financed by A.I.D. under the project is the U.S. and Kenya. There are no known aerial photography firms of U.S. or Kenyan nationality operating in or near the project area, nor is it reasonable to believe that, given the limited size and scope of the services required, a U.S. firm would consider establishing offices in Kenya. As explained in the project paper aerial photographic services are required for the mapping of selected ASALs. There exists no practical alternative to the provision of aerial photographic services in order to carry out the mapping requirements of the project. Inquiries made locally indicate that there are several firms incorporated in Kenya which can perform the services required by the project; however, these firms are not owned by citizens of Kenya and do not, thus, qualify as local firms.

A.I.D. Handbook 1 Supplement B paragraph 5C.4.a.(2)(b) allows waivers of nationality requirements in instances where there are no suppliers from countries included in the authorized geographic code available to supply the services required. As indicated above, the only firms available to provide aerial photography services are of Code 935 nationality and, therefore, a waiver to procure such services is justified.

## SOURCE/ORIGIN WAIVER FOR COMMODITIES

A source/origin waiver is requested for the procurement of eight vehicles from firms of Code 935 nationality.

(a) Cooperating Country: Kenya
(b) Authorizing Document: PAF
(c) Project: Kenya - Arid and Semi- Arid Lands Development Project (615-0172)
(d) Nature of Funding: Grant
(e) Description of Commodities: Eight, 4-wheel drive Land Rover type vehicles.
(f) Approximate Value: $150,000
(g) Probable Procurement Origin: U.K.
(h) Probable Source: U.K. or Kenya

Section 636(i) of the Foreign Assistance Act of 1961, as amended, prohibits A.I.D. from purchasing motor vehicles unless

such vehicles are manufactured in the United States. Section 636(i) does provide, however, that "...where special circumstances exist, the President is authorized to waive the provision of the act in order to carry out the purpose of this act." Additionally, in accordance with A.I.D. Handbook 1, Supplement B, procurement of motor vehicles of other than U.S. manufacture requires a waiver. The Handbook provides that a waiver may be granted when necessary to carry out the purpose of the FAA and if, inter alia, there is a present or projected lack of adequate service facilities and supply of spare parts for U.S. made vehicles. The authority to (1) determine that special circumstances exist for purpose of Section 636(i) and (2) that there is adequate justification for a waiver under Handbook 1, Supplement B, has been delegated to AA/AFR.

The Government of Kenya has requested A.I.D. assistance to assist in developing soil/water conservation practices, both physical and vegetative practices for arid and semi-arid lands in Eastern Kenya. The above project vehicles are required to provide mobility for project technicians who will be required to work in areas where roads are usually rugged, unimproved tracks. While U.S. manufactured right-hand drive vehicles normally would have been satisfactory for this project, it has been determined through experience that the constant shortage of spare parts and non-availability of qualified mechanics to work on U.S. vehicles in rural areas has caused major implementation problems where U.S. vehicles are utilized. The Government of Kenya through the Ministries of Agriculture and Water Development depends primarily on Land Rover-type vehicles for its transportation requirements. Unless project vehicles are compatible with the country's maintenance system, adequate maintenance and ability to obtain spare parts are virtually impossible.

For reasons stated above, it is recommended that AA/AFR: (1) find that special circumstances exist justifying a waiver of the requirements of Section 636(i) of the FAA, and (2) certify that the exclusion of the proposed procurement from Free World Countries and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Note: The Project Review Committee understands that the waiver for aerial photography services is being requested at this time because the expectation is that US firms would not be interested in a smaller contract such as this and/or that the cost of such services from eligible countries would exceed by more than 50% the services available from local firms. The waiver will not be utilized if an eligible firm is available to provide these photographs at a reasonable cost at the time such services are contracted for.