615-0168 (2)

C PD-AAK-295-B1

FINAL VERSION: CONTAINS DA/AID AUTHORIZATION

42

UNCLASSIFIED

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

PROJECT PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

KENYA - RURAL ROADS SYSTEMS PROJECT

AID-DLC/P-2239
FINAL

UNCLASSIFIED

SEP 27 1977

ACTION MEMORANDUM FOR THE DEPUTY ADMINISTRATOR

THRU : SEP 27 9 20 AM '77

THRU : AA/PPC, Alexander Shakow

FROM : AA/AFR, Goler Butcher

SUBJECT: Kenya Rural Roads Systems Project

Problem: To obtain your approval of a development loan in the amount of $13 million, a development grant in the amount of $1.748 million for the Kenya Rural Roads Systems Project (615-0168), and the following waivers:

(a) An increase in the per unit limitation on shelf item procurement of Code 935 origin from $2,500 to $5,000;

[(b) Proprietary procurement of the same brand names of equipment as that financed by AID under the previously approved FY 1977 Roads Gravelling Project (615-0170).] NOT APPROVED

Discussion: The purpose of the Kenya Rural Roads Systems Project (RRSP) is to develop a network of secondary, minor and farm-to-market rural access roads to provide isolated rural areas all-weather accessibility to public and private factors of production and social services. The project will impact on the broader program goal of assisting the rural poor to attain increased levels of rural income and improved general welfare.

To achieve this purpose, the project will a) equip and operate one self-contained road gravelling, bridging and culverting unit which will up-grade to an all-weather standard approximately 2000 km. of secondary and minor roads in the Western and Nyanza provinces of Kenya, b) finance the construction, on a fixed amount reimbursable (FAR) basis, of approximately 1000 km. of new all-weather access roads in remote, semi-isolated areas in Western and Nyanza provinces, c) design and test a pilot maintenance scheme to determine more cost-effective measures of maintaining low class roads, and d) design and manage an evaluation program to measure the economic, social and environmental effect of the project. The rural access roads will directly connect to the upgraded secondary and minor roads to form a critical network of all-weather farm-to-market roads. An estimated 500,000 rural inhabitants (95 percent of whom are poor small-holders) will directly benefit from this project.

The gravelling unit financed under this project will compliment a similar unit financed by AID under the previously approved FY 1977 Roads Gravelling Project (615-0170) to implement the national multi-donor-supported roads Gravelling, Bridging and Culverting Program (GBC). This program will improve low-class rural roads to an all-weather standard in those areas of Kenya that have relatively high concentrations of small-holders and in which the Government of Kenya (GOK), with external donor assistance, is designing and implementing rural and agricultural development programs. The national GBC program will compliment the national, multi-donor-supported Rural Access Roads Program (RAR) to construct approximately 15,000 km. of low-class rural feeder roads in areas of high small-holder concentration.

Loan funds will finance a) imports of capital equipment, spare parts and construction materials for the GBC component ($8.5 mil) and b) finance, the construction costs (i.e. materials, POL, labor and hand tools) of 1000 km. of rural feeder roads. Grant funds will provide for long-term technical assistance to a) operate the GBC unit and carry-out the pilot maintenance scheme ($1.263 mil), b) supervise the RAR construction activity ($85,000), and c) design and manage the evaluation program ($0.4 mil). The loan will be fully obligated in FY 1977 and the grant will be obligated on an incremental funding basis. The loan and grant will be disbursed over a six year, six month life-of-project. Construction under the RAR component should begin during FY 1978 and be completed in FY 81, while the GBC component will be fully operational by FY 1980 and continue through FY 1984.

The host country will procure on a competitive basis the equipment required under this and the earlier approved Roads Gravelling project. It is anticipated that, to ensure standardization of brand names for maintenance purposes, procurement for these two AID projects will be combined into one procurement action. However, should there be significant unforeseen delays in signing the necessary agreements pertaining to the proposed project, the GOK and USAID may decide to initiate procurement activities under the earlier approved and signed Roads Gravelling project. In such case an approval of proprietary procurement of the same brand names of equipment as under the Gravelling Project will be required for the Rural Roads System project. Therefore, your authorization of this project will also approve proprietary procurement of equipment required under this project (about $8.5 mil for motor graders, front-end loaders, trucks, materials, etc.).

The Project Committee has recommended, and I have approved an overall "Negative Determination" for the Initial Environmental Examination (IIE) for this project (Attachment B). The Mission will prepare an IEE for each group of roads to be constructed under the RAR component of the project. The Mission Director will make a formal determination as to whether the proposed construction is an action which will have a significant (positive or negative) effect on the environment for which an Environmental Assessment (EA) is required under Regulation 16. The Mission Director will, with respect to any road(s) for which a positive determination is made, take into consideration the results of an EA in reaching a decision regarding financing and construction of the road(s).

This project was reviewed by the Development Loan Staff Committee (DLSC) on 9/6/77 and approved by the same on 9/9/77. A Sec. 653(b) Notification, which requires a ten (10) day waiting/approval period, was submitted to the Congress on 9/15/77. Therefore your approval of this project is requested by 9/26/77.

Recommendation: That you approve a) a TRANSACTION development loan of $13. mil. and a development grant of $1.748 mil. for the Kenya Rural Roads Systems Project; b) an increase in the per ~~unit~~ limitation on shelf item procurement of Code 935 origin from $2,500 to $5,000. ~~[and c) proprietary procurement of the same brand name of equipment as that financed by AID under the previously approved FY 1977 Roads Gravelling Project (615-0170)]~~

APPROVED: [illegible]

DISAPPROVED: _____

DATE: 9/23/77

Attachments:
A. Rural Roads Systems Project Paper
B. Initial Environmental Examination
C. PAF Part I and II

Clearance:
GC:MBall [illegible] Date 9/23
AFR/DR:JLWithers [illegible] Date 20 Sept 77

AFR/DR/EAP:JWooten:rpb:9-19-77:X28286

Clearances:
DAA/AFR:WHNorth
SAAA/AFR:DWachholz
AFR/EA:HJohnson(Draft)
SER/ENGR:PStearns/JGardner(Draft)
AFR/DR/EAP:SCole(Draft)
AFR/DR:SKlein(Draft)
AFR/EA:HJohnson(Draft)
AFR/EA:TO'Keefe(Draft)
GC/AFR:TBork(Draft)
AFR/DR/ARD:HJones(Draft)
AFR/DP:HJohnson(Draft)
AFR/DP:CWard(Draft)
SER/COM:JShollenberger(Draft)
PPC/DPRE:PMatheson(Draft)
PPC/DPRE:EHogan
FM/FCD:DBaker
SER/FM:TBlacka

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

COUNTRY: Kenya

PROJECT: Rural Roads System Project

PROJECT NO: 615-0168 LOAN NO: 615-T-011

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize for FY 1977 a Loan and Grant to the Government of Kenya, the "Cooperating Country," of not to exceed Thirteen Million Four Hundred Thousand United States Dollars ($13,400,000) (the "Authorized Amount") to assist in financing certain foreign exchange and local currency costs of goods and services required for the Project as described in the following paragraph. Of the Authorized Amount, Thirteen Million United States Dollars ($13,000,000) will be loaned to the Cooperating Country and Four Hundred Thousand United States Dollars ($400,000) will be granted to the Cooperating Country.

The Project consists of (a) the construction of approximately 1000 kilometers of new all-weather rural access roads in certain districts of the Western and Nyanza provinces of Kenya (hereinafter referred to as the "RAR" component of the Project) and (b) the equipping and operating of one self-contained roads gravelling, bridging and culverting unit which will upgrade approximately 2000 kilometers of secondary and minor roads in certain districts of the Western and Nyanza provinces of Kenya by gravelling and spot improvement of selected sections of roads (hereinafter referred to as the "GBC" component of the Project). The AID loan will assist in financing, on a fixed amount reimbursement basis, the roads constructed under the RAR component of the Project and the procurement of equipment, spare parts, construction materials and related goods and services for the GBC component of the Project. The AID Grant will assist in financing services and related goods for (a) technical assistance for the GBC and RAR components of the Project, (b) a pilot program for maintaining low class roads, (c) the evaluation of the Project and (d) monitoring and evaluation assistance required for the Project.

I approve the total level of AID appropriated funding planned for the Project of not to exceed Fourteen Million Seven Hundred Forty Eight Thousand United States Dollars ($14,748,000) of which $13,000,000 will be Loan-funded and $1,748,000 will be Grant-funded including the funding authorized above for

FY 1977 and further increments of grant funding during the period 1978 through 1984 which shall not exceed, in total, $1,348,000, subject to the availability of funds and in accordance with AID 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 AID regulations and Delegations of Authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as AID may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to AID in United States Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to AID in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by AID under the Loan shall have their source and origin in the Cooperating Country, the United States or other countries included in AID Geographic Code 941, and goods and services financed under the Grant shall have their source and origin in the Cooperating Country or the United States, except as AID may otherwise agree in writing. Ocean shipping may be procured from any eligible source country except the Cooperating Country.

c. Conditions Precedent to Disbursement

Prior to any disbursement, under the present Agreement, or to the issuance by AID of documentation pursuant to which disbursement will be made, the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

(1) An opinion of the Cooperating Country's Attorney General that the Project Agreement has been duly authorized

and/or ratified by and executed on behalf of the Cooperating Country, and that it constitutes a legally binding obligation of the Cooperating Country;

(2) A statement of the names, and specimen signatures, of the authorized representatives of the Cooperating Country for purposes of implementing the Project Agreement.

d. Condition Precedent to Disbursement for the GBC Component

Prior to any disbursement of grant funds under the Project Agreement, or to the issuance by AID of documentation pursuant to which disbursement of grant funds will be made for the GBC component of the Project, the Cooperating Country will, except as the Parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID, an executed contract for technical and engineering services for the GBC component of the Project.

e. Condition Precedent to Disbursement for the RAR Component

Prior to any disbursement, or the issuance of documentation pursuant to which disbursement will be made under the Project Agreement for the RAR component of the Project, the Cooperating Country shall furnish in form and substance satisfactory to AID, documentary evidence that the requisite engineering services will be available on a timely basis for this component of the Project.

f. The Project Agreement shall contain covenants, the substance of which will be as follows:

(1) Road Selection

(a) The Cooperating Country will covenant that road selection for the GBC and RAR components of the Project will be made in accordance with the procedures and criteria set forth in the Project Agreement. The criteria and procedures set forth in Section III.A. of the Rural Roads System Project Paper, will be incorporated into the Project Agreement for this purpose. These procedures and criteria are subject to modification, by mutual agreement, to reflect periodic evaluations of the Project.

(b) The Cooperating Country will covenant to submit, with regard to the Rural Access Road component of this Project, an Economic Report of the roads selected for construction which would have, as one of its objectives, the demonstration that road selection procedures and criteria have

been complied with. The report may contain cost/benefit analyses of the selected roads and analyses of the economic development effects of the proposed roads. More specific details as to the content of this report as well as the timing for it will be given in Project Implementation Letters (PILs); however, the report will be required to be submitted to AID for its approval prior to commencement of work on the roads which are the subject of the report. Unless otherwise agreed to by AID, no reimbursement under the RAR component will be made for any road which is not included in an approved evaluation report.

(c) The Cooperating Country will covenant to submit for AID review and approval annual work plans for the GBC component of the Project. Such work plans will be submitted on dates agreed upon in PILs and will be adequate, at least, to identify:

(i) planned roads for upgrading and/or rehabilitating;

(ii) types of planned upgrading and/or rehabilitating;

(iii) sequence of the work to be undertaken.

(2) Manpower Training

(a) The Cooperating Country will covenant to provide the trained personnel required for construction and maintenance of the AID financed roadwork without detracting from non-AID financed roadwork and maintenance being undertaken, or projected to be undertaken, elsewhere in Kenya.

(b) The Cooperating Country will covenant, in order to achieve the purposes in item (2)(a) above, to expand its existing training facilities for skilled construction and maintenance personnel in accordance with guidelines set out in an Annex to the Project Agreement to meet the requirements of this Project and other, non-AID financed, roads projects. Any adjustments necessary in the training program will be the subject of required annual evaluations.

(3) Project Funding

The Cooperating Country will covenant that it will supply funding required for the continued support of roads construction and maintenance work in the AID project

area in addition to meeting other present and projected construction and maintenance requirements.

(4) Road Maintenance

(a) The Cooperating Country will covenant that it will provide all personnel and funds required, and take all actions necessary to maintain the roads upgraded or constructed by this Project. To this end, appropriate officials of the Ministry of Works will discuss with AID representatives, at intervals which will be set forth in PILs, proposed maintenance plans and procedures, including the frequency of road maintenance efforts. The result of these discussions, in the form of maintenance work plans, will be the subject of subsequent implementation letters.

(b) The Cooperating Country will covenant to submit reports, as required by PILs, which will assess the work undertaken pursuant to the Pilot Maintenance Program and which will describe the extent to which the recommendations of this program have been, or will be, implemented and integrated into the Ministry of Works' overall existing maintenance program.

(5) Spare Parts Procurement

The Cooperating Country will covenant that it will establish an appropriate, timely and effective system for procuring and transporting spare parts for the Project and that it will establish a separate warehouse for storage of spare parts for the Project. To this end, the Cooperating Country will submit, prior to the arrival in Kenya of the first shipment of AID project equipment, a plan satisfactory to AID which describes in detail the proposed procurement storage, and transportation system.

(6) RAR Equipment

The Cooperating Country will covenant that, except as AID may otherwise agree in writing, all equipment required for construction under the RAR component, which the Cooperating Country is providing as part of its contribution to the Project, will be procured and in country within 4 months after execution of the Project Agreement. The Cooperating Country will covenant to have equipment for each RAR unit on the construction site in accordance with a schedule to be mutually agreed upon in PILs.

g. Environmental Considerations

USAID/Kenya shall prepare an Initial Environmental Examination ("IEE") for each road or group of roads to be constructed under the RAR component of the Project. The Mission Director, USAID/Kenya, will make a formal decision whether the proposed construction is an action which will have a significant effect on the environment for which an Environmental Assessment is required under AID Regulation 16. The Mission Director, USAID/Kenya, shall, with respect to any road(s) for which a positive determination is made, take into consideration the results of an Environmental Assessment in reaching a decision regarding the financing and construction of the road(s).

h. Waivers

Based upon the justification set forth in the Project Paper, the following waivers of AID regulations ~~are~~ 215 hereby approved:

(1) an increase in the per TRANSACTION unit limitation on shelf-item procurement of Code 935 origin from $2,500 to $5,000;

~~(2) proprietary procurement of the same brand names of equipment as that financed by AID under the previously approved Roads Gravelling Project (615-0170).~~

Robert H. Nooter
Deputy Administrator

Date: 11/25/77

Clearance:
PPC/DPRE:EHogan
AA/AFR:GButcher
DAA/AFR:HNorth
AFR/DP:CWard
AFR/EA:HJohnson (Draft)
AFR/DR:JWithers
AFR/DR:JWooten (Draft)
GCMBall:

GC/AFR:TBork:jn 20379

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

UNCLASSIFIED

AID-DLC/P-2239

August 25, 1977

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Kenya - Rural Roads Systems Project

Attached for your review is the recommendation for authorization of a loan to the Government of Kenya (the "Cooperating Country") of not to exceed Thirteen Million United States Dollars ($13,000,000) to help in financing certain foreign exchange and local currency costs of goods and services required for the project.

This loan is scheduled for consideration by the Development Loan Staff Committee on Tuesday, September 6, 1977, at 2:30 p.m., in Room 3886 New State. If you are a voting member a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Development Program Review
and Evaluation

Attachments:
Summary and Recommendations
Project Analysis
Annexes I - XIII

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

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

PP

2. DOCUMENT CODE: 3

3. COUNTRY ENTITY: Kenya

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 615-0168

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

7. PROJECT TITLE (Maximum 40 characters): Rural Roads Systems Project

8. ESTIMATED FY OF PROJECT COMPLETION: FY 84

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 77; B. QUARTER 4; C. FINAL FY 79 (Enter 1, 2, 3, or 4)

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

A. FUNDING SOURCE	FIRST FY 77 B. FX	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	7740	5660	13,400	8,863	5,885	14,748
(GRANT)	(340)	(60)	(400)	(1,463)	(285)	(1,748)
(LOAN)	(7400)	(5600)	(13,000)	(7,400)	(5,600)	(13,000)
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY	1000	542	1,542	1,000	5,500	6,500
OTHER DONOR(S)						
TOTALS	8740	6202	14,942	9,863	11,385	21,248

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. 1ST FY 77 F. GRANT	G. LOAN	H. 2ND FY 78 I. GRANT	J. LOAN	K. 3RD FY 79 L. GRANT	M. LOAN
(1) FN	133	061	061	400	13,000	500	-	848	-
(2)									
(3)									
(4)									
TOTALS									

A. APPROPRIATION	N. 4TH FY ___ O. GRANT	P. LOAN	Q. 5TH FY ___ R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN
(1) FN					1,748	13,000
(2)						
(3)						
(4)						
TOTALS						

12. IN DEPTH EVALUATION SCHEDULED: MM 07 YY 81

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

1 — 1 = NO, 2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Charles Nelson Hanadene Johnson for

TITLE: Director, USAID/Kenya

DATE SIGNED: MM 09 DD 20 YY 77

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

AID 1330-4 (3-76)

BEST AVAILABLE DOCUMENT

PROJECT PAPER

KENYA: RURAL ROADS SYSTEM PROJECT

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ANNEXES

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II Government of Kenya Request

III Directors Certification Pursuant to FAA Section 611(e)

IV AID/W Cable Commenting on PRP

V Engineering Exhibits

VI Economic Analysis

VII Social Soundness Analysis

VIII Financial Exhibits

IX Logical Framework Matrix

X Project Performance Tracking Network

XI Draft Project Description (Annex to Loan Agreement)

XII Project Authorization and Request for Allotment of Funds

XIII Initial Environmental Examination

GLOSSARY

AAPC	-	African-American Purchasing Center
ADT	-	Average Daily Traffic
ASL I	-	USAID financed Agricultural Sector Loan, number 1 Part C of this loan focuses on smallholder credit Part C is identical with the GOK's SPSCP
CBS	-	Central Bureau of Statistics
CIDA	-	Canadian International Development Agency
CPI	-	Critical Performance Indicator
DAP	-	Development Assistance Plan
FAA	-	Foreign Assistance Act of 1961, as amended
FAR	-	Fixed Amount Reimbursement
FRG	-	Federal Republic of Germany
FTC	-	Farmer Training Center
GBC Program	-	Gravelling, Briding and Culverting Program: MOW's Program for improvement of secondary and minor roads throughout the country
GBC Component	-	AID's Contribution to GBC Program under RRSP
GBC Unit	-	One set of dozers, scrapers, loaders, trucks and other equipment appropriate to road improvement activity
GOK	-	Government of Kenya
IADP	-	Integrated Agricultural Development Program, World Bank financed. Designed to provide agricultural credit and technical services to small and medium holder farmers
IBRD	-	International Bank for Reconstruction and Development
IFB	-	Invitation for Bid
ILO/UNDP	-	International Labor Office/United Nations Development Program
IRR	-	Internal Rate of Return
IRS	-	Integrated Rural Survey
LBII	-	Louis Berger International, Incorporated
MOA	-	Ministry of Agriculture
MOW	-	Ministry of Works
MSA	-	Most Seriously Affected (by increased costs of energy)
NISSP	-	National Integrated Sample Survey Program
POL	-	Petroleum, Oil and Lubricants
RAR Program	-	Rural Access Roads Program: MOW's program for construction of rural feeder roads
REDSO	-	Regional Economic Development Services Office
RRSP	-	Rural Roads Systems Project, subject of this Project Paper

SIDA	-	Swedish International Development Authority
SPB	-	Special Projects Branch, Ministry of Works
STD	-	Staff Training Department, Ministry of Works
UK	-	United Kingdom
VOC	-	Vehicle Operating Costs

Conversions: US $1.00 = KShs 8.3
KShs 1/= US $ .125

RURAL ROADS SYSTEMS PROJECT

PART I - SUMMARY AND RECOMMENDATIONS

A. Face Sheet - See Above

B. Recommendations

1. LOAN $13,000,000

Terms:
40 years, 10 year grace period

Interest:
2 percent during grace period, 3 percent thereafter

2. GRANT $ 1,748,000

Total new AID obligation $14,748,000

3. WAIVERS

a. An increase in the transaction limitation of shelf items of Code 935 origin from $2,500 to $5,000 (see Part IV-B-3).

b. An increase in the life of project and life of project funding limitations, as set forth under AIDTO Circular A-466, Handbook 3, Chapter 3, to six years and six months (see Part IV-D, Issue No. 6).

c. Proprietary procurement of the same brand names of equipment as that financed by AID under previously approved Roads Gravelling Project (615-0170) (see Part IV-B-3).

C. Description of the Project

1. Borrower and Executing Agency

The borrower will be the Government of Kenya (GOK) acting through the Ministry of Finance and Planning. The Executing Agency will be the Ministry of Works (MOW). The Special Projects Branch (SPB) within the MOW Roads Department will oversee the two road activities.

2. Project Summary

The $13.0 million AID loan and a $6.5 million GOK contribution supports a major GOK rural development effort, the financing of 2,934 kilometers of "low class" roads under two companion road programs, the

Rural Access Road Program (RAR) and the Gravelling, Bridging and Culverting (GBC) Program. The $1.7 million AID grant will provide U.S. engineering and construction technicians to assist the MOW carry out the program and make available consulting services for project evaluation.

The cornerstone of Kenya's development strategy is the economic and social development of the rural areas in which 90 percent of the population lives. The GOK recognizes that the development of rural areas requires a significant increase in access and communication between rural farmers, small growth centers, and district/province urban centers. On one hand, the delivery of agricultural inputs and technology requires access to farms while, on the other hand, in order to make use of social services the rural population needs to have access to small growth centers where these services are offered. It has therefore become GOK policy to give major emphasis to providing access and communication between farms and small growth centers through the development of all-weather road networks in the rural areas. This represents a fundamental shift in GOK policy which has up until recently stressed the construction of trunk and primary roads.

To implement its rural road policy, the GOK has developed two parallel and complementary programs, the Rural Access Roads (RAR) Program and the Gravelling, Bridging and Culverting Program (GBC) (see Chart I). It is the GOK's belief that both of these rural "low class" roads programs are integral components of a larger set of development activities which are aimed at bringing the rural population into the mainstream of Kenya's development efforts and to provide the economic and social structure necessary to make life more rewarding for the rural population.

AID's development assistance has focused on supporting GOK rural development activities and, most particularly, those activities in western Kenya. Ongoing AID supported activities, most of which directly or indirectly impact on western Kenya, are Agricultural Sector Loan I, the Rural Planning Project, the Agricultural Credit Project, and the Marginal/Semi-Arid Lands Pre-Investment Study. In continuance of AID's philosophical commitment and financial support to Kenya's rural development efforts, it is proposed that AID provide assistance to a Rural Roads Systems Project (RRSP) in order to fund a clearly identified portion of the capital and construction costs of the GOK's GBC and RAR Programs.

The RRSP will construct and upgrade approximately 3,000 kilometers of access (unclassified) and secondary and minor (classified) roads in two provinces of western Kenya (Western and Nyanza), in order to both support increased smallholder agricultural production and to bring economic and social benefits to the rural population. The area is a poor but productive agricultural region with 95 percent of the approximately four

million residents being smallholder farmers with family on-farm cash incomes of around $100 per year. The objectives of the RRSP are:

- To support increased cash cropping and livestock production and to bring more people into the market economy through the provision of all-weather access to markets and small urban centers.

- To provide rural employment through labor-intensive construction and maintenance methods.

- To improve access to social facilities and services.

- To increase local participation in development planning through the district level selection of roads to be constructed.

3. AID Loan

A $13.0 million AID loan, together with a $6.5 million GOK contribution, will finance the two complementary activities described below:

a. Rural Access Roads Component

The AID loan will assist in the financing of eight labor-intensive construction units. These units will construct approximately 934 kilometers of new all-weather access roads from existing tracks and rights-of-way in remote semi-isolated areas of six districts in Western and Nyanza Provinces. This work is expected to cost $6.0 million, of which $4.4 million will be financed by AID on a fixed amount reimbursable basis (FAR) to cover road construction costs. $1.6 million will be provided by the GOK as a contribution to the total road construction costs.

The GOK's entire RAR Program provides for the overall construction of 15,000 kilometers of access roads in 22 districts over an eight-year period. Districts selected for the program include the most populous (nearly 80 percent of the population) and agriculturally productive portions of Kenya. External donors, including U.K., the Netherlands, Switzerland, IBRD and Norway, will assist in the financing of the $100 million program. The British Overseas Development Ministry (ODM) is already assisting a pilot project in western Kenya and the World Bank approved an $8 million loan in July 1976 to finance the construction of 1,000 kilometers of access roads. 1/

1/ The World Bank loan also includes financing for MOW training facilities.

CHART - I

Role of the Rural Roads Systems Project (RRSP) in Ministry of Works Road Development Programs

USAID and Other Donor Participation

Rural Roads System Project (RRSP)

1. Trunk and Primary Roads

MOW Road Program

No USAID Participation

2. Secondary and Minor Roads

Gravelling, Bridging and Culverting (GBC) Program

a. CIDA -3 units 1/

b. USAID

Roads Gravelling -1 unit

RRSP -1 unit

GBC Component

3. Unclassified Roads

Rural Access Roads (RAR) Program

a. Netherlands - 6 units 2/

b. U.K. (ODM) - 5 units

c. Switzerland - 2 units

d. NORAD -18 units

e. IBRD/IDA - 8 units

f. USAID: RRSP - 8 units

RAR Component

4. Staff and Training to Support GBC and RAR Programs

a. CIDA

b. IBRD/IDA

c. SIDA

d. USAID:

Roads Gravelling- 3 TA

RRSP - 4 TA

e. ODM (UK)

f. ILO

g. UNDP

h. Switzerland

1/ One GBC unit typically consists of a set of trucks, dozers, graders, rollers, tankers, mobile workshop, hand tools, staff and labor sufficient to improve up to 2000 kilometers of secondary and minor roads over a five year operating life.

2/ One RAR unit consists of tractors, trailers, trucks, hand tools, staff and labor to construct 126 kilometers over 3 years.

b. Gravelling, Bridging and Culverting Component

The AID loan will assist in financing U.S. equipment and construction materials to outfit and operate one self-contained unit which is designed to upgrade and rehabilitate 2,000 kilometers of secondary and minor roads. The road improvement effort is estimated to cost $13.5 million, of which $8.6 million covering U.S. equipment and spare parts will be financed by AID, and $4.9 million covering local construction costs will be financed by the GOK. This GBC unit is additional to the one being financed under the previously approved Road Gravelling Project (615-0170). The MOW proposes to assign one AID financed unit to Western Province and the other one to Nyanza Province. CIDA has extended a $13.4 million loan to Kenya to finance three gravelling units. SIDA is providing technical assistance for the training of MOW personnel.

The newly constructed access roads together with the rehabilitated secondary and minor roads will provide an all-weather network of rural roads linking small farms to marketing centers

4. AID Grant

The AID loan will be supported by a grant for $1,748,000 consisting of three parts. The first sets aside $1,263,000 for assisting the GBC program by providing through an OPEX contract with the MOW the services of (1) a Deputy Project Leader (engineer), (2) a construction superintendent, and (3) a maintenance mechanic. The Project Leader (financed under the USAID's Road Gravelling Loan) and the Deputy Project Leader will be headquartered at the MOW office in Nairobi. The others will be in the field with the GBC unit. This contract will also provide for the services of (4) a roads engineer to design and test a pilot maintenance scheme in the project area for a five-year period. The second part of the grant will finance a U.S. consulting services contract with the MOW for $400,000 to design and manage an evaluation of the RRSP to measure the economic and social impact of improved roads on the rural economy and society of western Kenya. The third part provides $85,000 for local engineering services to assist the USAID Project Manager monitor RAR construction activity.

D. Summary Findings

The Project Committee has determined the proposed activities to be technically and financially feasible for completion within the proposed disbursement period of six years.

Louis Berger International, Inc. assisted the GOK and the USAID in developing the technical analysis of the project. The MOW, the Executing Agency, has been thoroughly examined. With the support of the MOW training program, financed by the World Bank and SIDA, and technicians provided under this loan and by other donors, it is believed the MOW will have the expertise and capacity to carry out the project. There appear to be no financial constraints to prevent the MOW from providing the required funding for project implementation. Although maintenance financing is an issue which has drawn considerable Mission interest and concern, it is felt the proposed maintenance pilot scheme which will be conducted by the grant-funded engineer will result in actions being taken by the MOW that will lead to a savings of resources on one hand and improved maintenance on the other. The social analysis indicates the project will have a substantial positive impact on the small farmers residing in the project area. Work on the access roads will not interfere with normal on-farm activities.

On the basis of the analyses contained in this paper, the USAID Mission to Kenya concludes that the project is technically, economically, and financially sound and recommends that the project be authorized at a level not to exceed $14.7 million.

The project meets all applicable statutory criteria (see Annex I). The USAID Mission Director in Kenya has certified that Kenya has the capability to effectively maintain and utilize project financed activities (Annex III).

E. Project Issues

The ECPR cable commenting on the results of the PRP review (Annex IV) was dated January 8, 1976. In the interim, several changes in design have occurred which have varied some of the program elements. The following represents issues addressed in that message and subsequent messages as they now relate to the final design:

1. Road Construction/Improvement Requirements in the Target Area

a. Overview

Spatial analysis of the rural development process highlights the critical need for physical access and social communication between rural areas and small growth centers in order to increase the number of people able to take advantage of social, economic and technical services and information. In rural Kenya, the principal means of communication is the direct physical encounter utilizing the road network; telephone and letters are not functioning elements in the lives of Kenya's rural population. Rural economic activities rely on the physical delivery of bulk

inputs and the bulk export of surplus production. Furthermore, experience gained in past agricultural activities and which is supported by numerous comprehensive studies points to the need for reliable all-year physical access and communication between rural areas and small growth centers. Large scale participation in the development process and increased economic specialization is possible only with improved facilities for the movement of people, goods and ideas. 1/

Western Kenya has been identified as an area of high population density and unreliable road networks. In order to complement ongoing and proposed rural development activities, including ASL I and IADP, the GOK has developed a comprehensive rural roads network development program, of which this Project Paper proposes to finance one portion. The project area is one of frequent and heavy rainfall yet only 20 percent of the D and E class roads (secondary and minor roads) are at an all-weather standard. Therefore, up to 80 percent of the D and E roads linking farms to rural centers are vulnerable to frequent impassible conditions due to rainfall.

The GOK's rural roads development strategy is based on a complementary, companion roads concept. In order to provide all-weather access to the smallholder, farm-to-market roads must link up to an all-weather network of minor and secondary roads and then into the existing trunk system. In reverse, access from small urban centers to the farm level requires an all-weather network linking the rural market to the rural access roads. It is therefore imperative that both the rural access roads and the secondary/minor roads be improved and constructed to an all-weather standard at approximately the same point in time as part of one overall roads development program. To do one without the other leaves a gap in the linkage between the farm and the trunk roads system and/or the rural market centers.

b. Rural Access Roads: Number of RAR Construction Units Required In Project Area

The actual kilometers of rural access roads to be constructed in each district has been determined, inter alia, from the district's agricultural potential and the extent to which the district is served by the existing road network. As its contribution to the Government of

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1/ See: W. McKim. "Spatial Organization and Development Planning in Kenya". Paper to ASA Conference, 1974.

Logan, M.I. "The Spatial System and Planning Strategies in Developing Countries". The Geographical Review. 62,2 (1972).

Kenya's nationwide Rural Access Roads Program, AID will assist in the construction of rural access roads in six districts of western Kenya.

After undertaking detailed sociological, economic and technical studies of the project area, Louis Berger International recommended the construction of approximately 1,000 kilometers of rural access roads in the six project area districts. In order to complete this work program within the time frame of the national effort, it was recommended that eight road construction units, each with an output capacity of 42 kilometers per year, be established in western Kenya.

c. Secondary and Minor Roads: Number of GBC Units Required In Project Area

There are a total of 6,151 kilometers of D and E roads in Nyanza and Western Provinces. Of this total, approximately 1,200 have already been gravelled leaving a total of 4,951 kilometers of earthen surfaced D and E roads in the target provinces. In addition to a technical analysis, an economic traffic threshold analysis was conducted on the subject roads and concluded, based on traffic flows, location of development projects, rights-of-way, soil structures, and costs of various road improvement technologies, that 4,000 kilometers of road were both technically and economically eligible for the GBC road improvement program.

One GBC unit has a lifetime output capacity of approximately 2,000 kilometers of road improvement when 75 percent of the improvement is performed on a spot basis. The Roads Gravelling Project (615-0170) provides financing for one GBC unit in western Kenya. In order to complete the 4,000 kilometers road improvement task in western Kenya and to insure the successful use of the rural access roads, whose construction this project will finance, it is necessary to provide a second GBC unit.

d. Timing of GBC Operations

In addition to the spatial considerations which dictate two GBC units in the project area, intertemporal considerations clearly indicate the need for undertaking access road construction and secondary road improvements within the same relative time period. The risks inherent in financing a GBC unit are considered to be significantly less than those risks accepted in typical AID financed rural development activities in Kenya and elsewhere. The GBC unit consists of a known physical entity undertaking improvement work on existing roads. There is more than sufficient technical, economic and social information available and presented in this Project Paper to justify the second GBC unit. Waiting, for example, for the results of an evaluation of the first unit introduces a five to six year delay with little promise of generating data essential

to the financing of the second unit. The concept of a companion road system requires the linkage of rural roads to functioning all-weather secondary and minor roads. A significant delay between start-up of the two GBC units will greatly reduce the benefits anticipated from the RAR component and the first GBC unit and, in fact, such a hiatus would not be acceptable to the GOK.

2. Construction Techniques: Capital and Labor-Intensive

The RRSP proposes to finance (1) the construction of 934 kilometers of rural access roads using labor-intensive construction techniques, and (2) the improvement of 2,000 kilometers of minor and secondary roads, relying on capital-intensive techniques. Technical and economic analysis of various construction techniques and input costs have selected what is considered to be the optimal construction technique appropriate to each particular construction/improvement task.

The technical and economic analysis leading to the selection of these particular techniques is more fully described in Section III.A. and Annex VI.

The GBC unit, which will improve 2,000 kilometers of road, is to be highly mobile entity composed of graders, dozers, loaders, rollers, trucks, and other essential equipment. An assessment of the road improvement requirements in western Kenya revealed that most of the work should be done on a "spot" basis, that is, in order to bring an entire 100 kilometer link of road up to an all-weather standard, actual improvement and upgrading would only be required on the approximately 20 kilometers of the link which prevent all-weather travel. This approach alone dictates a highly mobile construction/improvement unit. Economic analysis of various construction operations (shaping, digging gravel, loading, transport, and spreading gravel) indicates that significant cost increases could be expected if labor-intensive techniques were employed as against the use of machines. Labor-intensive techniques will be employed in those operations for which they are technically and economically justified. For example, the placement of culverts and the construction of small bridges are very labor-intensive operations. The Ministry of Works is very conscious of the labor employment issue and even now is making a serious effort to substitute labor-intensive for capital-intensive construction and maintenance techniques wherever possible and feasible.

The RRSP provides funding for a maintenance engineer who will be charged with the responsibility of implementing a pilot road maintenance scheme in western Kenya. The essence of the pilot program is a highly labor-intensive approach to road maintenance where sections of road are allocated to individuals living near the road. For a negotiated sum, the selected individuals are given the responsibility of maintaining a certain

section of road up to an agreed upon standard. This concept will provide additional employment opportunities for the very target population being served by the roads. In addition to providing rural employment, the maintenance scheme promises to provide considerable savings to the MOW.

3. Capacity of the MOW to Implement the Program

REDSO/EA engineers are fully satisfied that the MOW has the proven capacity to carry out this program and that given ongoing training activities, the required manpower will be ready and able to fill an assigned role in the planned road construction and improvement program.

4. Ability of MOW to Maintain Roads in the Project Area

Through a combination of the MOW's ongoing maintenance efforts and the improved maintenance capacity which the grant funded maintenance technician will provide to the MOW, the MOW will be capable of providing satisfactory maintenance to project area roads.

Under the labor-intensive pilot maintenance scheme, it will be possible to provide appropriate and timely maintenance to an increased number of roads while at the same time not straining the MOW's maintenance budget. The new maintenance scheme, combined with other efficiencies to be introduced by the grant maintenance engineer, should greatly increase the efficiency and capacity of the MOW to perform routine road maintenance. The present MOW maintenance budget is therefore not seen as a binding constraint to the MOW's expanded maintenance duties since, through this project, new maintenance techniques will be implemented which will make a significant reduction in the per kilometer maintenance costs now being incurred by the MOW.

5. Length of Project Life

The total life of project is 78 months (6 years, 6 months); the total Disbursement Period is 73 months (6 years, 1 month); with the total Work Period for the RAR component at 40 months (3 years, 4 months), and for the GBC component at 58 months (4 years, 10 months). The length of the Project Life is determined by the physical nature of the GBC unit and the road improvement work it is performing. As detailed in the Critical Performance Indicator Network in Annex X, the principal factor which lengthens Project Life is the long lead time required when ordering equipment from the U.S. Note that equipment for the GBC unit is not scheduled to reach a Kenyan port until project month 22.

While the Life of Project is estimated at over six years, project disbursements will be heavily weighted toward the first years of the project. For example, within the first two project years it is anticipated

that 50 percent of the AID input will be disbursed, that by the fourth project year over 80 percent disbursement will be realized, and that by the end of year five, 90 percent disbursement will be achieved.

6. Economic Analysis and Internal Rate of Return

The internal rate of return on the RRSP has been estimated at 14.8 percent under the assumptions and methodology presented in Section III-B and detailed in Annex VI. For the purpose of economic feasibility analysis the RRSP has been disaggregated into its two principal components and a separate economic appraisal has been made of each.

The Gravelling, Bridging and Culverting (GBC) component has an estimated internal rate of return of 11.5 percent and the Rural Access Roads (RAR) component has an estimated internal rate of return of 17.9 percent. The allocation of project benefits to specific project components is based on best estimates of benefits generated by each specific component. Numerous social benefits have been identified but due to the arbitrary nature of any quantification procedure these benefits have not been assigned a monetary value.

The internal rates of return therefore represent a conservative estimate of benefits. The project's overall rate of return, as well as the rates of return on the two components, is in excess of Kenya's generally accepted 10 percent social opportunity cost of capital.

7. Project Beneficiaries

The RRSP will directly benefit approximately 500,000 rural inhabitants of the project area, about 13 percent of the total project area population, or roughly 4 percent of Kenya's entire population. This target group represents the most isolated segment of the population in western Kenya. The RAR component will focus maximum benefits on the 120,000-130,000 inhabitants residing within the rural access roads' zone of influence. These persons are among the most isolated and poorest subsection of the 500,000 target population. It is anticipated that incremental agricultural income generated by the RRSP will represent, on average, a 22 percent increase in farm income.

F. Project Committee

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Part II - BACKGROUND AND DETAILED DESCRIPTION

A. PROJECT BACKGROUND

1. Agriculture

About 90 percent of Kenya's population lives in rural areas and depends primarily upon agriculture, which provides over 25 percent of recorded wage employment. In 1975, the agricultural sector contributed about 29 percent of GDP, of which about 16 percent was provided by subsistence agriculture and 13 percent by monetary agriculture.

Less than 20 percent of Kenya's land has high or medium agriculture potential. Most of the better agricultural land is located in the highlands, in western Kenya (the Project area) or along the coast. Because of geographic and climatic variations, a diverse range of farm commodities are produced. The principal export products are coffee, tea, sisal, beef and pyrethrum, and the major food products marketed domestically are maize, wheat, sugar, livestock and dairy products. Maize is the main subsistence crop, although pulses, cassava, millet and bananas are also grown for subsistence.

Before Independence, the agricultural market sector was dominated by large-scale holdings generally operated by Europeans. Most of these holdings have since been transferred to Africans, with some of the holdings kept intact and some sub-divided. Considerable efforts have been made to develop smallholder agriculture throughout the country, with special emphasis on encouraging the production of high value export crops, such as coffee, tea and pyrethrum, and the introduction of hybrid maize and improved "grade" cattle. As a result of these developments, small-scale farms now produce about 50 percent of total marketed agricultural production.

2. The Road Network

Since Independence the GOK has extensively improved its highway facilities. Over the past five years, the Government has spent an average of $36 - $43 million per year on new construction, improvements and maintenance. Most of these funds have been used to upgrade the trunk and primary roads in order to accommodate the increase in traffic, reflected by the rise of imported vehicles from 7,390 in 1968 to 15,296 in 1974. Special purpose roads (e.g., tourism, sugar, tea and rice roads) have also received attention.

The highway network of classified roads now totals 50,000 kilometers, of which approximately 15 percent are paved, and, in terms of

MOW classification, the network comprises the following:

International Trunk Roads	Class A	2,827.5 km.
National Trunk Roads	Class B	2,403.5 "
Primary Roads	Class C	7,891.0 "
Secondary Roads)	Class D	10,147.7 "
Minor Roads) 1/	Class E	20,210.2 "
Special Purpose Roads		6,301.7 "
Municipality Roads		308.4 "

It is important to note that the roads classification is functional in nature and does not necessarily denote the relative standard of a road or the level of traffic it carries. Some Class E roads, for example, have higher traffic levels than some Class D roads, and are constructed and maintained to a higher standard.

A brief definition of each class follows:

Class A - International Trunk Roads - Link centers of international importance and across boundaries or terminate at international ports. Examples of such centers are Nairobi and Mombasa.

Class B - National Trunk Roads - Link nationally important centers. Examples in the Project area are Busia, Kisumu, and Kisii.

Class C - Primary Roads - Link provincially important centers to each other or to high class roads. Examples in the Project area are Homa Bay and Siaya.

Class D - Secondary Roads - Link locally important centers to each other and to higher class roads. Examples are Akala and Luanda.

Class E - Minor Roads - Any link to a minor center. Examples are Boro and Kadenge.

In addition to the above, there are about 60,000 kilometers of unclassified roads and tracks which are the subject of the GOK's Rural Access Roads Program. It is anticipated that the unclassified roads will soon be added to the classified network.

1/ GBC Program

The basic skeleton of the trunk and primary roads portion of the classified system is close to completion with all but about 4,000 kilometers (2,400 miles) having all-weather surfaces (bitumen or gravel). The secondary and minor network constitutes the remaining two-thirds of the system but, by contrast, only about 4,500 kilometers or 15 percent of these are all-weather. As secondary and minor roads will link rural access roads and/or the smaller market centers to primary roads and/or larger centers, there now exists a serious gap in the ability of the road network to connect farms effectively to local, provincial and national production, marketing, distribution and storage centers throughout the year.

As stipulated in the current Development Plan (1974-78), GOK policy places emphasis on the construction of the secondary and minor roads, rural access roads (not classified) and maintenance of existing roads, in addition to major projects involving selected heavily trafficked road segments for new construction.

3. Priority and Relevance

a. GOK Development Policy

The 1974-78 Development Plan is regarded by the GOK as a comprehensive strategy for developing the rural areas so as to achieve the Plan's overall goals of a more equitable distribution of national income and faster growth of employment opportunities. Achieving these goals, however, is believed to be dependent primarily on development of the agriculture sector in order to increase production, to increase farm incomes, particularly of small producers, to increase sectoral employment opportunities and to develop less favored areas.

This approach has not changed despite a severe worsening of Kenya's balance of payments position as a result of world-wide inflation, several years of bad weather, and a resultant slowing down of the economy which has jeopardized the GOK's efforts to restructure its economy and use its resources more effectively. However, in response to balance of payments and inflation problems the GOK announced in Sessional Paper No. 4 of 1975 an Action Program to adjust the structure of the economy in a way that would enable a high growth rate to be regained in the 1980's under a permanently more severe balance of payments constraint while at the same time maintaining, in the short run, an annual growth rate of between five and six percent.

The role of agriculture development in such a strategy has thus become even more crucial since in addition to increasing production, absorbing labor, and maintaining incomes and consumption, the sector must also make a major contribution to import substitution, both directly and

through resource-based local industry, and also, in a similar fashion, must open up export opportunities. Doing this through small farmers will require an acceleration in the Plan's shift in financing availabilities in the direction of agriculture and supporting activities, and away from development activities whose pay-off requires a long time to realize. It will also require that smallholders have better access to agriculture services (extension, input supply, marketing and credit) and that there be improvement in related activities such as transportation.

The following table shows how the revised GOK forward budget in the Action Program is to bring about the first change:

Table I: Shifts in Shares of Total Development Expenditures

	FY 69-73 (Actual)	FY 74-78 (Plan Projections)	FY 75-78 (Forward Budget Projections)
Agriculture and Rural Water Supply	13.0%	22.3%	37.3%
Roads, Bridges and Buildings	34.8%	21.3%	16.9%

Implementing the change in access is to be done through the Part C program of the first AID Agriculture Sector Loan and the IBRD-assisted Integrated Agriculture Development Program. Both represent integrated agriculture development efforts targetted on smallholders with the Part C effort probably reaching lower income farmers much more quickly.

Simultaneously, and in support of the above efforts as well as other agriculture and rural development activities, the GOK has dramatically shifted its emphasis in roads construction from major to rural roads with the thrust of such efforts being on provision of efficient connections between farmers and market centers. Special attention is to be directed to providing all-weather access to such centers so as to enable isolated rural populations to travel more easily, to market their produce more cheaply and easily, and to have access to provincial and nation-wide markets rather than the more restricted local markets. Accordingly, major emphasis during the Plan period is to shift (1) to maintenance and upgrading of the secondary and minor roads portions of the classified roads network, and (2) to constructing new access roads.

b. Origins of the Rural Roads Programs

As indicated, the GOK's decision to shift its emphasis to favor rural roads was made in the 1974-78 Development Plan while the speed at which the shift was to occur was accelerated in the 1975 Action Program. Emphasis prior to that time had been given to the trunk and primary levels of the classified system which are now essentially in place and mostly constructed to a fairly high, i.e. bituminized, standard. The shift also reflected a number of other factors:

i. Discussions in the early 1970's and subsequently involving the Ministries of Works, Agriculture and Local Government and other departments to ascertain the needs which rural roads should meet and to develop an approach which would assure they would meet the identified needs.

ii. While this internal assessment was taking place, the International Labor Organization (ILO) and the IBRD conducted intensive surveys in Kenya during 1972 and 1973 resulting in several reports which concluded that coordination between rural roads and agriculture development was required. The ILO report in particular emphasized that feeder or access roads contribute to higher income for farmers by reducing the transport costs between farm and market as well as improving the marketing process. The report also stressed the beneficial effects of rural roads in facilitating and stimulating the development of rural services in education, health, and agriculture.

iii. The ILO report injected another important concept into the Government's considerations on rural roads--the recommendation that labor intensive techniques be applied in rural areas to generate employment and incomes. This concept was given further impetus when GOK officials met with IBRD officials in Washington in 1973. The Bank emphasized the need to develop the roads linking agriculture production areas with market and service centers. The Bank, further, proffered assistance if the GOK were to develop a comprehensive program for carrying out the necessary development of rural access roads based on their social and economic impact and utilizing labor intensive methods.

To effect the shift the MOW has initiated two rural roads programs and actively sought donor assistance to enable it to carry them out. One, the Rural Access Roads Program directly grew out of the above events, and in March 1974 the GOK submitted a proposal to the IBRD and the Swedish International Development Authority. (A July 1975 revision of that proposal is the basis for part of this Paper.) Shortly thereafter the British Overseas Development Ministry (ODM) allocated funds to enable the MOW to test its labor intensive approach on a pilot scale. That testing program has been underway in Nyeri since October

1974, constructing 90 kms of roads and, additionally, the MOW has operated a similar pilot operation in South Nyanza and Kwale Districts since March 1976, which has also built 90 kms of roads.

At about the same time the MOW was also continuing discussions begun in 1972 with SIDA and the Canadian International Development Agency (CIDA) regarding assistance for the second rural roads effort, the Gravelling, Bridging and Culverting (GBC) program. After review of the GOK proposal and the carrying out of various economic, financial and technical studies, these two donors agreed to participate in the GBC, each to provide three gravelling units and related technical assistance personnel. The total CIDA contribution agreed upon in 1974 was $13.5 million, of which $11.4 million was to be loan-financed and the remainder, a grant. SIDA agreed in June 1975 to grant $14.7 million for GBC plus additional funds for in-country training of MOW staff needed for both the RAR and GBC programs. The three Swedish-financed units were to operate in Western and Nyanza Provinces while the Canadian-financed units were to work in Central, Eastern and Coast Provinces.

c. History of AID Involvement

AID was first approached about the possibility of its assisting in the rural roads area in early CY 1975. The MOW then inquired about AID's interest in financing two GBC units and related TA for use in the Rift Valley Province and also about AID's interest in supporting the RARP, the proposal for which was then being revised. The USAID agreed to consider both and proceeded in June 1975 to prepare a PID (see FY 1977 ABS) covering an estimated $5-$6 million in FY 1977 loan assistance for RARP based on information then available from the MOW, the IBRD, and other donors. It was then anticipated that the two GBC units might be included in ASL-II proposed for FY 1976, planning for which was already underway.

The USAID had previously submitted a PRP for ASL-II on February 14, 1975, anticipating this loan would support with dollar funds or local currency generations the GOK Integrated Agriculture Development Program (IADP), fertilizer imports, and a range of GOK agriculture services, such as extension, training and research. AID/W recommended after reviewing the PRP a change in the loan's focus and that the PRP be redone by the DAP team (75 STATE 73794). The USAID could not agree to the latter, believing it regressive, and proposed the DAP team do a PP rather than another PRP (75 NAIROBI 2822). As a result of the team's efforts, which were limited on the PP due to time constraints, and because of the evolutionary nature of the project design process, ASL-II's concept was narrowed over the summer to support for IADP in the areas of extension, research and training and for the GBC. At about the same time the USAID concluded that it might be more

appropriate to deliver the two GBC units in separate stages with one unit to be included in ASL-II and the second in the FY 1977 roads loan. (The prospect then existed of AID's two units, and SIDA's three, arriving simultaneously.) Staged delivery, it was felt, might place less of a burden on MOW manpower and administrative capabilities. These changes in Mission thinking were embodied in an August 25, 1975 memorandum on ASL-II to the USAID Director from the Program Officer (copies previously were sent to AID/W). (Because of problems affecting AID support to IADP, the proposed FY 1976 sector loan later became the FY 1977 Roads Gravelling project approved by the DLSC in January 1977.)

The following month (September 1975) SIDA and the GOK unexpectedly agreed that SIDA would withdraw its direct support for the GBC and RARP while continuing its indirect assistance through financing for the expanded MOW staff training capability needed to support both rural roads programs. SIDA found itself unable to finance project cost increases for on-going activities resulting from inflation because an increase in the appropriation of new aid funds could not be made available. Thus, it was agreed that the GOK would utilize funds committed for the not-yet-operational GBC program to cover these cost increases.

The MOW then approached AID regarding the possibility of changing the area of operations for its GBC units to Western and Nyanza Provinces--a request with which the Mission readily concurred. At the same time it was agreed that the USAID would consider increasing the number of gravelling units to be provided under the Rural Roads Systems Project from one to two, which taken together with the one being proposed under the then-existing ASL-II would make three such AID-financed units, or the same number as the original SIDA commitment for this area. This revision in the PID Project concept was embodied in the PRP submitted to AID/W in late November 1975, following the September IBRD-other donor appraisal of the RARP. That document also added another element not originally included in the PID--study of the impact of low class rural roads' improvements on rural development (see 75 STATE 226677 and NAIROBI 8641). The current Project concept has remained basically unchanged since the PRP. The RARP would be integrated with the GBC program for the Project area--Western and Nyanza Provinces. Resulting from investigations by the MOW, Louis Berger International, Inc. and the Project Committee, it became evident that two GBC units were required, one for each province, with one to be financed under the Roads Gravelling Project and one under the proposed Rural Roads Systems Loan (see Part II. B.5).

4. Other Donor Activities

As indicated above, an IBRD-sponsored appraisal mission visited Kenya in September 1975 to review the RARP. Meetings were held with

MOW and MOFP officials and attended by representatives of AID, UNDP, ODM, SIDA and KFW (West Germany) in addition to the IBRD team. The agreed plan of action which emerged from those meetings was that the various donors would coordinate their inputs with the IBRD taking the lead. The ODM, which was already active, preferred to remain independent of this procedure.

As time passed, the World Bank found the agreed approach unwieldy due to its own desires to move ahead while the other donors could only proceed at a slower pace because of their organization's bureaucratic requirements for project design and approval. The Bank, therefore, proceeded to negotiate an $8 million project consisting of an IDA credit of $4 million provided on standard terms and an IBRD loan in the same amount for a period of 25 years having a five-year grace period and an interest rate of 8.85 percent. These funds are to finance eight construction units over a three-year period during which about 1,000 kilometers of access roads are to be constructed. No geographic area was designated for these inputs, selection being left to the GOK.

To date, the GOK has received expressions of interest from six donors (including AID) to finance 47 RAR units over the next three years as recapped below:

Donor	No. Units	Geographical Area
United Kingdom	5	One unit each in the Districts of Nyeri, South Nyanza and Kwale; selection of two remaining districts pending.
Netherlands	6	Three units in the two Districts of West Pokot and Trans Nzoia; other three units open, selection pending.
Switzerland	2	Districts not selected by GOK to date.
NORAD	18	No restriction as to area; selection pending GOK decision.
World Bank	8	No restriction as to area; GOK selection to be made soon.
AID	8	Restricted to Western and Nyanza Provinces
	47	

The GOK will probably hold the number of units to 47 over the next three years for its own budgetary purposes.

At the present time the only other donor directly participating in GBC is CIDA (see above). The CIDA-financed Project Engineer arrived in Kenya in mid-1976 and, working out of the MOW Special Projects Division (SPD), began making necessary logistics arrangements for the three Canadian-supplied gravelling units. The equipment for all three units has now arrived in Kenya, and construction is about to commence in the Provinces east of the Rift (Central, Eastern and Coast).

5. Relationship to Other AID Activities

The Kenya DAP, issued in October 1974, and the DAP Supplement of July 1975 set forth the basic strategy and rationale for an expanded program of U.S. assistance to Kenya. Agriculture is designated as the principal sector of concentration with the focus of that involvement being increasing smallholder incomes through improving low income agricultural producers' access to agriculture institutions, services and infrastructure. This includes access to agriculture inputs (credit, seeds, pesticides, fertilizer and animal health services), markets and/or storage, rural roads, and water.

Illustration I provides a visual presentation of the interrelationships between various USAID development assistance activities in Kenya to emphasize that the program is not a disjointed set of projects but rather represents a cohesive development assistance strategy which focuses on agricultural production and the smallholder farmer. In addition to sectoral cohesion, the USAID projects also exhibit a very strong spatial cohesion, with many of the activities centered in Western and Nyanza Provinces; the very provinces in which the RRSP is centered.

Spatial analysis of the development process repeatedly emphasizes the importance of communication and access between rural areas and the small growth centers, markets, administrative centers, and small urban places.[1/] In order to effectively provide credit and extension services to smallholder farmers, as well as to permit easy export of agricultural surplus from farms to markets, it is essential that reliable access be

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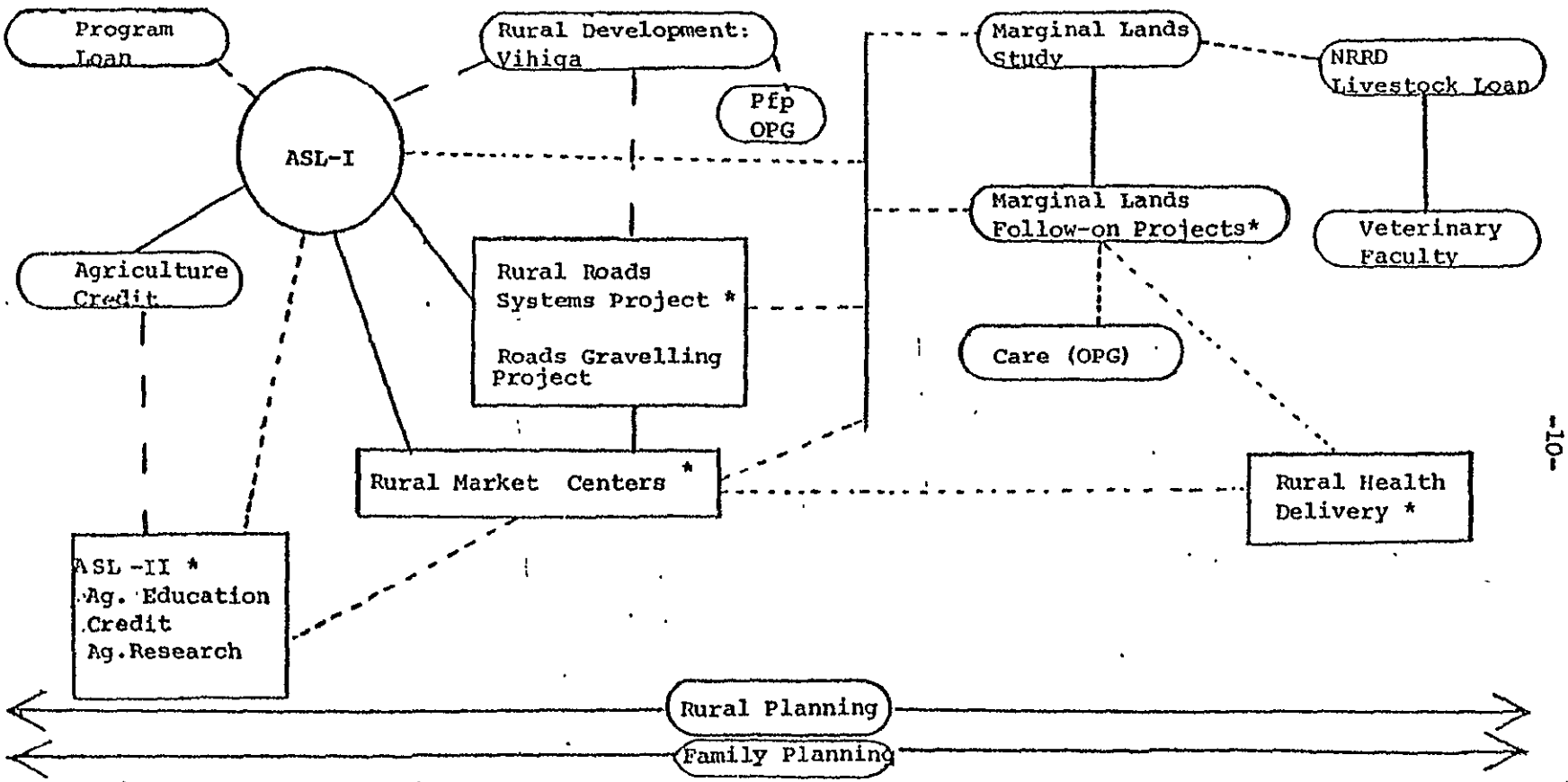
1/ W. McKim. "Spatial Organization and Development Planning in Kenya". Paper presented at ASA Conference, 1974.

D. Taylor. "The Role of the Small Urban Place in Development: A Case Study From Kenya". Presented at ASA Conference, 1972.

Illustration I

USAID/Kenya- Development Assistance Activities



Project Inter-relationships

Derivative or Contributory — — — —
Possible Direct - - - - - - - - - - - - - -
Direct ————————

*Proposed/Not Yet Approved

available to and from the rural farmers. The effectiveness of ASL 1 and the Agricultural Credit Project is greatly increased in those locations where physical access is not a barrier to reaching the smallholder farmer.

Economies of scale dictate that many social services, including educational and health facilities, are provided at locations no smaller than the small growth center or the small urban place. For the rural population to take advantage of services offered, or to provide sufficient demand to justify the expansion or even the initial provision of certain services, there must be dependable access between the rural farmer and the offered services. The effectiveness of the rural health delivery system, to which AID proposes to provide financial support, is very much influenced by the degree to which reliable access exists between the service recipient and the service provider.

The proposed Rural Access Roads and Roads Gravelling Components are two parts of an overall integrated rural roads program. Both components share a common purpose, will operate in the same geographic area, and will be administered by the same USAID Project Manager. Road selection criteria for the integrated project places emphasis on providing all-weather small farmer access to market centers in areas of other development programs. Two such development programs are Part C of the AID Agriculture Sector Loan I and the GOK-IBRD Integrated Agriculture Development Program. While AID does not now contribute directly to IADP, the proposed ASL II may indirectly support that activity through support for improved training for extension staff, credit, and agriculture research more relevant to smallholder needs and concerns.

ASL I approved in FY 1975, through its Part C program for subsistence farmers provides an integrated package of credit, inputs delivery, extension and marketing through cooperative societies and unions principally in Western and Nyanza Provinces. Six of the eight Part C target districts are located in these two provinces (as are a number of districts selected for the IADP).

Taken in the wider extent, support for rural roads development in this particular geographic area will also be closely related to proposed efforts by the USAID in developing rural market centers. The concept of such assistance is still being refined, but the basic principle is to provide assistance to develop the capabilities of such centers to service their surrounding rural populations, thus involving aid assistance at the crucial points for the farmer, the small rural market center, and the rural roads system linking the two. This assistance activity may be proposed to AID/W in FY 1979 or FY 1980, about the time AID's roads efforts should be reaching full implementation, allowing time for equipment procurement and delivery.

A final AID project to which the Rural Roads Systems activity is related is the recently concluded Rural Development-Vihiga project which, under one sub-activity, developed the prototype system for labor-intensive rural access roads construction now being used by the MOW for the RARP. The experience gained in Vihiga was a significant factor in convincing the GOK that labor-intensive roads construction could be done effectively, efficiently, and at reasonable cost.

B. DETAILED PROJECT DESCRIPTION

1. Goal

The goal, to which this and other AID assistance programs are being directed, is to assist the rural poor to attain increased levels of rural income and improved general welfare. The project will contribute toward the accomplishment of these objectives by addressing one of the set of interlocking constraints to increase income for small farmers in selected areas of Kenya; namely, the provision of all-weather access between farms and small urban places.

2. Purpose

The purpose of the project is to develop a network of secondary, minor and farm access roads to provide isolated rural areas accessibility to public and private factors of production and social services.

3. End of Project Status

By the end of the project, a minimum of 934 kilometers of all-weather access roads and 2,000 kilometers of all-weather secondary and minor roads are expected to be constructed and upgraded, forming essential year-round links between isolated rural smallholder farm communities and market centers. At the local level, the District Development Committees will have participated in the selection and planning of the 3,000 kilometers of roads.

Conditions indicating that project purpose has been achieved are predicated upon the assumptions detailed in the logical framework, namely that increased access will provide the economic and administrative impetus for the increased provision and utilization of agricultural production factors, social services, technology and marketing facilities. It is further assumed that complementary development activities, such as the IADP and ASL 1, will continue as planned and that the GOK will continue to provide support to these activities. As all-weather access becomes available to small farm families, the USAID anticipates that average net real income of smallholders in the project area will increase by approximately 18 percent; Ministry of Agriculture extension agent visits per smallholder farm will increase up to 50 percent; volume of marketed crops will increase by 20 percent; volume of farm inputs will increase by 15 percent; average rural family use of social services in project area will increase by 10 percent (see Logical Framework, Annex IX). These targets are only indicative of an anticipated end of project status. Given the scantness of precise data presently available concerning the individual family in the project area, the failure to achieve exactly these listed targets in and of itself does not predicate the failure of the project.

Further, through the assistance of the proposed grant-funded pilot project aimed to demonstrate methods and procedures for effecting cost savings and improved maintenance coverage, the MOW is expected to introduce new innovations resulting in a conserving of resources on one hand and improved maintenance on the other.

Indirect project benefits will result from various sources. The provision of rural roads will complement both USAID's existing (ASL I)

and proposed programs in agriculture, education and health, as well as services being provided through IADP by the GOK and through other donors. In terms of employment, the project will generate: 1) technical and skilled personnel services for project construction; 2) part-time jobs for road maintenance; and 3) increased opportunities for more productive labor associated with increases in agricultural production and marketing activities.

In addition to incremental agricultural production and employment, provision of all-weather access to and from rural farms is expected to generate significant non-quantifiable social benefits.

4. Target Area and Population

Road improvement activities under the GBC component will take place in the three districts of Western Province (Busia, Bungoma and Kakamega), and the four districts of Nyanza Province (Kisii, Kisumu, Siaya and South Nyanza). Since the ODM is already financing the construction of rural access roads as a pilot project in South Nyanza, AID financing of the RAR component will not extend into this district.

The two target provinces are characterized as having high population densities and low relative and absolute income levels. 95 percent of the target districts' inhabitants make their living from agriculture with the remainder engaged in wage employment. Due to a high levelof population density these districts are among those having the highest out-migration in the country, resulting in significant numbers of women acting as heads of rural households, and, thus, day-to-day farm managers.[1/] The target group is the bulk of the 4 million people -- the "working poor" [2/] -- living in the two provinces. Annual per capita income ranges from $94 to $150. According to the World Bank, the poverty level in Kenya approximates $122 per capita and a minimum acceptable income level in the target area might be about $196.

Despite its current high population density, the project area presents considerable opportunity for economic growth through more intensive and efficient exploitation of the agricultural potential. In part because of its high annual rainfall and the nature of the soils, land in much of the Western Province and most of Nyanza Province is classified as having a high potential for agricultural production. Two crops a year are harvested in the high density areas. Altitude is a principal determinant of Kenyan climate and thus determines the types of crops that may be grown most successfully in the different areas of the two provinces. Most of the region receives some moisture all year round with the peak period in April-June, (the "long rains",) and secondarily, in November-December, (the "short rains").

1/ The 1969 census showed that about 525,000 rural households were headed by women, of which an estimated 400,000 - about one-third of all rural households - might be households headed by women due to male migration to urban areas. As the two provinces had the second and third highest out-migrations in the country per that census one could posit the percentage of female heads of household to be somewhat higher in these provinces than the national average.

2/ Reference: 1972 ILO/UNDP Report.

In Western Province, Kakamega and Bungoma Districts are predominantly high rainfall zones. Busia District lies at a lower elevation and receives much less rain. In Nyanza Province, Kisii District is in the high rainfall zone and Kisumu, Siaya and South Nyanza are the low zones. Maize, beans and livestock (dairy) production are common to both zones. In the high zone, coffee, pyrethrum and tea are often grown as cash crops, while cotton and sugar are primary cash crops in the low zone. In general, the high zone has denser population and smaller land holdings, and at the same time appears to have greater potential for agricultural production.

Taking each province separately:

(1) In Western Province, approximately 90 percent of the land area is available for agriculture (7,388 sq. km.) of which 5,244 sq. km. (70 percent) was registered to smallholders at the end of 1974. There are a total of about 240,000 holdings averaging about 3 hectares in size, although in the most densely settled areas, holdings are little more than 1 hectare. An estimated 37 percent of the land is cultivated, and 90 percent of that is devoted to subsistence crops. The combination of small farms and the low level of cash-crop farming has resulted in very low rural incomes, with per capita income from crop sales being one-quarter or less that in more prosperous areas of the country.

(2) In Nyanza Province, about 11,200 sq. km. (nearly 90 percent of land area) is available for smallholder registration. Through 1974, 4,524 sq. km. was registered, and a further 3,704 sq. km. was in the process of being registered. There are about 400,000 smallholdings averaging 3 hectares in size, although size varies from an average of 2 hectares in Kisii to 5 hectares in South Nyanza. Intensity of land use varies greatly. Of the area cultivated by Kisii smallholders, about 23 percent is devoted to such crops as tea, coffee and pyrethrum. Maize production is well developed and so is dairying, which uses grade cattle. The other three districts are much less well developed, partly because of lower potential but also because available potential is not exploited. Only about 7 percent of the area cultivated by smallholders in these three districts is in cash crops, primarily cotton, but with some sugar and groundnuts. While maize is still the major food crop, sorghum and millet take up one-third of the cereal acreage. The reason why this area has not been exploited relates directly to an overriding constraint to better agricultural production--a very poor rural road network.

Other significant land uses in the two provinces include forestry in Bungoma and Kakamega, serving both export and domestic timber markets, as well as a major pulp and paper mill located in Bungoma District; urban land uses, particularly in Kisumu Township; land alienated to private investors (particularly sugar and tea estates); and areas reserved for tourism, such as the Olambwe Game Reserve in South Nyanza. In addition, four districts

(Busia, Siaya, Kisumu and South Nyanza) border [illegible] therefore, constitutes another important economic activity in these areas and a valuable source of protein in the local diet. There exists a potential for touristic development in the area which has so far remained largely unexploited.

Due to very heavy rainfall, the problem of access in the Project area is a major constraint. Some of the districts have the highest rainfall in Kenya, averaging about 52 to 62 inches a year. During the peak rainfall periods, roads without all-weather surfaces become extremely slippery and dangerous, if not completely impassable, seriously limiting transport during about six-eight months annually. In these areas, average rainfall exceeds 4 inches per month, generally being 5-7 inches, throughout the year with relatively low evaporation so that perennial crops, such as tea and coffee, will do well in addition to other cash crops and the staple food crops. Taken together, these rainfall and cropping patterns make year-round access to markets and distribution centers a vital necessity.

5. Significance of Transportation to the Project Area

The flow of people, goods and services relies on physical transportation. With a largely illiterate and poor population very little communication and exchange of ideas is done by letter, newspaper, telephone or even over radio. Beyond distances of three to five miles people rely on public transportation since private ownership of vehicles is severely limited. Communication between central places and the rural hinterland is therefore dependent upon the development of a public transportation network which, in turn is dependent upon a reliable road network.

Western and Nyanza provinces contain approximately 277 central places. A central place is defined as either a rural center, which services a population area of about 40,000 individuals, a market center, which serves about 15,000, and a local center serving only about 5,000 persons. In order to pass the benefits of growth to the rural majority, the rural majority must have access to the health and educational facilities located in the central places. Furthermore, research indicates that the spread of innovation is a declining function of the recipient's travel time from a central place.1/

There is already considerable traffic volume along main arteries north and west of Kisumu. The highest volume of passenger traffic on the rail system occurs immediately east of Kisumu due to poor road conditions in the area. Recorded traffic volume south of Kisumu is rather light, due to less economic activity and fewer passable roads than north of Kisumu. Given the area's high and frequent rainfall, non-all-weather roads pose a severe transportation barrier for a considerable portion of the year. Furthermore, the interruption of transportation due to impassable roads during the rains is a significant barrier to the establishment of any regular transportation services in the area.

1/ Barry, B. "Hierachical Diffusion, the Basis of Development Filtering and Spread in a System of Growth Centers". in Man, Space, Environment. English, Mayfield (eds). 1972.

The GOK has prepared comprehensive physical development plans for most of Kenya, including Nyanza and Western Province. At the core of these physical development plans is a strategy for the building up of a network of selected centers, growth centers, to provide the social, economic and administrative services considered necessary for the more rapid economic development of the project area. To support this so-called "growth center" strategy, it has been recognized by the GOK that the transportation network, and particularly the roads system, must be improved in order to provide reliable year round access between growth centers and the hinderlands.1/

The design of the RRSP is supported by a factor of change approach to development assistance strategy which seeks to address the question: what interventions can be undertaken by AID to significantly impact on the income levels and quality of life of the rural poor? The principal results of a meaningful intervention would be increased economic activity in rural areas, increased consumption of social services, improved distribution of income, and increased levels of social and cultural interactions. The DAP Supplement identifies four constraints which appear most critical in inhibiting the GOK to achieve its agricultural goals, especially of priority, trained manpower, macro-economic policies, small producer access, and adaptive research. The DAP Supplement goes on to state that, "when there exists a technology that is both applicable to small producer conditions and profitable for small producers to adopt, the key constraint to small producers realizing the benefits of this known technology is their lack of access to agricultural institutions, services and infrastructure."

Spatial analysis of the dynamic flows involved in the development process indicates that large scale participation and increased economic specialization is possible only with improved facilities for the movement of peoples, goods, and ideas.2/ Considerable theoretical and specialized studies support the concept of rural access as a vital intervention point in the rural development process, with analysis of the Project area and its transportation requirements further supporting the rural roads development strategy.

1/ See Nyanza Province Regional Physical Development Plan. Ministry of Lands & Settelement. Western Province Regional Physical Development Plan. Ministry of Lands & Settlement.

2/ W. McKim "Spatial Organization and Development Planning in Kenya." Presented at ASA Conference 1974.

6. Project Design

a. Description

The GOK has decided to concentrate its roads construction activities in developing an all-weather rural network of "low class" roads. This effort is part of the overall rural development thrust of the GOK Development Plan (1974-78) and has the principal objective of providing small farms with year-round connections to marketing centers, agricultural services, and better health and educational facilities.

The two companion programs which are to implement this strategy are the Rural Access Roads (RAR) program and the Gravelling, Bridging, and Culverting (GBC) program, which together form the backbone of a rural road network, effectively linking farms to markets. The strategy is entirely dependent on the integration of the rural roads into one all-weather road network. The MOW has repeatedly pointed out during the intensive review of the Program that rural access roads are "worthless" unless they connect with all-weather minor and secondary roads which, in turn, lead to market centers.

The $13.0 million AID Loan, together with a $6.47 million GOK contribution, will finance portions of these two complementary, parallel road programs over a six-year period. The $1.70 million AID Grant will provide supporting technical assistance to the GOK in the implementation of the program, which is described below:

AID Loan

Rural Access Roads Component: The Loan will assist in the financing of eight labor-intensive construction units which will construct from existing tracks and rights-of-way in remote semi-isolated farming areas approximately 934 kms. of new all-weather access roads in six districts of the provinces of Western and Nyanza. This work is expected to cost $6.0 million, of which $4.4 million will be financed by AID to cover largely local costs due to labor-intensive construction methods to be employed, and $1.6 million by the GOK.

Gravelling, Bridging and Culverting Component: The Loan will assist in the financing of U.S. equipment and construction materials to equip and operate one self-contained construction unit which is to improve and upgrade 2,000 kms. of secondary and minor roads. The work is estimated to cost $13.4 million, of which $8.6 million covering U.S. equipment and spare parts will be financed by AID, and $4.8 million covering local construction costs will be financed by the GOK. This construction unit is in addition to the one being financed under the recently approved Roads Gravelling Loan. The MOW proposes to assign one unit to Western Province and one to Nyanza Province.

AID Grant

The AID Loan will be supported by a Grant for $1.7 million, consisting of three parts. The first sets aside 1.26 million for assisting the GBC program by providing through an OPEX contract with the GOK the services of a Deputy Project Leader (engineer), a construction superintendent and a maintenance mechanic. The Deputy Project Leader (the Project Leader is financed under the Roads Gravelling Loan) will be headquartered at the MOW office in Nairobi. The others will be in the field with the GBC unit. This contract will also provide for the services of a road engineer to design and test a pilot maintenance scheme in the Project area for a five-year period. The second part of the Grant will finance a U.S. consulting service contract for $400,000 to design and manage an evaluation of the program to measure the economic and social effect of improved roads on the rural residents. The third part provides $85,000 for the services of a local engineer to assist the USAID Project Manager monitor RAR construction activity.

b. Rationale

The design of this project, integrating the two complementary RAR and GBC programs into the Rural Roads System program, stemmed initially from discussions with the MOW. Subsequent investigations during the intensive review of the project reinforced USAID thinking that the design makes sense. There are four principal reasons supporting the integrated two-component design. They are:

(1) It has already been mentioned (Part II A-2) that the Class A, B and C roads in general are in good condition and have an all-weather status. What is needed and what the GOK is proposing specifically through this project is a priority operational response to implement its rural road development strategy. This means not only improving the lower class roads (D and E) which directly service the bulk of rural population, but to extend these roads by the way of new rural access roads to those people whose direct access to the classified system is presently being denied.

It was recognized at an early date that upgrading the D and E roads (GBC program) would involve capital-intensive means. AID's change in the GOK's original approach to emphasizing spot improvements only reinforces and makes more important the efficiency in terms of both cost and operational considerations of the capital-intensive approach. On the other hand, the construction of the Rural Access Roads lends itself to labor-intensive methods. Because of these two vastly different construction methods the GOK rural road strategy is being implemented through two separate programs, but in actuality, they are "part and parcel" of the same rural roads concept--providing all-weather farm to-market access--and strategy. The two road activities are complementary, companion roads,

the two vital links in the farm-to-market chain, and they form together the very backbone of the transportation infrastructure network in the rural area. It is this "companion road" concept that had the single, biggest influence in the design of the RRSP, and more than any other factor led to the conclusion that the goals and purposes of the GOK's strategy will best be achieved by constructing and implementing the RAR and GBC activities together as one coordinated project.

The MOW is convinced (see GOK application for AID funding, Annex II) that the two road activities must be planned, coordinated and selectively constructed together if a truly rural, all-weather road network is to take place. In closing the gap between individual farms and market centers, the access road is just as important as the secondary and minor roads, and vice versa. The surest way to remove any gaps in the rural roads network is to plan and construct the RAR and GBC programs simultaneously, and in close coordination with each other, thereby automatically ensuring, on a selective basis, a continuous farm-to-market road system.

(2) According to the MOW, there are almost 5,000 kms. of secondary and minor roads in the two provinces of the project area that do not provide all-weather access and require rehabilitation, as illustrated below:

Roads Eligible for GBC Program

District	Total Km. D&E Roads	Kms. Already Gravelled	Total Km. Eligible
Bungoma	731	198	533
Busia	327	88	239
Kakamega	960	262	698
Kisii	862	135	727
Kisumu	1,042	163	879
Siaya	815	129	686
South Nyanza	1,415	225	1,190
Total	6,152	1,200	4,952

LBII undertook a traffic threshold analysis, examining existing and projected traffic levels on project area roads against the cost of various improvement technologies, which concluded that of the 5,000 kilometers of D and E roads in Western and Nyanza Provinces which are eligible for the GBC program, only improvement to 4,000 kilometers can be economically justified. 1/

A comparison of traffic levels with costs for different improvement technologies resulted in the following allocation of work: 1) 3,000 kilometers of road to be upgraded by "spot" improvements, 2) 740 kilometers improved to MOW standards (full length improvements), 3) 180 kilometers improved to MOW standard with sealed grades, and 4) 100 kilometers improved up to MOW standard on poor soils.

One GBC unit can improve approximately 2,000 kilometers during its operating lifetime, with improvements allocated to technologies as indicated above. 2/ Given that there are 4,000 kilometers of D and E roads in Western and Nyanza Province for which road improvements are technically and economically feasible and justified, and given that one GBC unit can only improve 2,000 kilometers during its operating lifetime, then it is clear that if the D and E road network is to be upgraded to an all-weather standard two GBC units will be required to do the job. One GBC unit is being financed under the Roads Gravelling Project (615-0170) and the second unit is being requested under the RRSP.

It is proposed to place one AID-financed GBC construction unit in Nyanza Province under the Roads Gravelling Loan (615-0170), and one in Western Province under the RRSP. Considering the logistics and distances involved, it would not be economical to split one unit into smaller units over the two provinces. The conclusion is clear. There is work for two units, the geography requires two units, and the failure to provide both units would mean that an all-weather access road would connect to secondary and minor roads that are not all-weather. This would be a misuse of resources.

(3) The responsibility of the District Development Committees (DDC's) in selecting roads within their districts, especially the access roads, is described in the Technical Analysis, Part III-A. One function of the DDC is to make certain its Development Plans reflect the needs of the people within each district and are well balanced by coordinating different sector development activities such as RAR, GBC, IADP, ASL I, and the like. To illustrate, the DDC's know well which roads should be given priority, which should be constructed and improved and the proper linkages between different classes of roads to insure the objective of all-weather access to markets.

1/ See Roads Gravelling PP, Annex IV, for details of the analysis.
2/ See Technical Analysis, Section III-A.

(4) An important consideration in financing GBC/RAR activities relates to employment. It is GOK policy that the RARP be a labor-intensive program in order to provide meaningful employment opportunities during the off-agriculture season to rural inhabitants in which RARP is being implemented. At AID's initiative a proposal is also included in this PP for a pilot labor-intensive maintenance program for all rural roads (GBC and RARP) which will also provide increased rural employment opportunities as well as improved MOW maintenance capabilities through increased road maintenance being done at reduced cost.

7. Summary of Project Inputs and Costs

Loan Program	AID	GOK	TOTAL
A. Rural Access Roads			
1. Equipment	-	$1,618,600	$1,618,600
2. Hand Tools	$215,700	-	215,700
3. POL	925,400	-	925,400
4. Construction Materials Concrete Culverts	151,200	-	151,200
5. Construction Unit Management	998,400	-	998,400
6. Labor	1,847,000	-	1,847,000
7. Superintendent's Staff	187,200	-	187,200
8. RAR Engineer Staff	96,000	-	96,000
9. Special Project Branch and MOW Overhead	45,600	-	45,600
10. Road Reserve Acquisition and Soils Testing	21,000	-	21,000
TOTAL RAR	$4,837,500	$1,618,600	$6,106,100
ROUNDED	4,500,000 1/	1,619,000	6,100,000
Percentage Distribution	74	26	100
B. Gravelling			
1. Equipment & Spare Parts	5,878,000	-	5,878,000
2. Construction Materials	2,225,000	400,000	2,625,000
3. Procurement Services	435,000	-	435,000
4. Labor	-	1,200,000	1,200,000
5. POL	-	1,650,000	1,650,000
6. Equipment Maintenance	-	200,000	200,000
7. Camp Operations	-	300,000	300,000
8. Bridge Construction	-	800,000	800,000
9. Equipment Transportation	-	200,000	200,000
10. Provincial Headquarters Construction	-	100,000	100,000
TOTAL GBS	$8,538,000	$4,850,000	$13,388,000
ROUNDED	8,550,000	4,850,000	13,400,000
Total Loan Program (A+B)	$13,000,000	$6,468,600	$19,458,600
Grant Program			
1. Engineering T/A	1,348,000	-	1,348,000
2. Consulting Services (Evaluation)	400,000	-	400,000
Total Grant Program	$1,748,000	-	$1,748,000
Total Program	$14,748,000	$6,468,600	$21,216,600
Percentage Distribution	69	31	100

1/ The Fixed Amount Reimbursement System (FARS) will be used.

III. PROJECT ANALYSIS

A. TECHNICAL ANALYSIS

1. Engineering and Engineering Requirements

a. Introduction

The program proposed for AID financing under the RRSP consists of two parts: the Rural Access Roads (RAR) Component, and a second gravelling unit for the Gravelling, Bridging and Culverting Program (GBC). The PP for one complete gravelling unit has recently been approved. Both of these programs are located in the Western and Nyanza Provinces of Kenya.

The RAR component proposes financing the construction of 1008-km of farm access roads using labor intensive techniques over a 3.5-year implementation period. The roads will be constructed in six of the seven districts in Western and Nyanza Provinces (excluding South Nyanza District). Technical assistance requirements to supervise implementation of the RAR component in the field will be met by other donors including UNDP, ODM, ILO, the Netherlands and others, who have agreed to provide a minimum of eleven expert engineers for the GOK's RAR program.

Also financed in this proposal is Technical Assistance to supervise a pilot maintenance scheme to research and devise a more cost-effective and administratively viable approach to road maintenance than that currently in practice. The pilot maintenance scheme will include both the RAR and the GBC components.

The AID assistance to the GOK's RAR program funds one geographically specific component of a national-wide program. The IBRD, ODM and the Netherlands are funding construction costs of RAR's and repair shops as well as supplying related technical services. SIDA is contributing through assistance to the expansion of the Staff Training Department.

The GBC component proposed for loan financing includes the purchase of equipment and spares for a second construction unit to be used in the improving of approximately 2000-km of existing secondary and minor roads in the two provinces - Western and Nyanza (one complete unit will be assigned to each of the two provinces). Also to be loan-financed by AID are materials for construction of approximately 20 bridges and a total of 4000 cross drains.

In addition, the AID program will include funding of contracts for: a) 21 worker-years of technical assistance (to be grant

financed) and b) equipment procurement services (to be loan-financed). The technical assistance will include a road engineer assigned to MOW to design and test the pilot maintenance scheme, one deputy project engineer at MOW headquarters level, an engineer/construction superintendent and a master mechanic. Additionally, AID will conduct annual evaluations to assure proper implementation of this program. (For further evaluation information, see part IV.)

Over a five-year construction period, a total of approximately 2000-km will be improved to all-weather standard through a combination of spot improvements to selected segments of 1500-kms and full length improvement of 500-kms of roads. Technical and economic analysis by Louis Berger, International, Inc. (LBII) recommended that the GBC unit concentrate on spot, rather than full length improvements. 1500-km can be improved by working only on those sections of a road which prohibit all-weather traffic. LBII estimates that approximately 20 percent of every road length selected for spot improvements would require major improvement in order to bring the entire length up to an all-weather standard. In addition to spot improvements, the GBC will undertake full length improvements on approximately 500-km of roadway. The MOW has reviewed the LBII analysis and concurs with their recommendations.

b. Design Standards

1) RAR Component

The standards for the RAR component have been set by the MOW Special Projects Branch (SPB) and have been analyzed by both LBII and REDSO engineers and found to be satisfactory. The standards provide for adequate drainage to discharge surface water and murram (or select material) surface when required. The road standards have been developed by the MOW through intensive experimentation in the ODM-sponsored pilot schemes in Nyeri, Kwale and South Nyanza Districts as well as in the Vihiga and Migori Special Rural Development Program road schemes. The MOW will, however, continue to alter the standards if further experience demonstrates the need (see Annex V for a typical section).

The purpose of the RAR component is to construct all-weather surfaced roadways along existing paths and right-of-ways connecting small farmer areas with the classified road network in order to provide two-way access between the farms and market/service centers.

These access roads are of short lengths (usually 5 to 10 kilometers) and in many cases connecting at one end only; consequently they do not generate a substantial amount of motorized traffic (initial ADT of 5). Bicycle, animal and pedestrian traffic, however, is likely to be significant.

Design requirements are not complicated and generally subject to field decision. The most important element is route locations. These tend to be existing footpaths or right to ways. Since local people presumably know where they want to go, this is a logical method of route locations. However, for drainage and grade considerations, it is desirable that very steep sections be avoided by traversing slopes (footpaths frequently do not) but without adding too much length as this would make the road unattractive to pedestrians. The only other reasons for relocation from existing footpaths would be straightening or shortening existing routes. Field practice varies but in general, local consultations with villages and chiefs precedes final determination of route alignment.

Curves are laid out prior to clearing but grade control is carried out along with the work. Where SPB has access to survey staff, the surveyors do the road location and stake out. Where no staff is available, inspectors and, in certain instances, overseers have been trained to stake lines and curves using tangent offset techniques. Detailed topographic surveys are rarely required but have been utilized to determine alternative alignments.

Since work proceeds at a relatively slow pace, there is sufficient time for supervisors to correct problems as they develop or are identified. Cross drainage requirements and select material locations are the the responsibility of the RAR field engineer or his superintendent. In the case of the latter, they rely on known sources or local knowledge, but will be able to utilize the results of the Materials Branch exploration already tested and mapped for the GRC units for sources of murram.

In brief, the standards being applied are as follows:

i) Surfacing Width: 4-meters (13-feet) 1/

ii) Surfacing Material: select material crowns of 10 cm (4-inches) 1/

1/ Where traffic warrants, the width of surfacing will be increased to 6-meters (utilizing the shoulder areas) and the thickness of surfacing will increase to 6-inches.

iii) Shoulder Width: 1-meter on each side of earth material.[1/] Flexibility is built into design to permit reducing the total width from 6 to 4.5 meters where terrain conditions are very severe and a wider roadway is not absolutely necessary, or to broaden sections when sight distance is lost (sharp curves and crests)

iv) Ditches: shaped at a minimum depth of .5-meters (20-inches) paralleling the road on both sides (except in fills)

v) Drainage: concrete culverts locally manufactured to be placed where necessary, cross culverts will be a minimum of 24-inches in diameter for ease of maintenance, culverts under access paths crossing road side ditches may be 18-inches in diameter

vi) Bridges: bridge construction is to be treated by exception, they need to be examined on a case by case basis - for small streams, culvert crossings will be designed and installed by MOW engineering staff.

vii) Geometric Standards: there are no firm limiting criteria controlling horizontal and vertical geometry, all-weather access is the controlling criteria - on rural access roads already built, horizontal curves with 50-meter radii are desirable but a sharper curve may be used in hilly sections; similarly, an 8 percent maximum grade is considered desirable but grades up to 12 percent can be tolerated when using labor intensive construction. The difference is small and the roads have adequate capacity to carry traffic in any weather

2) GBC Component

The standards used for the GBC road improvement component are basically those of the Ministry of Works Roads Department for secondary (class D) and minor (class E) roads applied throughout Kenya (see Annex V for a typical cross section and classification). These standards were reviewed by LBII and REDSO engineers and found to be acceptable.

The purpose of the GBC component is to upgrade existing classified roadways to all weather standards in the two western provinces of Kenya by adding gravel surfacing materials, drainage facilities and bridges as necessary. There are only minor readjustments to the alignment for provision of a better and safer travelled way. Drainage improvements are the responsibility of the construction superintendent and are included as part of this program. The selected roads are classified secondary and minor roads with selection based on, among

other factors, traffic volume and linkages to a RAR or other development activities.

Surveyors will be provided by the MOW where necessary for vertical and horizontal controls. The construction superintendent will be provided with detailed information on available gravel sources located and tested by the Materials Branch of the MOW and will be responsible for optimum utilization of these sources.

Standards for this program were developed by the MOW in consultation with LBII:

i) Surfacing Width: 5.5-meters (18-ft), where terrain is difficult, less than 5.5 meters may suffice

ii) Surfacing Material: generally 6 inches (15-cm) of gravel material; some areas of high rainfall and steep slopes will be bituminized by double surface treatment

iii) Shoulder Width: 1.25 meters (4-feet) on both sides to be constructed of surfacing quality material

iv) Ditches: shaped at a minimum depth of .5-meters (20 inches) paralleling the road (except side hills and deep fills)

v) Drainage: cross drainage will be in the form of concrete culverts locally manufactured with rough stone head walls, minimum size of 24-inches to be used for ease of maintenance-culverts up to size 36 inches will be reinforced concrete type, culverts of 42 to 72 inches will be of corrugated metal type

vi) Bridges: reinforced concrete/composite bridges and/or reinforced concrete box culverts with masonary walls, inlets, head walls and reinforced concrete decks will be used where perennial stream conditions prevail, Bailey bridges or other truss structures may be necessary where a temporary need becomes evident due to planned stage construction

vii) Geometric Standards: both vertical and horizontal alignments may require minor adjustments to provide minimum vehicle stopping sight distance. The MOW standards for gradients are maximum desirable 8 percent, horizontal curves minimum radius 100 meters and sight distance minimum 70 meters; however, since the program is to upgrade existing roads, major revisions are not anticipated.

The roads and bridge standards have been developed by the Roads Department of the Ministry of Works. These standards represent a low-cost-type of standard developed for the requirements

suited to Kenya. Standards for composite bridges and reinforced concrete box culvert construction and the standards for the roads have been reviewed by REDSO engineers and are considered appropriate and acceptable for the proposed program. The Standard applied is referred to as ¾ HA, (see British Standard Design No.153) which, among other things, defines the single axel load as being in excess of eight metric tons. Copies of the MOW standard design criteria and specifications are on file at the USAID.

c. Construction Methods

1) RAR Component

The RAR component is designed to utilize labor intensive construction methods. The methods to be applied have been developed by the IBRD sponsored Appropriate Technology Unit (ATU). The MOW has been testing and evaluating methods, project organization and management, tooling requirements, local manufacture of tools and equipment (including haul trailers) and related matters for labor intensive construction on the ODM-financed pilot projects. The standards that have emerged and the methods of constructing to these standards are appropriate to the nature of the roads being constructed. They are both practical and cost effective with unit costs generally lower than could be obtained by capital intensive methods on projects of the size proposed.

The ATU has focused on determining the optimum allocation of work activities to labor and to machines, and the limiting conditions governing the use of either. For example, it was found that production could be increased substantially by assigning daily tasks to labor rather than working hours. It was also found that practically all tasks, with the exception of materials transported beyond wheelbarrow range, could be accomplished efficiently using manual labor.

The preliminary findings of the ATU formed the basis of the MOW costing in the July 1975 Loan Application. These values and quantities have been found to be realistic and the results obtained satisfactory based on discussions with ATU staff, SPB field personnel in the pilot projects and inspections of roads under construction and completed and under maintenance.

An SPB manual providing full details on construction techniques will be circulated to RAR field engineers to serve as guidelines to follow, although descretion is given to permit adjustment of construction techniques to contend with the widely varying topographical and soil conditions throughout Kenya. The SPB intends to continue experimentation with techniques and standards during the RAR component's implementation and to adopt changes when potential improvements are identified. This is to be done under the supervision of competent SPB staff.

The AID financed RAR component will perform the following construction work:

i) right of way clearance and stump removal where required

ii) blasting and removal of boulders from roadway beds

iii) top soil removal

iv) placing of culverts

v) terracing and levelling the profile

vi) ditching and bringing the soil on roadway

vii) reshaping/placing of surface material murram (up to 12 months after completion of earth works)

viii) watering and compacting the surfacing material

There will be considerable variation from road to road in the amount of work necessary for a viable all-weather road. As with the GBC component, the needed amounts will vary with the topography, rainfall pattern, angle of axis and soil conditions- for example, it may be necessary to place some surfacing material immediately after terracing operations are complete on the road beds to cap-off silty, loamy or black cotton-type soil. The bridging operation in this program is on a case-by-case basis.

Average job values in worker days per kilometer have been developed to cover various types of works such as touching up work, camp related activities, reshaping before putting on the murram surface, etc. These values in effect constitute a "job contingency".

The use of mechanical equipment in each unit is kept to an absolute minimum. All operations except where uneconomical are done using single hand tools (a list of tools and equipment is at appendix VIII). Provision has been made within each unit for maintenance and repair of tools.

i) Surfacing Material: the normal practice is for each unit to be divided into two to three work groups in addition to one group for quarrying and hauling of surfacing material. Surfacing will be done up to 12 months after construction to permit consolidation under rain and traffic where this is advantageous. There are exceptions where surfacing will not be required. For surfacing purposes, the best select materials to be found within an economical practical haul distance will be used. Throughout the project area, there is sufficient murram (lateritic gravel) available generally

within a 6 kms. haul distance. At 6 kms. haul distance the borrow pit crew and the tractor trailor units can be efficiently utilized and the cost per cubic meter of gravel surfacing is economical.

ii) Culvert Placement: cross drainage installation will be performed by hand labor and will be placed in advance of the terracing operation. Head walls can all be done by labor. For ease of maintenance, a minimum size of 24 inches is selected for cross drainage and a minimum size of 18-inches for access roads.

iii) Earthworks and Ditching: after clearing and stump removal, the normal sequence of operations is topsoil removal; terracing (excavation in bulk) to level and profile;. ditching with spoil being cast onto the roadway; and spreading of the spoil to shape the crown in the road and adjust the profile grade. Compaction is used generally at the terracing and spreading stages where material is cast onto the roadway.

For purposes of allocating daily work tasks to the usual labor force, the construction of roads has been divided into required man-day works and tasks have been defined by the ATU. The same standards will be used for this program with flexibility to adjust where appropriate.

iv) Experimental Issues: the ATU is experimenting in the areas of compaction, boulder-blasting, ditch standards and erosion resistent road surfacing.

The current hand ram method of compaction was observed to be ineffective due to the light weight of the rams and low resulting energy of the compaction effort. A tractor drawn compaction roller is included with each construction unit. This would allow much greater compaction and avoid the loss in road camber (road cross shape) now occuring between the terracing operation (construction of the platform) and subsequent surfacing. The tractor drawn roller is believed to be more suitable than hand operated machines in terms of quality and the required task.

The task of removing large boulders also is felt to require a different approach than the current "fire and water" techniques whereby the boulder is broken up by alternatively heating and pouring water on it. A trained blaster assigned to the unit is one possible solution which if deemed necessary will be provided by MOW. The Vihiga roads project used the technique of digging a hole next to the boulder, pushing

it in and burying it. This may, however, have the same disadvantage as the "fire and water" technique in that it requires high labor input.

Ditch check standards were also considered to require testing in terms of their spacing on different grades and controlling erosion and water dissipation, possibly by turfing ditches. Since much of the AID project is in hilly and rainy areas, the problem of controlling water run-off will need attention. Another area where additional experimentation will be carried out is that of alternative erosion resistant road surfacing on steep grades where longitudinal erosion is a problem. Hand-built dry-bound macadams or hand laid Telford stone surfacing are two possible solutions to the problem of erosion on steep slopes.

2) GBC Component

The GBC component, by the nature of its work, is designed to utilize equipment intensive construction methods. Allowance is made to maximize the use of labor where feasible, e.g., all culvert and bridge construction works will utilize labor intensive methods.

The AID-financed self-contained gravelling unit will perform the following construction work:

i) right of way clearance (where required)

ii) shaping of road surface and parallel ditch sections

iii) curvature correction of roadway, both vertical and horizontal

iv) placement of cross drainage culverts (ahead of the main operations)

v) reinforced concrete bridge work to start well in advance of earth works and gravelling

vi) pioneering of access roads to gravel pits

vii) pit excavation and stockpiling of surfacing material

viii) loading and hauling of surfacing material

ix) placing and spreading of surfacing material

x) compaction of the surfacing material.

There is a great variation from road to road in the amount of these works required for viable all-weather roads. The needed amounts will vary with the topography, rainfall pattern, angle of the axis to contours (practically no realignment is planned) and soil conditions. The blend of equipment proposed was reviewed by LBII and found acceptable for the average requirements of Western and Nyanza Provinces, determined from experience over the last five years. Sufficient flexibility exists to allow shifting of dozers, trucks and loaders to keep two crews efficiently employed.

i) Surfacing Materials: The MOW has an ongoing materials survey (for 1½ years) identifying quality and specific location of surfacing materials for the gravelling operation in the areas where AID units will be working. The materials source information is mapped and available. Selection of specific quarries for surfacing materials will be carried out following the arrival of the project engineer. Investigations by MOW and LBII indicate sufficient sources of surfacing material are available adjacent to the roads. Therefore, material source and quantities are not expected to present a problem in the implementation of the program and no crushing equipment will be required.

The quality of material selected for surfacing will be based on MOW standard specifications for gravel wearing courses. The "gravelling" is the application of "murram" as surfacing on the subgrade of existing material. Murram is a term applied to select material containing particles from larger than gravel size, gravel sand and silt and/or clay in varying proportions. The gradation curve will be improved by "scalping" to eliminate over 8-cm sizes, by selecting the thickness of the layer to be exploited and by dozer blending before loading. Generally this material provides a good and durable surface for the traffic volume anticipated on these roads.

In areas of high rainfall and steep grades (e.g. Mount Elgon region in Western Province) murram surfacing will not be sufficient and some areas will have to be bituminized to resist torrential runoffs. LBII has estimated that 20 percent of the total road length may require bituminizing. However, MOW believes that a 10 percent estimate will be more realistic.

The LBII study has suggested placing only four inches of surfacing material in some areas where the existing material is "quite hard". Additionally, the report suggested that, at areas where traffic volume is light, a surfacing width of less than 5.5-meters will suffice.

These two suggestions were not accepted by GOK officials and the MOW officials intend to maintain their own standards, as designed and accepted by other donors now carrying out GBC operations (see MOW standards, pages 28 and 29).

ii) Culvert Placement: Cross drainage installation will be carried out by hand labor and equipment contained within the gravelling unit. Most culverts will be reinforced concrete pipe of local manufacture for diameters of up to 90 cm (36 inches); culverts of 42 and 72 inches will be of-corrugated metal pipe type.

Unloading, grading, placing of pipes and stone headwalls can all be done efficiently and well by labor only. Where 72 inches diameter culverts are inadequate for drainage, small box culverts of short span will be hand built with masonary walls and head walls, concrete or masonary inverts and reinforced concrete decks.

iii) Bridge Construction: Bridge design plans, as well as engineering supervision and inspection, will be the responsibility of the MOW; however, if considered necessary inspection control may be supplemented by employing a local consultant firm.

Bridge construction will be undertaken using local contractors selected through competitive bidding procedures. The MOW will finance all design and construction costs using GOK local cost contributions to the project. Bridging materials, i.e. reinforcing steel/steel beams will be purchased with AID financing and made available to the contractor(s).

The project engineer/MOW will assume coordination responsibility between the bridge and road construction programs. Bridge work, wherever possible, will be started well in advance of earth works and regravelling.

Bridges of masonary substructure, reinforced concrete deck and masonary parapets are considered adequate and are already widely used in Kenya. This type of bridge is constructed by labor intensive methods and is the expected "standard" type prepared to be used in the GBC program. Local contractors will be encouraged to bid for this work.

Bailey bridges or other truss structures may be necessary where flood conditions dictate, for example, where there are special river bed configurations, or temporary need for planned stage construction for future programs, etc. Some steel bridges are available in Kenya and could probably be used economically, perhaps more than once.

Because of the high cost, long delivery time and the need for cranes which are not part of the GBC unit, long span steel beam bridges will be used only where no other solution is practicable.

d. Road Selection Criteria and Procedure

1) RAR Component

The GOK has placed major responsibility for the selection of the Rural Access Roads with the local District Development Committee (DDC) of the districts in which the roads are planned. Thus, one of the attractive features of the program is this substantive local participation in development planning. A description of the various steps in the selection process follows.

i) Introduction

The respective DDC selects the roads to be improved within the framework of each district's annual program and MOW guidelines relating to objectives, function, terrain, length, etc. Since the DDC's comprise both the district-level officers of all government departments concerned with rural development and public representatives of the districts, a high degree of identification with, and support for, the program and a sound selection of roads can be expected.

Members of a DDC include:

(a) The District Commissioner (Chairman)
(b) The District Development Officer (DDO) (Secretary)
(c) all District Heads of government departments
(d) Members of Parliament representing the district
(e) the Chairman and Councillors of the county council
(f) the District KANU Chairman 1/

DDC's meet several times a year. It is their primary function to make certain that the District Development plans reflect the needs of the people within the district and are well balanced, by coordinating different sector development proposals into a comprehensive, integrated plan. They do this by insuring that (1) the sectoral ministries are aware of their district's needs, and (2) the nationally-funded programs for their districts are well

1/ Kenya African National Union, the political party.

coordinated. This aspect of their work includes programs such as the RARP and GBC under the MOW and agricultural credit and extension programs under the MOA.

ii) Selection Criteria and Procedure

As a first step in the planning procedure for selecting access roads, each DDC is required to select a total of 600 kilometers of rural access roads and identify 90 to 100 kilometers which it considers to be of the highest priority. The DDC will develop information following specific MOW instructions on the physical characteristics of the roads and the areas that they serve. In making its selection, the DDC will use the following guidelines:

(a) roads should be in general between 5 and 10-km long;
(b) they should directly serve underdeveloped areas having agricultural potential or areas where they may be expected to bring about a change from subsistence to cash crop farming;
(c) they must not be constructed in areas which already have reasonable access to existing roads;
(d) they should benefit the small farmer who has a land holding of three hectares or less;
(e) they should benefit as many people as possible by passing through high population areas or should pass through areas of low population where the population may be expected to increase as a result of migration;
(f) they should avoid, if possible, areas of predominantly black cotton soil;
(g) they should be preferably unclassified earth tracks.

The District Agricultural Officer will provide land use data, crop and livestock information, off-farm sales figures, number of hectares of cultivated area to be serviced by the proposed road project, availability of agricultural services, market potential and other relevant information.

iii) Evaluation Procedure

The MOW then, on the basis of this data and the District Development Plan, will assess the probable impact of the proposed access roads on the development of the area it serves, and will prepare an Evaluation Report. The purpose of this exercise and the report is to establish the economic evaluation of the road package selected by the DDCs to make possible an inter-district appraisal to determine priorities between districts and to obtain financing from donor agencies by providing them with information about the program. The report actually evaluates a "package" of roads, not specific roads. At this stage in eligibility screening, the proposed roads must fulfill the

following MOW criteria:

(a) the road proposed for construction must connect to an all-weather road,[1/] which, in turn, leads to a marketing center. The purpose of this requirement is to insure that the anticipated agricultural benefits attributed to the project will be maximized;

(b) the distance requiring improvement should generally not exceed 10 kilometers;

(c) the proposed route must serve an average farm density of 20 farms per kilometer. Using the projected average construction cost of about $6,200 per kilometer, this is the minimum number of farms which assures a favourable cost/benefit ratio, based on available information to date;

(d) the proposed route improvement should serve a zone of influence which has a significant agricultural potential - this criteria encourages a preliminary appraisal of the general economic potential of the subproject area.

iv) Final Selection Criteria

If the DDC road proposals have passed the above eligibility screening, they are then subjected to a further and final review to insure their financial and economic viability:

(a) The MOW is responsible for determining the financial feasibility of constructing the DDC road package. This involves on-site inspections and calculations as to construction costs including:

(i) necessary changes in road alignment
(ii) necessary structures (bridges, culverts)
(iii) nature of soils to be excavated
(iv) extent of necessary excavation of rock and conglomerate
(v) amount of earth to be removed
(vi) appropriate method of road improvement
(vii) construction period.

(b) Roads which are determined to be technically feasible to construct will be subject to an economic analysis by an MOW economist. The economist will undertake the preparation of the Evaluation Report, a technically and economically

1/ Secondary and minor roads (GBC Program)

reasonable estimate of road induced benefits and costs associated with each road under consideration. The report will contain a computation of project benefits on a "with and without" project basis. The internal rate of return will be calculated for the net benefits of each road "package" (cluster of roads under consideration) over a period of 20 years. A comprehensive analysis of non-quantifiable benefits will be required for any road cluster failing to achieve an internal rate of return of at least 10 percent.

From MOW experience to date, all road packages show at least minimum returns and demonstrate significant nonquantifiable social benefits.

A covenant of the Loan Agreement will require the GOK to submit to USAID its Evaluation Reports 1/ for review and approval prior to commencement of work on the roads evaluated in the reports. Thus, the economic, financial, environmental, technical and social viability of the rural access roads will be a condition for AID financing.

(2) GBC Component

The MOW is chiefly but not totally responsible for the selection of roads to be upgraded under this program. A system of road selection and criteria has been developed by MOW which identifies and assigns priorities for the GBC component. The system selects D and E roads which require improvement and are economically feasible and/or associated with local development projects. This selection process includes the MOW's evaluation of technical and economic criteria, as well as allowing for formal consultation between the MOW and DDC which is the local planning body in the project area. The selection procedure and criteria are as follows:

Step One

The MOW examines existing data and establishes a list of candidate roads. Supplemental data may be obtained from the DDC. This data will relate to road conditions, soil types and traffic levels.

Criteria

Non all-weather links that are impassable during the year, which provide

1/ The Economic Report format will be identifcal to the one being furnished the IBRD. USAID has renewed and approved the format.

increased access to relatively isolated rural areas, where local inhabitants give high priority to road improvements, and which (a) have average traffic levels greater than or equal to 20 ADT on good or fair soils, (b) have average traffic levels less than 20 ADT on good or fair soils and which connect to rural development project areas or all-weather roads on good or fair soils, (c) have traffic levels greater than 20 ADT on poor soils which connect to rural development project areas, and (d) all of above roads with gradients of 8 percent or more.

Step Two

MOW conducts an inspection of the candidate road list to determine the actual type of improvements needed.

Criteria

(a) Spot improvement when 20 percent or less of the road links are impassible, when this procedure is technically feasible and when the average ADT is between 20 and 70 (b) construction to MOW standard roads (5.5-meter surface with 1.25-meter shoulders) where the ADT is greater than or equal to 70, and (c) built to MOW standards with bituminous seal on steep grades of 8 percent or more on sections with intense rainfall and where the ADT is greater than or equal to 60. Exception to ADT criteria may be considered in areas where other development activities warrant road improvement to a higher standard.

Step Three

The MOW submits the list to the DDC for their review and verification and to include other priority roads which in their view were not included in the list.

Criteria

(a) Local knowledge of road conditions, (b) local knowledge of present and planned rural development activities, and (c) local knowledge of present and future traffic levels.

Step Four

The MOW will prepare a final short list on the basis of the DDC's comments. This list will become the final "candidate roads" List.

Criteria

(a) Availability of funds, and (b) the output capacity of MOW.

Step Five

From this short list, the MOW develops an annual program of work for the GBC units.

Criteria

Select base area and subsequent work areas as those which have the largest percentage of highest priority roads (see Step One above) and which minimize necessary movement of the units.

Step Six

The MOW will submit the annual work plan to USAID for approval (note: the annual program is actually projected for eighteen months).

The traffic levels used for this selection should be the future traffic in the opening year of the road. This traffic should include an allowance of 8 percent per year for growth from the last traffic count and 10 ADT for each significant development project to which the road is directly linked (to be verified by evaluation). This would include a rural access road project, a health center or agricultural training center or any other project that can be expected to generate some traffic.

A covenant of the Loan Agreement will also require the GOK to submit to USAID its annual work plans for review and approval prior to the commencement of work on the applicable roads. This review will ensure that the GBC roads selected for AID financing meet the MOW selection criteria and will provide all-weather links to access roads and marketing centers pursuant to the objectives of this program.

e. Work Plan and Reports

1) RAR Component

Since this project will adopt the FAR procedure for the RAR construction it was necessary to determine the approximate need for access roads in the six districts and the feasibility of completing the work involved. The final figure of 1008-km was arrived at by LBII by reducing the MOW's estimated average of 45-km per unit per annum to 42-km in a 250-day work-year in order to adjust for the ambiant terrain of the project areas. This figure was accepted by the MOW as the minimum amount of RAR constrution required in the Project area.

Using the 1008-km figure the following implementation schedules can be set forth reflecting the need from 150 to 200 km of road construction in four of the six districts. For two of these districts (Bungoma and Kakamega) approximately five unit years are required. In the other two (Busia and Siaya) only four units years appear to be needed. The projected construction in Kisumu and Kisii districts would need two and three years respectively. For contingency purposes one unit year (4 percent) is added for possible changes in the estimated road lengths, etc. 1/

1/ Source: LBII draft report. Note that while financing is provided only for 934 kms, the work plan was based on a target figure of 1008 km.

The MOW intends to activate two units in the first year and an additional six in the second year. The LBII had proposed two alternatives for activating two units each year for a total construction duration of five years. However, due to the urgency of need for rural access roads in the two provinces and the fact that manpower is not a constraint, (see Manpower Analysis) the MOW intends to accelerate the construction schedule and complete construction within 3.5 years. The first two units are scheduled to commence construction in month ten and the additional six units at three-month intervals following the start of the initial phase.

USAID has discussed this construction schedule with the MOW and finds it to be reasonable and acceptable.

RAR Units Suggested Commencement Schedule

Units Commissioned	Month 10	Month 13	Month 16	Month 19
First 2	2	-	-	-
Second 2	-	2	-	-
Third 2	-	-	2	-
Fourth 2	-	-	-	2

Total: 8 Units

RAR Units Suggested Work Schedule

Units	Commencement	Completion	Kilometers Completed	Unit Year
First 2	Month 10	Month 50	280	6.75
Second 2	Month 13	" "	263	6.25
Third 2	Month 16	" "	241	5.75
Fourth 2	Month 19	" "	220	5.25
		Total:	1,008	24.00

3) GBC Component

The annual program of work will be developed to identify the specific roads to be improved, the proposed type and sequence of the improvement and the proposed plan of evaluation. All work plans will be submitted to USAID for review and approval at least sixty days prior to commencement of the work for the relevant period. No construction shall commence prior to receipt of USAID approval of the work plan.

During the implementation of the work plan, the SPB will submit to USAID quarterly progress reports specifying, inter alia, the extent to which the program of work has proceeded (kilometers gravelled, whole links or spot improvements, bridges erected/repaired, etc.), progress and/or problems associated with the technical services provided and with procurement, storage and transportation of spare parts and equipment, percentage of capacity utilization, rate of progress (kilometers gravelled per day) and other information as may be jointly agreed upon by USAID and SPB. A format for these reports will be jointly developed by the AID-financed project engineer and USAID.

The purpose of the annual programs of work and quarterly progress reports is to ensure that the project is successfully implemented without serious delays, particularly on the planning side. It should be noted that, although the specific roads that are to be improved are not identified prior to the loan/grant signing, there are numerous roads in the project area that meet the above established and agreed upon criteria. Thus the possibilities of delays on the planning side are minimized.

The actual improvements to the 2000-km of proposed roads are scheduled to be completed in five years. The mobilization date is set for month 25 (estimated to be February 1979) with completion scheduled for month 83 (estimated to be December 1983).

2. Technical Feasibility

a. Appropriateness of Technology

1) The RAR Component

This program was designed to provide all-weather connectors between farms and market centers. The general standards were developed by the SPB of the MOW. The IBRD is also contributing $400,000 to a three-year research program of rural roads work methods and technology which is already providing insight into ways to improve the technical aspects of the RAR program. Target construction is for each RAR unit to complete 42-km of roads per year. This rate of construction (recommended by LBII) is somewhat less than GOK's proposal of 45-km per year.

The CIDA and IBRD funded programs for gravelling units and access roads will be operating in other provinces and will be emphasizing improvement of whole road links as well as gaining knowledge in various experimental projects. The proposed equipment lists to be used on the RAR and GBC components were developed in collaboration with these donors. These proposed equipment lists were reviewed both by LBII and REDSO engineering staff. Modifications introduced were based on observations within the East African coun-

tries. The final lists proposed in this document were considered as acceptable and appropriate for the topography of Western and Nyanza provinces. However, it should be noted that certain adjustments in the equipment lists may be necessary if considered warranted by the experience gained in the initial operation of other donors.

2) The GBC Component

The nature and scope of the GBC component precluded the possibility of economic construction by labor intensive methods. Canadian support (three units) is being provided on this basis and SIDA, had its support not been withdrawn, would also have supported this approach. Target construction is for each gravelling unit to improve 2.0-km of road per productive working day (1.25 mile) at a sustained rate of 400-km (250 miles) per year. This rate of improvement can only be completed by an equipment intensive operation with a minimum, although highly skilled, labor component. USAID supports this basic premise (also see the Economic Analysis Annex VI on "Labor vs Capital - Intensive Methods"). The feasibility of additional labor operations will be examined as the construction gets underway and as project engineers evaluate the project to determine what labor substitutions are practicable.

b. Equipment Selection

1) RAR Component

The RAR is designed to be a labor-intensive type of operation. The equipment requirement for each unit in this program is relatively small. The effort will require a maximum of eight such units. An equipment unit consists of farm tractors and tipping trailers for moving surfacing material to areas where the adjacent borrow materials are unsuitable, water trailers and pumps to be used for compaction and consumption, tractor drawn rollers to allow better compaction and the necessary transportation vehicles for delivery and access to the project sites. An equipment list proposed to be used on this project is presented in Annex VIII. The basic equipment spread is the same as that proposed by the IBRD and CIDA. LBII has studied this list and recommended minor modifications, the most important of which is the adding of a compaction roller to each unit to obtain better density.

2) GBC Component

After an exhaustive study of the target roads, proposed outputs and economic considerations, LBII recommended that the GBC unit concentrate on spot improvements. Given the proposed construction/improvement approach, LBII examined and approved the recommended equipment list which is presented in Annex VIII. The

basic equipment spread is the same as that recommended in the CIDA feasibility report; however, alterations have been made to increase mobility and effectiveness of the unit, for maintenance of the construction equipment and to allow for greater use of labor intensive methods wherever possible.

Major modifications from the CIDA design for increasing the mobility and effectivenss of the unit are increases in the number of fuel tankers, service trucks and parts vans, a fuel storage tank and a lowboy tractor-trailer. Major modifications to allow for a more labor intensive unit are the deletion of one front end loader (loading some dump trucks by labor) and the addition of water storage tanks for the labor camps and flat bed trucks for transport of workers.

c. RAR and GBC Spare Parts Support

Because of the equipment and intensive nature of the work, availability of a timely access to spare parts are major factors for the successful operation of the field gravelling unit. Orders, in-country deliveries/transportation, storage and installation of the spares have in the past represented major constraints for the efficient functioning of an equipment fleet in Kenya.

There are generally excessive delays in ordering spare parts under the existing GOK procurement system simply because of the amount of bureaucratic "red tape" involved. The most critical element in the procurement system is a requirement that parts costing over $2,500 must be purchased via a lengthy competitive process involving in-country and, frequently, international biddding. To address this constraint, it is proposed that AID fund spare parts equivalent to sixty percent of the FOB value of the total equipment purchased. 1/ This level of funding is intended to ensure sufficient supplies of spare parts during the six-year life of the construction phase of the project. To avoid problems in acquiring this volume of spare parts, procurement for this project will be undertaken by an independent overseas procurement agency (e.g. the Afro-American Purchasing Center) under contract with the GOK. For timely ordering and delivery of spare parts, the following system will be observed:

1/ The sixty percent is based on 12 percent per year for five years and is inclusive of 15 percent spares ordered initially with the equipment.

i) fast-moving spare parts will be ordered and received in conjunction with the initial consignment of equipment and vehicles,

ii) phased procurement from the US combined to the extent available with off-shelf procurement, through authorized dealers in Kenya, and

iii) certain hard-to-obtain spares will be air freighted from the US or obtained from bonded warehouses.

The system outlined above is intended to prohibit the high degree of non-use normally experienced when all spares are ordered as stock items with the equipment.

Problems encountered with in-country transportation under the existing MOW arrangements result from the nonavailability of adequate transportation fleets for conveyance of the spares from port-of-arrival to storage warehouses and from the warehouses to specific work sites. To address this constraint the present project will be self-sufficient in transportation fleets for spare parts (using flat bed trucks provided by the project).

Problems encountered with spare parts installation result from the lack of sufficient numbers of adequately trained mechanics at the provincial level workshops and work sites. This question will be addressed by providing a mechanical engineer with the AID gravelling unit, where it is expected that eighty percent of repairs will be handled. The major overhauling and rebuilding will be undertaken at provincial work shops with some support from the central workshops in Nairobi. Performance in repairs at these levels should improve with the expanded and improved staff training programs implemented by the STD which will produce increasing numbers of trained mechanics.

To avoid problems of not having adequate storage space for the volume of spares to be ordered (60 percent FOB value) and of storing the parts for the US gravelling unit along with other miscellaneous makes of equipment, the Loan Agreement will include a covenant wherein the GOK shall provide storage warehouses/depots in Nairobi for the spare parts provided under this loan, with certain amounts moved in the field.

Spare parts for the GBC component will be purchased at 60 percent of FOB equipment value, with additional allowances for escalation, procurement charges and contingencies.

The total funds thus earmarked for procurement of spare parts will be expended as follows:

1. Fast moving spares equivalent to 15 percent of the total will be purchased with the initial equipment order.

2. Spares equivalent to 35 percent of the funds will be purchased after the first six months of construction experience.

3. Spares equivalent to 15 percent will be purchased after twelve, twenty-four and thirty-six months following step 2 above (total of 45 percent).

4. Spares equivalent to 5 percent will be purchased within twelve months of completion of step 3 above.

Spare parts requirements for the RAR component will be less of a problem than for the GBC units. Equipment for the RAR is provided by the GOK. Some of the equipment pieces are manufactured locally. Therefore, replacement parts will be easy to obtain, and other equipment such as tractors and vehicles seem to have good support by local representatives of the manufacturers. It should be noted that, to the extent possible, GOK through their own competitive bidding system, procures locally manufactured equipment, and thus local suppliers are required to stock adequate quantities of spare parts for effective sales.

Spare parts for vehicles and tractors are readily available at provincial levels by representatives of the suppliers. As a fall back any additional spares that may not be available within the provinces can be procured in Nairobi.

The availability of spare parts will not be a problem provided the tractors and vehicles in common use in Kenya are employed on the program. Also, availability of spares through local farm equipment dealers is not seen to be a problem for the RAR component.

MOW's existing maintenance capability supplemented by the spare parts support programs outlined above and the availability of US technical assistance for maintenance will keep the AID-financed equipment operating at the level needed to meet the construction targets.

d. Equipment Maintenance

1) RAR Component

A list of the limited amount of small equipment for the RAR component will be prepared by the MOW Mechanical Branch staff and workshops in the project areas. It is also possible, to the extent feasible, that the tractors and pumps will be turned over to local dealers for repair and maintenance since these units are well

represented in Kisumu and to a lesser degree, in other sizable towns in Western and Nyanza Provinces. It is also intended that once the GBC units become operational their mobile maintenance shops will be able to provide maintenance services to the RAR units as well. It is probable that geographic convenience will be the determining factor.

2) GBC Component

The AID-financed gravelling unit will have sufficient maintenance support equipment on site to enable repairs to be carried out on all equipment and vehicles up to the third echelon level of maintenance. Major overhauls and rebuilds (4th and 5th echelons) will be generally undertaken at dealer service points or the central workshops at MOW in Nairobi. In addition, MOW has 256 permanent maintenance camps established throughout Kenya, 61 of which are in the project area and are also available for equipment repair. Additionally, the MOW has three major workshops for the repair of road equipment and vehicles in the project area. One is at Kakamega in the Western Province and the others are at Kisumu and Homa Bay in the Nyanza Province. The MOW Mechanical Department operates the workshops. In July of 1975, the Mechanical Department separated organizationally from the Roads Department, but at Kakamega, both departments continue to share the same compound. The Mechanical Department at Kisumu has administrative control over the workshops in both provinces.

The existing workshop at Kakamega will be replaced by a new and larger facility currently under construction. Completion is anticipated by Dec. 1977. Funds for equipping the new shop are being provided by IBRD. Equipment being purchased for this shop is generally light shop tools, e.g. compressors, air and hand tools, are welding machines, lubrication units, battery chargers, diesel fuel injection testers, generators, etc.

The workshops at Kisumu are much larger and more complete than the existing shop in Kakamega. The workshop at Homa Bay is also self sufficient. GOK intends to supply additional tools, lubrication units, etc., to these shops on an as-needed basis.

Generally, day-to-day maintenance and greasing is the responsibility of the individual operator assigned to the equipment. Drums of grease and grease guns are kept at the road construction camp for daily use. This procedure has been found to be most satisfactory as the equipment is maintained and kept in good working condition.

GOK has contracts with various suppliers to provide tires and batteries. Therefore, supply of these items presents no problems.

The Caterpillar dealer in Kisumu has the capability to take care of all repairs and services for Caterpillar heavy construction equipment. Other dealers, such as that for International Harvester, offer a more limited service. The major problem in servicing equipment is the extreme variety of makes and models in the provinces. Not only does this make it difficult to keep mechanics up to date, but it makes parts stocking almost impossible. Standardizing equipment in these two provinces is highly desirable. The STD of the MOW has sent 20 grade III mechanics to the Kisumu workshops recently and intends to increase this number by training additional mechanics on the IBRD-provided equipment. Tools for these mechanics are presently being procured under the IBRD/GOK financed shop equipment procurement program.

Conclusion

It is believed that with the addition of (1) a fully equipped repair shop at Kakamega, (2) more and better trained mechanics from the STD (3) USAID-financed spare parts and mobile workshops and (4) one U.S. technical assistance mechanic to each GBC unit, to complement existing MOW facilities, equipment and personnel, the GOK will be in an excellent position to conduct an adequately equipped repair and maintenance operation for both the RAR and GBC programs.

3. Road Maintenance

a. Strategy

Both the design standards and construction methodology of the roads to be built under this program will require the MOW to provide a closely controlled and adequately financed follow-on program of road maintenance. This is necessary to protect the initial investment and to maintain the "as built" character of roads developed under this program.

An examination of the operations of the Roads Maintenance Branch of the MOW Roads Department indicates it to be a well organized unit with a considerable degree of planning and implementation capability. Expansion of the Roads Maintenance Branch to meet the requirements of the GBC and RAR components is in the planning stage. In fact, the GOK/MOW is fully cognizant of the need to provide

the additional trained staff not only for construction purposes but for maintenance as well, and has taken the necessary steps, including GOK financing of a major technical training program,to significantly increase the availability of skilled supervisors, plant operators and mechanics (see Manpower Analysis).

The GOK, represented by the Ministry of Finance and Planning, has assured AID that roads have a very high priority in the Government's development strategy and that given this priority, sufficient budgetary resources will be provided to ensure that the RAR and GBC roads will be maintained (see financial section for availability of road maintenance funds).

To assist with the maintenance program, AID will provide grant financing to MOW for one roads engineer for five years to work within the Ministry to design and manage a pilot maintenance scheme for the RAR and GBC roads in the AID project area of Western and Nyanza Provinces. This scheme will attempt to maximize the use of labor intensive methods where practical and minimize recurrent financial costs to the government. The MOW will provide all finances, equipment and labor inputs for the pilot program. This will conclusively demonstrate the commitment of the government to address roads maintenance needs.

b. Discussion

The AID project is directed at two complementary rural roads programs. Their success depends ultimately on satisfactory maintenance of the roads that are constructed.

The secondary (D) and minor (E) roads in the program area and throughout the country have not received adequate maintenance in the past. The higher class roads have in general been maintained well. The maintenance problem of the D and E roads developed when the responsibility for maintaining them was transferred from "county councils" to the MOW in the early seventies. Overnight MOW became responsible for some 46,000-km of poorly maintained D and E roads. Prior to this time MOW had been responsible for a relatively well engineered trunk road system of less than 5,000-km. Consequently, MOW maintenance funds were severely stretched for upgrading purposes as well as maintenance. This resulted in some improved road conditions, but reflected unfairly on MOW resources and technical capability. This situation gave rise to the GBC program which is specifically designed to upgrade and rehabilitate the D and E roads, thereby relieving the MOW Maintenance Department of this responsibility and removing the severe burden on funds and technical capabilities.

Loan assistance to improve the MOW capability for trunk road maintenance (particularly workshops) was given by IBRD in 1972 (85 percent complete). There was no further assistance to cope with the secondary and minor roads. Although much progress has been made during the 1970-1976 period, the classified road network is still under-maintained.

Since much of the "county council" road network was not in satisfactory condition for maintenance (inadequate drainage, unsatisfactory surface material, etc.), maintenance funds have had to be reprogrammed for progressively upgrading or rehabilitating inadequate sections of the more important roads. This is a valid approach since experience, both in Kenya and other countries, has shown that to try to maintain deteriorated roads consumes normal levels of maintenance funding without resulting in any lasting repairs or improved road conditions. However, this upgrading program has placed a large burden on MOW maintenance funds and capability, particularly by diverting equipment normally used for regravelling operations.

Maintenance priority has continued to be given to the trunk networks, particularly to the paved roads which are generally kept in fairly adequate condition, and to keeping the most important of the unpaved ones passable in all weather. When allocations for this purpose have been inadequate, funds allocated for minor roads have been used on the high traffic roads, particularly in recent years in anticipation of the start-up of the gravelling program. This, USAID believes, was a logical approach in light of the above cited problem of attempting to maintain already badly deteriorated roads.

The net effect of these two priorities has been a shortage of funds, resources and capability of caring for non-trunk roads which in consequence have been receiving minimum, rather than optimum, maintenance attention. The situation is aggravated by the fact that the trunk road maintenance procedures are too costly to permit general application to C, D and E roads within the present budgetary limits. In order to be able to return more regular maintenance equipment and funds to maintenance work on the upgraded rural roads network, the MOW has initiated its gravelling, bridging and culverting program to take over the upgrading with self-contained equipment and staff packages specifically earmarked for this purpose.

c. Pilot Project

To assist the MOW in revising its maintenance procedures for low class roads and in developing an appropriate system

for maintaining the RAR and GBC component roads, AID is proposing to incorporate a technical assistance component for road maintenance in the AID-funded program. This component of the AID project would establish and test a pilot roads maintenance system which would be phased in over the total project area over the life of the project, and possibly could be replicated in other provinces. Replication of such maintenance strategy could have significant impact in enabling the GOK to meet incremental maintenance requirements resulting from its expanded roads initiatives.

AID grant funds provide for the five-year services of an engineer to work directly with the MOW roads maintenance department and conduct a maintenance pilot scheme which is expected to result in action being taken by the MOW that will lead to savings of resources on the one hand and improved maintenance on the other. The pilot scheme was a suggestion of LBII and was discussed in considerable detail with the Ministry of Works. The MOW is interested in the recommendations that will emerge from the pilot project and is expected to take immediate action to implement them.

MOW under the present system, has a permanent labor force of about 5,000 persons working for the road maintenance department throughout the country. These laborers are provided with housing, transportation to job sites and numerous other permanent government employees benefits.

The LBII study recommends conversion from a permanent labor force to a locally hired casual labor force. The LBII study also states that at present it is costing the government an average of approximately KSh53.00 per day for permanent labor, whereas casual labor is available at about KSh8.00 per day, payable for only actual hours worked. This conversion will result in great savings to the MOW which, in turn, will increase the funds available for maintenance work. The approach outlined above was presented and discussed with the MOW in detail. MOW has agreed to accept this new concept. However, they have stressed that such a change must follow standard government procedures such as (a) stop new recruitment, (b) attrition on a national basis, (c) transfer of the permanent labor force to other areas where casual labor is not available, (d) transfer of some of the casual workers that have overseer (supervision of casual labor) ability to the RAR or pilot maintenance scheme and other means of reduction, short of dismissing the employees.

The pilot maintenance scheme will place an engineer (USAID grant financed) at the provincial level to start up an experimental road maintenance program, devising and introducing changes

in the present system in one geographic area and hopefully expanding the program to other areas. The engineer assigned to this project will personally formulate the plan and will base his program on the following guidelines:

i) develop an organizational structure able to cope with both the RAR and GBC component

ii) develop a maintenance plan and procedure to maximize labor intensive operations and minimize capital intensive input

iii) develop techniques to reduce maintenance costs and increase production

iv) review past labor intensive operations in Kenya (i.e. Vihiga project) and improve techniquest based on the experience gained

v) introduce new technologies along with some essential equipment (i.e. rock blasting) to improve production rate

vi) study availability of casual labor in various locations, etc.

The MOW has agreed to provide all the necessary manpower and tools required for this project. It is envisaged that the MOW input will consist of, (a) necessary support staff to select areas where pilot maintenance programs can be tested, (b) manpower to collect data, (c) financing for casual labor and supervisory staff, (d) the required hand tools and minor essential equipment to conduct maintenance, (e) construction material as deemed necessary, and (f) logistical and other support beneficial to the program.

4. Manpower Analysis

a. MOW Staffing Requirements

The controlling factor in successful implementation of the Rural Access Roads (RAR) and Gravelling, Bridging and Culverting (GBC) programs is the MOW's capacity to staff and equip the construction units. The requirement for engineering supervisors is to be met through various donor technical assistance programs. Sub-professional staff for the units is to be provided by the Staff Training Department (STD) and through the MOW's rotational career development program. Casual labor will be recruited within the vicinity of project sites.

The MOW has commitments from the ODM, the Netherlands, ILO, Switzerland and the UNDP to provide 11 roads engineers for the RAR program. With one engineer supervising five units, the MOW will have the capacity to satisfactorily operate 55 units. The MOW currently has financing for 47 RAR units, including 8 by USAID, so engineering supervision of the RAR program is not a constraint.

The technical assistance component of the AID-financed GBC unit under this project will consist of a Deputy Project Leader (engineer), a construction superintendent and a maintenance mechanic. The Deputy Project Leader (The Project Leader is financed under the Roads Gravelling Loan) will be head-quartered at the MOW office in Nairobi. The Construction Superintendent, in charge of actual construction, and the maintenance mechanic, supervising preventive maintenance and repair of equipment, will be in the field with the GBC unit.

Training sufficient numbers of sub-professional staff is the largest potential constraint to implementation of the labor intensive operations of the RAR and GBC programs. The most important categories of personnel are those that are trained by the STD, i.e., Road Supervisors, Equipment Operators and Mechanics. Other categories of personnel required on these types of projects do not require special training and are available, as needed, on the local job market. Staffing requirements for each CIDA and USAID gravelling unit and each RAR unit are shown in Table a-1:

Table a-1: Personnel Per Construction Unit

	CIDA gravelling	USAID gravelling	RAR
Road Supervisor	8	8	5
Equipment Operator	10	13	7
Mechanic	16	24	4

These figures are MOW staffing patterns for the construction units with some modification made after discussions

between MOW and AID engineers. The original MOW staffing pattern had 33 mechanics assigned to each USAID gravelling unit. Experience with the CIDA unit in operation has shown that the mechanic-to-equipment ratio of 1:2.5 which is normally recommended by the STD is adequate. The change to 24 mechanics from 33 reflects this 1:2.5 ratio. The eight Road Supervisors assigned to each CIDA and USAID gravelling unit consist of seven construction supervisors and one mechanical supervisor for each unit. The numbers of Road Supervisors, Equipment Operators and Mechanics assigned to each unit are considered sufficient given the types and quantities of equipment and the construction methods.

All five gravelling units and all forty-seven RAR units are scheduled to be phased into operation as shown below:

Table a-2: New Construction Units Added Each Year

	1976	1977	1978	1979	Total All Years
CIDA GBC	1	2			3
USAID GBC			1	1	2
USAID RAR		2	6		8
Other Donor RAR	4	5	9	21	39

New personnel requirements for the RAR and GBC programs for each year are determined by multiplying the personnel requirements per unit given in Table a-1 by the phasing schedule of new units given in Table a-2.

Table a-3: GBC New Staff Required Each Year

	1976	1977	1978	1979	Total
Road Supervisors	8	16	8	8	40
Equipment Operators	10	20	13	13	56
Mechanics	16	32	24	24	96

Table a-4: RAR New Staff Required Each Year

	1976	1977	1978	1979	Total
Road Supervisors	20	35	75	105	235
Equipment Operators	28	49	105	147	329
Mechanics	16	28	60	84	188

b. STD Training Activities

The MOW Staff Training Department is responsible for the training, retraining and upgrading of MOW personnel. The STD was set up with IDA assistance in 1971 by reorganizing and expanding the former Kenya Highway Training Center. Between 1971 and 1976, the STD has trained 1867 technicians as shown in Table b-1.

Table b-1: STD Training 1971 - 1976

	1971	1972	1973	1974	1975	1976	Totals
Overseers	82	102	85	66	50	45	430
Foremen	18	30	32	31	29	30	170
Inspectors	-	-	20	40	32	21	113
Senior Supervisors	-	-	15	15	17	6	53
Labor-Intensive Supervisors	-	-	-	-	32	30	62
Equipment Operators	-	68	73	59	94	110	404
Mechanics	-	50	64	48	76	78	316
Mechanics Instructors	-	-	-	9	11	20	40
Other Mechanical Personnel	-	-	-	95	115	69	279
Totals	100	250	289	363	456	409	1867

Most of STD training activities have concentrated on the retraining and upgrading of Road Supervisors and Equipment Operators to meet the needs of MOW maintenance activities on the classified roads system. The training of mechanics was carried out by U.S. Raytheon consultants but has now been taken over by STD staff. Much of the program has consisted of classroom/workshop courses with some practical field training. STD technical staff consists of a Principal and nine expatriate instructors, 25 Kenyan instructors and nine counterpart instructors. The STD now has the capacity to train up to 500 persons annually, although the actual number of trainees passing their courses is somewhat lower.

c. STD Training Expansion Program

In 1975, the STD projected staff requirements for eight GBC units, 74 RAR units and normal growth of MOW activities. They determined that during the period 1976 to 1980, STD would be required to train approximately 4000 employees, of which 2800 would be new recruits. This represented an output more than double that of the previous six year period of 1971 to 1976. Concurrent with the initial planning of the gravelling and RAR programs, the MOW recognized that an expanded training program would have to be initiated by the STD in order to provide the necessary training of the existing and newly hired personnel required to staff

these programs. In consideration of training requirements and subsequent donor financing of these programs, an evaluation of the MOW Staff Training Department was funded by the IBRD and SIDA. This evaluation, conducted in January and February 1975 by the Organization for Rehabilitation through Training (ORT, Switzerland) resulted in a series of recommendations for training expansion and improved operations as contained in its report "Study of Training Needs, Road Maintenance, Road Gravelling and Rural Road Program, Kenya", dated October 1975. Concurrent with the publication of this report was a second report prepared by the department head of the STD, titled "Staff Training Department, Review of Current Activities and Proposed Expansion", dated September 1975.

These two reports concluded that (1) additional training facilities needed to be constructed, (2) additional training equipment needed to be procured, and (3) expansion of the training staff was required.

Estimated total cost of the five-year training expansion program of the STD is $4.6 million, of which $2.2 million will be financed by the IBRD $1.4 million by SIDA and the balance of $1.0 million by the GOK. The expansion program consists of the following components:

(1) expansion of STD facilities (additional dormitories, stores, classrooms/workshops, laboratories, etc.)

(2) acquisition of training equipment (heavy road maintenance equipment, audio-visual and teaching aids, etc.)

(3) an increase in the current number of instructors and/or administrators from 44 to 72

The planned expansion has fallen behind schedule due to changes in, and timing of, donor inputs. This has been mitigated by the fact that phasing in of RAR and GBC units has also been delayed.

Physical expansion (dormitories and workshops) is approximately one year behind schedule, but all funds are now allocated and facilities are under construction and will be available for a full training complement in January 1978. Training outputs for 1976 and 1977 have been geared to current facilities. Dormitory space for MOW trainees at the Kenya Polytechnic will not be provided as originally planned. Trainees will instead be expected to provide their own housing while in Nairobi. This will not affect total numbers to be trained.

The MOW has secured funding from IBRD and SIDA to supplement its own budget for the programmed vehicles, equipment, additional

classrooms and other facilities. These will be available by January 1978 and this timing will cause no delay in planned STD outputs.

Instructors for training of Road Supervisors and Equipment Operators are recruited locally in Kenya. Instructors for training of Mechanics are also recruited locally, but require instruction from more qualified, expatriate instructors before they are fully able to take over training duties. U.K. and Swiss instructors are currently being recruited to train the Kenyan instructors. All recruitment of additional instructors for the STD is proceeding as the schedule of projected outputs requires. Instructors for the STD training programs should not be constraints to implementation of the GBC and RAR programs.

d. STD Staff Training Outputs

While the STD expansion program has been delayed one year, donor financing of RAR and GBC units has also been delayed. In January 1977, the STD revised their projected training outputs to reflect the approximately one year delay in phasing in of new construction units. The projections include training required for normal growth of other maintenance activities of the MOW through 1981. Projections are shown in Revised Tables 1/1, 1/2 and 1/3.

The total number of 930 Road Supervisors trained by the beginning of 1981, 1114 Equipment Operators trained by the end of 1981 and 1429 Mechanics trained by the end of 1981 are targeted for assignments as shown in Table d-1.

Table d-1: Targeted Assignments

	Road Supervisors	Equipment Operators	Mechanics
Maintenance	520	540	1019
Gravelling	40	56	114
Rural Access Roads	370	518	296
Total	930	1114	1429

REVISED TABLE 1/1
Road Supervisors

	1977	1978	1979	1980
a. Total: Start of Year	553	774	857	869
b. Induction Courses	218	146	45	88
c. Promotion Courses	127	160	205	71

d.	Labor Intensive Course	65	104	128	80
e.	Retraining	50	50	50	161
f.	Total Training	460	460	428	400
g.	Polytechnic	9	9	9	18
h.	Attrition (5% a+b)	36	42	42	45
i.	Net Gain	191	113	12	61
j.	Total: End of Year	774	857	869	930

REVISED TABLE 1/2
Equipment Operators

		1977	1978	1979	1980	1981	Total
a.	Total: Start of Year	585	654	772	932	1016	
b.	Gravelling	20	13	13	-	-	56
c.	RAR Program	49	105	147	84	98	518
d.	Existing Maintenance & Retraining	115	176	73	136	122	
e.	Total Training	184	320	233	220	220	
f.	Attrition (5% a+b+c)	32	38	46	50	55	
g.	Net Gain	69	118	160	84	98	
h.	Total: End of Year	654	772	932	1016	1114	

REVISED TABLE 1/3
Mechanics

		1977	1978	1979	1980	1981	Total
a.	Total: Start of Year	636	678	885	1110	1279	
b.	Gravelling	32	33	33	-	-	114
c.	RAR Program	28	60	84	48	56	296
d.	Existing Maintenance	18	161	166	188	169	
e.	Total Training	78	254	283	236	225	
f.	Attrition (5% a+b)	36	47	58	67	75	
g.	Net Gain	42	207	225	169	150	
h.	Total: End of Year	678	885	1110	1279	1429	

e. Summary and Conclusion

Road Supervisors for GBC units will be experienced men from within the MOW who will be given retraining (see Revised Table 1/1) as necessary. Their replacements and the Road Supervisors for the RAR program will be new men trained through induction or promotion courses and men recruited from the Polytechnic. Equipment Operators and Mechanics for both GBC and RAR programs will be new recruits that will receive training at the STD (see Revised Table 1/2 and 1/3).

STD's projected outputs of personnel in the Revised Tables are based on a total of 5 GBC and 74 RAR units. The phasing into operation schedule for these units was the same as the schedule given in Table a-2 with three exceptions. The original schedule called for 5 total RAR units to begin operation in 1976, whereas only 4 units were fielded. The original schedule also called for 12 RAR units to be added in 1980 and 14 RAR units to be added in 1981 for a total of 74 RAR units for all years. Donor financing is not available at this time for these final 26 RAR units so they have been omitted from the schedule in Table a-2.

This means that STD planned outputs for the three categories of personnel for each year are equal to or greater than the numbers we now believe will actually be required. The flexibility of the STD training plan is such that if donor financing is not made available for the final 26 RAR units, STD will alter its planned outputs downward to levels required for MOW's normal maintenance operations and attrition.

Total training outputs in 1976 were 409 persons. Planned outputs over the next two years are 722 in 1977 and 1034 in 1978 (from the Revised Tables). This phased increase in training outputs is consistent with the status of the ongoing Training Expansion Program.

STD's planned outputs are more than sufficient to staff the 5 GBC and 47 RAR units and normal expansion of maintenance activities that the MOW is currently planning. With its increased capacity from the Training Expansion Program and its ability to alter training plans as requirements change, the STD is fully capable of not only meeting total skilled manpower requirements but also of allowing an orderly phasing of trained personnel into the GBC and RAR units.

5. Technical Assistance

It is proposed that AID grant-finance expatriate personnel at supervisory and operational levels in the MOW to administer and implement the AID project. The technical assistance component will, therefore, provide the following:

a. One Deputy Project Leader (engineer) assigned to the gravelling program at MOW headquarters for six years. The Project Leader also assigned to MOW headquarters was provided under the Roads Gravelling Project. Drawing on experience gained with the CIDA-financed projects, the MOW has determined, and the USAID concurs, that a Deputy Project Leader (e.g. two-full time managers at MOW headquarters) will be required to effectively administer two AID-funded GBC units, specifically to assist in the review of bids for equipment, the awarding of contracts, the selection of candidate roads, the mobilization of equipment, the preparation of Work Plans, and to provide daily supervision over Project activities.

b. One construction superintendent at field level and in overall charge of the gravelling unit's operation for five years.

c. One master mechanic in charge of overall maintenance, on-the-job operator training and performance of the equipment located within the gravelling unit for five years.

d. One construction engineer to be in charge of the pilot maintenance program, to supervise maintenance works and obtain data for evaluation and revision of the maintenance procedure for five years.

e. One local engineer to assist the USAID Project Manager (engineer) conduct periodic inspections of RAR construction activity. (See Part III-C, Financial Analysis, for costing of technical assistance component.)

6. Reasonableness of Cost Estimates

Cost estimates used for equipment and technical assistance are based on prices of equipment and consultants for recent (January 1977) AID-financed projects in Kenya and adjacent countries in the Eastern Africa area and AID/Washington-furnished up to date cost data.

Cost estimates for GOK/MOW inputs for labor, POL and related items are based on 1974 prices also contained in the CIDA report and updated to reflect increases in POL, materials and labor, through January 1977.

A price escalation factor of 1.5 percent per month and a contingency factor of 10 percent have been added to basic cost estimates for equipment.

7. Environmental Impact Statement

An Initial Environmental Examination prepared for the

RRSP indicates that no significant problem areas exist or are likely to develop. Thus a negative determination was made. See Annex XII for details.

8. Summary and Conclusions

a) Section 611(a)(1) of the FAA related to technical and engineering plans is deemed to be satisfied. The engineering analyses for this Project were initially developed by the MOW and CIDA for the GBC program, and the MOW and IBRD for the RAR program. Louis Berger International, Inc. assisted the MOW and the USAID in further developing the analyses for this Project. REDSO engineering has determined that these analyses, including the analysis presented in the Project Paper, are consistent with sound engineering principles applicable to Kenya for the GBC and RAR programs.

b) Section 611(a)(1) of the FAA related to firm cost estimates is deemed to be satified. The precise work program for the Project will be developed by the Special Projects Branch of the MOW and the DDCs on the basis of the criteria and according to the schedule set for in this Paper. The work program will be developed in conjunction with the USAID Project Manager. Typical cross-sections for the GBC and RAR components have been established by the MOW, along with standard drainage-designs, and are attached as an annex to this Paper. Additionally cost estimates have been verified by Louis Berger International, Inc.

B. ECONOMIC FEASIBILITY ANALYSIS

1. Summary

The Rural Roads Systems (RRSP) Project, through the complementary road construction and improvement activities of the GBC and the RAR, is designed to generate a series of direct and indirect economic benefits, chief among which are a reduction in transportation costs and an increase in agricultural production. Direct Project benefits include reduced vehicle operating costs, reduced transportation time and incremental regional income due to labor intensive construction techniques and consumption multipliers. Indirect benefits primarily include incremental agricultural output generated by changes in realized farmgate prices of agricultural inputs and products (consumer and producer surplus effects), improved delivery of production technology and road induced expansion of cultivated land.

The economics of transportation has developed a rich literature in the field of vehicle operating costs; this analysis employs generally accepted techniques for estimating the net benefits derived from improving existing roadways and is more appropriate for analyzing the reduced vehicle operating costs which are attributable to the GBC program. The chief benefit anticipated from the road construction program is the increased agricultural output attributable to an expanded and upgraded road network through the project area. Unfortunately, transportation economics has only recently begun to focus on methodologies for observing and estimating indirect benefits. This analysis incorporates an approach, recommended by the World Bank, which relies heavily on the expert opinion of transportation and agricultural specialists in order to set the parameters required to quantify incremental agricultural output.[1/] While a certain level of disaggregation is feasible in the analysis of this Project (e.g., the GBC and the RAR Project components), the thrust of the economic analysis lies in the inseparable complementarity of the GBC and RAR Project components.

A detailed analysis of economic costs and benefits is set forth in Annex VI. A summary of the analysis is presented in Table 1, indicating an internal rate of return of 14.8 percent and a benefit/cost ratio of 1.17 at a 10 percent social rate of discount. In addition to the quantifiable benefits detailed in this section and Annex VI, the RRSP

1/ Carnemark, Biderman, Bovet. A Broadened Approach to the Economic Analysis of Rural Roads. IBRD, January 1976.

serves an important role in increasing the access and hence communication between isolated rural locations and administrative, social, or economic centers. While many of these benefits are nonquantifiable, they nonetheless are real and important benefits which must be seriously considered, in addition to those benefits detailed elsewhere in this paper, while undertaking an economic analysis of the RRSP.

Table 1

Rural Roads Systems Project: Summary of Economic Analysis
(US$ '000)

	Discounted At	
	10 Percent	20 Percent
1. Present Value of Benefits		
a. RAR Component	7,859	3,351
b. GBC Component	14,046	5,189
c. Total Benefits	21,905	8,540
2. Present Value of Costs		
a. RAR Component	5,294	4,049
b. GBC Component	13,476	7,937
c. Total Costs	18,770	11,986
3. Present Value of Net Benefits	+3,135	-3,446
4. Benefit/Cost	1.17	N/A
5. Internal Rate of Return Over 20 Years:	14.8 percent	

2. Macroeconomic Analysis

Kenya's current economic situation is fully described in the recent IBRD report, Current Economic Position and Prospects of Kenya, October 15, 1976. Macroeconomic analysis focusing on Kenya's debt service position, government budget, and monetary and fiscal policy has recently been prepared by USAID/Kenya and is available in the Roads Gravelling Project PP (615-0170) (AID-DLC/P-2212).1/

1/ Kenya's debt service ratio, inclusive of East African Community Debt, is estimated at 6.6 percent in 1975 and projected to increase to 7.0 percent by 1980 and 10 percent by 1985.

3. Benefit Matrix and Methodology

The basic question which this economic analysis must answer is: What will the Rural Roads Systems Project do for the Project area? The principal benefit categories are described in the following section and accompanied by a discussion of methodology. Supporting details are available in Annex VI, sections A and B.

a. Direct Benefits

i. User Benefits - Operating Costs

These benefits are the user cost savings which accrue to the vehicle operators or owners whose vehicles use the improved roads. Given the low traffic volume anticipated on the rural access roads (1-2 vehicles per day) only those vehicle operating costs which are saved due to the improvements on GBC roads (traffic volumes ranging between 40 and 90 vehicles per day) will be identified and quantified.1/

Traditional analysis of transportation systems has focused on the savings in vehicle operating costs (VOC) generated by improvements in roadways (smoother surface, wider passageway, straighter alignments, and reduced accidents). These benefits have been calculated for the GBC program by the Ministry of Public Works (MOW) and Scandia-Consult and form the basis of this portion of the economic analysis.2/ The analysis distinguishes between those benefits accruing to (1) existing traffic (on passable roads which will be improved), (2) generated traffic resulting from an increase in demand as operating cost savings are passed on to consumers, and (3) traffic diverted from existing roads to the newly improved road network.

As an approximation to savings in road user costs, savings in vehicle operating costs (VOC) are used, including savings in

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1/ Experience in Vihiga indicates that a dramatic increase in bicycle traffic can be expected along the entire access road network. The economic implications of this particular traffic flow have not been quantified but rather are included under the general analysis of "improved access".

2/ Scandia-Consult. Improvement of Roads in Kenya. April 1974. and MOW. Gravelling Program in Bungoma District. February 1976. Calculations of VOC savings in the Project area have been prepared by LBII and may be found in Kenya - Roads Gravelling Project Paper. AID-DLC/P-2212, pg. 71-84.

fuel, lubricants, tires, spares, repairs and maintenance.[1/] For the normal traffic load (existing and projected) the full amount of these VOC savings is a Project benefit. Savings in VOC for diverted traffic will be taken as the difference between the VOC on the road otherwise used and the VOC on the improved road.

The full analysis is present in Annex VI, section B.

ii. User Benefits - Access to Social Services

There are large sections in the Project area where people have to walk more than five kilometers before reaching an all-weather road. Quite apart from the negative impact on agricultural production, the absence of all-weather roads from within a radius of approximately three kilometers from a settlement diminishes the benefits that local people can derive from the improved social services offered at the nearest growth center. The presence of an all-weather road, providing year-round access to these centers, opens up considerable possibilities for improvements in the general welfare of the Project area population. While this benefit can be identified and analyzed in a sociological context, it is not reasonable to impute an economic value to improved access to social services. It must be pointed out, however, that while not quantifiable, this type of benefit is fundamental to the concept of rural roads program.

iii. User Benefits - Time Saved

In addition to reducing VOC, improved roads will reduce travel time, either because vehicles can move more rapidly, more vehicles are available (reducing waiting times and uncertainty) or vehicles are now available for transport on roads where once there were no vehicles. Although no attempt has been make to quantify this benefit its recognition is important to obtaining a full picture of a roads improvement and construction program.

iv. Non-User Benefits - Employment

The RAR component will construct 934 kms of rural roads using labor-intensive techniques, employing up to 5700 man-years

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1/ But not including the value of travel time or accidents foregone.

of unskilled labor. Net social benefits are expected to increase through the income distribution weights which are implicitly attached to both the first round construction wages and the second round income increases which are generated by consumption multipliers. While no quantitative set of income distribution weights have been calculated on a spatial (interregional) or income (interpersonal) basis, the target employment population (poor rural farmers) is being favored by the GOK's national development strategy. While the social analysis does highlight potential social costs resulting from increased rural employment opportunities, that analysis does carefully point out that these social costs are minimized through the employment of relatively poorer farmers on the road construction program (section III, D).

b. Indirect Benefits

i. Methodology

The principal indirect, or secondary, benefit of the road improvement/construction program is the incremental agricultural output generated by price effects, technological transfers, and shifts in land use. An all-weather road network will reduce the transportation costs and uncertainty associated with both the delivery of agricultural inputs into the farming areas as well as the export of surplus produce from the farming areas. To the extent that the transportation savings are passed on to the farmer, and there is good reason to believe that much of the savings will be passed on to the farmer because of the competitive nature of the transport network, the farmer's realized gain from crop sales will increase and the cost of his inputs will decrease. Furthermore, reduction in uncertainty over the availability and dependability of transportation will be reflected in an increase in net social benefits to the farmer since the farmer can move produce to market at the farmer's and not the transporter's convenience.

While the GBC and RAR form an integrated transportation network, it is the RAR which is providing first-time access for many farmers in the Project area. The GBC is a necessary, but not sufficient, condition for reaching the large proportion of smallholder farmers who are to benefit from the RRSP. The bulk of the incremental agricultural output is therefore attributed to the RAR, under the criterion of newly provided access. The final analysis of the RRSP rests, however, with the combined effect generated by all-weather access roads which link up to other all-weather minor and secondary roads.

Indirect benefits will be analyzed by means of a modified producer surplus approach.[1/] Rising farmgate prices for agri-

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1/ See Carnmark, Bickerman, Bavet, op. cit, for a discussion of the microeconomics of the producer surplus approach.

cultural products induces incremental agricultural production in the first round, due to the price increase alone. Further production increases can be expected as the farmer's marginal costs decrease through a combination of lower prices for farm inputs and improved production techniques resulting from better transportation and improved access to production technology.

A comprehensive application of the producer surplus approach requires consideration of: (1) the decrease in consumer surplus which occurs when on-farm consumption is a significant factor, (2) the degree of complementarity between the agricultural and the transport sector which determines the distribution of the producer surplus between the farmer and the transporter, (3) the case of two or more competing markets which results in a loss of consumer surplus in the non-project market area, (4) the crop substitution effect whereby production shifts in favor of transport-intensive products, and (5) the case of alternative producers, those in and those out of the zone of project influence, where lower marginal costs reach only the in-zone producer and reduce the producer surplus of the out-of-zone producer.

While these various aspects of producer surplus are recognized, there is insufficient data available for a realistic analysis of the factors. The modified producer surplus approach focuses on incremental net agricultural production (value of incremental production less incremental costs). It is asserted that the significant net Project benefits are captured by use of a modified producer surplus approach and that the sum of sub-effects (1-5), listed above, are negligible.

The basic approach taken towards calculating Project benefits is the "with-and-without" approach, where net benefits are the sum of total output and VOC with the Project less output and VOC without the Project. In this context, existing development efforts (ASL I and IADP) are taken as a given, with their set of benefits and costs accruing whether the RRSP exists or not. The RRSP is a complement to these activities in that total benefits generated are greater if the roads program and the two agricultural activities are both undertaken, as against the benefits possible with only the agricultural activities or only the roads program. Since ASL I and IADP are taken as given investment programs, this analysis does not, and should not, represent a combined economic analysis of costs and benefits of both the two agricultural programs and roads program.

ii. Valuation

The principal increase in producer surplus is anticipated from decreases in the farmer's marginal costs through a combina-

tion of decreases in farm input prices (via improved transportation and access) and technological shifts (brought about by the improved technological transfers of the ASL I, Part C and the IADP programs and improved access to farmers). Central to incremental agricultural output is the complementarity of the RRSP and the two agricultural programs. The RRSP, alone, is a necessary, but not sufficient, condition for incremental agricultural output. The Rural Roads Systems Project will serve to improve the efficiency of on-going agricultural programs through reducing physical barriers to the delivery of improved technology and the marketing of crops.

While there is no thoroughly researched data currently available to verify the magnitude of the complementary effect between the rural access roads and ASL I and IADP, the best estimates of agricultural technicians and transport specialists is that the rural access roads component would add another 20 percent per annum to the incremental agricultural output anticipated from the IADP alone.1/ Employing the same principal, it is estimated that the GBC component would have a complementary factor of 5 percent with the IADP.2/ For the sake of valuation, IADP model farm budgets and IADP proposed agricultural interventions form the basis of the economic benefit calculations. These IADP based benefits are, however, indicative of benefits generated by ASL I and other on-going agricultural development activities.

In addition to complementarity, the introduction of new roads through the Project region will stimulate the cultivation of presently unused land as access is improved. Experience gained during the Vihiga Project indicates that cultivation along newly constructed roads increased between 15 percent and 70 percent. It is anticipated that the area under cultivation will increase 20 percent in the RAR zone of influence due to the road construction program.3/

1/ IBRD. Appraisal of Rural Access Roads Project in Kenya. February 1976.

2/ J. Gerhart. Diffusion of Hybrid Maize in Western Kenya. CIMMYT. 1975. Gerhart's work indicates a high degree of receptivity to technological innovation. He has constructed learning "S" curves which indicate up to 60 percent of farmers accepting hybrid maize seeds within 4 years of its introduction into the test zone.

3/ MOW. Rural Access Road Evaluation: Kirinyaga District. October 1976.

In the IBRD's appraisal of a Rural Access Roads Project for Kakamega District, the World Bank undertook an analysis of shadow prices for unskilled labor and foreign exchange. Given the similarity between the World Bank Project and the RRSP, the Bank's calculations of shadow prices have been incorporated into this analysis.

4. Subproject Feasibility Analysis

a. Gravelling, Bridging and Culverting Component

i. The principal GBC benefits identified and quantified are savings in vehicle operating costs due to improved road conditions, reduction in transportation time, and fewer accidents. Secondary benefits are generated from the complementarity between the CBC component and ASL I and IADP.

ii. Construction and Improvement Schedule

Fiscal Year	Kms Improved/Constructed
1979	204
1980	450
1981	350
1982	450
1983	400
1984	146

iii. Summary of GBC Component Costs and Benefits (See Table 22, Annex VI)

	Total (US$ '000)	
Benefits		
Total Vehicle User Cost Savings	47,259	
IADP Complementarity	3,518	
		50,777
Costs		
Construction Costs	12,621	
Routine Maintenance	7,136	
Regravelling	9,711	
		29,464
Net Benefits		
Discounted at 0%		21,313
Discounted at 10%		570
Discounted at 20%		-2,748

Internal Rate of Return: 11.5%

b. Rural Access Roads Component

i. The principal RAR benefit identified and quantified is the increase in producer surplus resulting from the incremental agricultural output generated by the complementarity between the RAR component and ASL I and LADP.

ii. Construction Schedule

Fiscal Year	Kms Constructed
1978	182
1979	336
1980	336
1981	180

iii. Summary of RAR Component Costs and Benefits (See Table 1, Annex VI)

	Total (US$ '000)	
Benefits		
Incremental Agricultural Output		23,828
Costs		
Construction Costs	6,535	
Maintenance Costs	2,234	
		8,769
Net Benefits		
Discounted at 0%		15,054
Discounted at 10%		2,565
Discounted at 20%		-697

Internal Rate of Return: 17.9%

5. Benefit Incidence

a. Rural Access Roads Component

It is estimated that there will be approximately 120,000 - 130,000 direct beneficiaries of the incremental agricultural output which is generated by this component. In addition, there will be approximately 20,000 road construction laborers who will directly benefit from the

temporary employment offered during the construction of the rural access roads.[1/]

The target beneficiary of the RAR component is the smallholder, physically isolated farmer, cultivating between 2.5 and 7.5 hectares and earning an on-farm cash income of between $90 and $300 per family. This income does not include either the valuation of subsistence consumption nor income earned off the farm. A detailed socio-economic description of the intended project beneficiary is available in Annex VII. The actual selection of beneficiaries is a direct function of the road selection process. The District Development Committees and the Ministry of Works will undertake a road selection process which will satisfy both local considerations as well as broader national development concerns. The MOW will be required to submit a socio-economic analysis of each set of selected rural access roads. See Road Selection Procedure, section III-A.

It is expected that the average beneficiary will realize a 25 percent increase in on-farm income due to the introduction of an all-weather road network into the beneficiary's area of residence.

Road construction wages will average $100 per laborer over the life of the Project. This income will represent a significant increase in family cash income for the 20,000 laborers participating in the road construction program.

b. Benefit Incidence - GBC Component

Potential beneficiaries of the GBC component number approximately 500,000 in the seven Project districts. Of this number, the overwhelming majority are smallholder farmers, with the income characteristics described above. Annex VI, section C, estimates the distribution of benefits arising from vehicle operating cost savings over six categories of beneficiaries. While this is admittedly a crude estimate, it suggests the order of magnitudes anticipated given the existing microeconomic data available for western Kenya.

The smallholder is expected to receive between 25 percent and 37 percent of the VOC savings, given the stated assumptions concerning competition in the transport sector. Similarly, the smallholder is expected to receive between 65 percent and 85 percent of the benefits

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1/ There may well be some duplication between the beneficiaries of the incremental agricultural output and the road construction wages.

generated by incremental agricultural output which results from a completed all-weather road network. Assuming that 60 percent of the benefits earmarked for cooperatives actually accrue to the small farmer (reasonable given the role of smallholder farmers in the cooperatives of western Kenya) then the smallholder farmer ultimately captures 33 percent of the VOC savings and 77 percent of the incremental agricultural output. For a given year, say 1990, annual GBC component benefits average around $12.00 per family for the smallholder farmer, representing a 4 percent increase in on-farm income.1/ The GBC component benefits will flow for a period of time and therefore the overall evaluation of benefits and benefit incidence must take a dynamic approach, rather than the static approach, with GBC benefits, discounted at 10 percent over twenty years, averaging $102 per family.

6. Overview

On the basis of the data presented in this section and the supporting and explanatory tables and narrative presented in Annex VI, the Rural Roads Systems Project is found to be economically sound, with an overall internal rate of return of almost 15 percent. The benefit incidence analysis indicates that this Project is anticipated to make a significant impact on the economic and social welfare of the Project area's isolated and rural poor.

1/ Total on-farm income per family: $300
Total on-farm cash income per family: $100

C. Financial Analysis and Plan

1. Summary

The Rural Roads Systems Project will result in the rehabilitation of approximately 2,000 kilometers of existing secondary and minor rural roads, construction of 1,003 kilometers of rural access roads where only trails and paths now exist and the development of more efficient road maintenance regimes for Kenya's road network. The project will provide all-weather access to market centers and other agricultural and social services through this rural road network keyed to servicing a population comprised predominantly of subsistence level farmers.

A summary of total project funding is presented below:

FUNDING SUMMARY
(In Millions U.S. $)

	AID			GOK			Total Project
	FX	LC	TOTAL	FX	LC	TOTAL	
Construction/Improvements							
RAR Component	-	4.5	4.5	1.0	.6	1.6	6.5
GBC Component	7.4	1.2	8.6	-	4.9	4.9	13.5
Total Road Work	7.4	5.7	13.1	1.0	5.5	6.5	19.6
Technical Assistance	1.5	.2	1.7	-	-	-	1.7
Total Project	8.9	5.9	14.8	1.0	5.5	6.5	21.3
Percentage			69			31	100

The GOK contribution satisfies the requirements of Section 110(a) FAA.

2. Rural Access Road Construction

a. AID Contribution

The financing of rural access road construction amounts to $6,018,600, $4,400,000 to be financed under the AID loan, and $1,618,000 by the GOK.

The AID loan will finance the operational and indirect local costs of constructing 934 kilometers of rural access roads over a four year period. Alternative methods for the financing of the $4,400,000 AID contribution were studied, and it has been determined that the Fixed Amount Reimbursement (FAR) system is appropriate for such financing. The GOK concurs. The determination to use (FAR) considers the following:

(1) The relatively short construction period of the RAR activity--three years per construction unit with all construction (eight units) to be completed in less than four years from start-up of the first unit.

(2) The logic of linking AID's contribution to an easily quantifiable and identifiable output.

(3) The construction of short discrete units--each selected road will be short in length, averaging about 8 kilometers. The USAID will knows in advance the particulars of the RAR roads that will be financed under FAR since it approves an Evaluation Report, a technical and economic analysis, of each road or group of roads prior to the commencement of construction work.

(4) The potential for a steady flow of reimbursements through the construction and completion of roads in "packages", one for each district of the project area. (It is expected that disbursements will be made quarterly.)

(5) The administrative convenience to the GOK of not having to maintain separate financial records for each of eight construction units working in Western and Nyanza Provinces.

(6) AID will be financing only local costs.

(7) Realistic cost estimates which were carefully prepared and fully accepted by MOW and the USAID.

(8) Sufficient GOK cash resources to finance the roads pending reimbursements from AID.

(9) The MOW's qualified and experienced staff.

The RAR cost estimates (Section 8 below) include the operational and indirect costs incurred in operating e t RAR construction units, each for three years. An AID consultant, Louis rger International, Inc. (LBII), analyzed production outputs for a typical RAR construction unit containing a casual labor force of 270 workers and a unit management structure such as outlined in Annex VIII, Table 4. LBII's analysis considered road construction

over the various topographical conditions in the project area and concluded that construction of 42 kilometers per year per unit was both reasonable and in line with sound management and engineering principles.

The anticipated output of the RAR component is 934 kilometers of constructed rural access roads with eight RAR units each producing an annual average of 42 kilometers of road over three years. The average per kilometer construction cost is $4,762, or K.Shs. 39,525, based on total estimated construction costs of $4,400,000 and the projected output of 934 kilometers.

The basis of the cost estimation and the FAR rate will be periodically reviewed by the USAID and the MOW. Even though the costs include a factor for inflation, there may be a need for a revision as experience dictates. The first formal FAR review will take place about eighteen months after the start of RAR construction, and should coincide with the second annual evaluation of the entire project. A further FAR cost review will take place at the third annual project evaluation. The planned reviews comply with established FAR guidelines (Handbook 3, App. 3F, E.2).

AID will consider reimbursement only for a completed all-weather rural access road. Completed segments of a road will not be considered for reimbursement. Reimbursement at the fixed per kilometer rate will be effected upon: (1) submission of appropriate voucher forms and MOW Engineering Field Reports showing, to the nearest 1/10 kilometer, the amount of completed rural access roads constructed, and (2) the AID Project Manager's (engineer) certification, based on his physical inspection of each completed road, that the road for which reimbursement is requested has (a) earth works, drainage, culverting/bridging and impacted wearing course (where deemed necessary), (b) is completed to an all-weather standard, and (c) is open to traffic.

To assist the USAID Project Manager in monitoring RAR construction work, $85,000 in grant funds will provide 42 man-months of local engineering services to assist inspection of each unit's construction once every two months. This will satisfy the need for frequent inspections called for in the FAR guidelines (Handbook 3, App. 3F, section B3).

Different roads constructed over different terrain will require various levels of construction inputs to attain an all-weather standard. Steep grades may require bituminization, while flat, level segments may be able to utilize appropriate indigenous soils for their impacted wearing course. AID's reimbursement at the fixed per kilometer rate will be based on a road meeting an all-weather standard, not on the investment required for the particular road. The Evaluation Report, approved by AID before construction begins, will identify each road to be constructed. Roads eligible for reimbursement under FAR will be defined by those roads listed and analyzed in the Evaluation Report.

b. GOK Contribution

The $1,618,600 GOK contribution to the RAR program will provide the equipment and spare parts for the eight construction units (see Annex VIII, Table 10). About $600,000 represents locally manufactured items; hence are local project costs. The balance of $1.0 million will either be purchased from private sector "off-shelf" inventories or, if not available locally, will be imported specifically by the MOW for project use. Over the next three to four months, there will be sufficient "off-shelf" inventories available to provide the $1.0 million of required RAR equipment. However, since there is no assurance that the AID project will be authorized in time to take advantage of this equipment availability, it is conceivable that as RAR projects financed by other donors move forward, these inventories could be depleted by the time the loan is authorized, necessitating the importation of some or all RAR equipment. The $1.0 million is therefore classified as a foreign exchange cost. Handbook 3, Part I, page 6A -12, defines local costs as "those for the procurement of goods and services within the recipient country which are to be paid for in currency of the recipient country". For the purpose of this project, the RAR construction equipment is a local cost if purchased from available "off-shelf" inventories. Given the question of the timing of both AID's loan authorization and other donor financing of similar equipment, much effort can be wasted on deciding whether RAR equipment costs are "local" or "foreign exchange". To be on the conservative side, the equipment costs have been classified as foreign exchange costs.

The reasons for recommending that the GOK finance the $1.0 million foreign exchange cost of RAR equipment are:

(1) Once the loan is authorized and the agreement executed, the MOW will be under considerable pressure to rapidly implement the project. The GOK Rural Access Roads Program has been given a high priority and further delaying the program in western Kenya will increase the anxieties and frustrations of the western Kenya residents, particularly as RAR activities in other areas financed by other donors move forward at a faster pace (see GOK Application, Annex II). To preclude this situation, project equipment must be procured promptly after loan signature so that construction can start no later than three months after initial conditions precedent to disbursement have been met. The MOW has assured the project committee that the equipment can be purchased and available on-site to meet the start-up target date. The MOW is willing to include a covenant in the Project Agreement stipulating that the equipment for the eight RAR construction units will be procured and warehoused four months after execution of the Project Agreement (see Part IV, D-2). If equipment were to be procured through host country contracting procedures from U.S. suppliers, construction start-up would be delayed a minimum of seventeen months, a delay which the GOK and the USAID would view as intolerable.

(2) Total foreign costs of the RRSP (RAR and GBC components) are estimated to be $9,914,000. AID will be financing $8,905,000 or 90 percent and the GOK $1,009,000 or 10 percent. The GOK's potential foreign exchange expenditure represents a small portion of total project foreign exchange costs and demonstrates the GOK's commitment to the importance of expeditious implementation.

(3) The funding of RAR equipment by the GOK assures a maximum uniformity in equipment standards for the GOK's overall multi-donor financed RAR program, which will include approximately fifty RAR units.

3. GBC Component: Secondary and Minor Roads Rehabilitation

a. AID Contribution

Financing the improvement of 2,000 kilometers of existing secondary and minor roads is estimated to cost $13,500,000, of which $8,600,000 will be financed by AID and $4,900,000 by the GOK.

The AID contribution will finance the equipment costs of one self-contained, highly mobile gravelling unit, spare parts, construction materials and related procurement services. See Section 8 for the GBC unit equipment list.

It is anticipated that the foreign exchange costs of AID's contribution to this activity will be financed by Bank Letter of Commitment/ Letter of Credit procedures and that the GOK will contract with the Afro-American Purchasing Center to provide the necessary procurement services, as done previously under the Kenyan Livestock Loan.

A minor amount of AID's input will be used for local cost financing for emergency off-shelf spare parts procurement and locally purchased prefabricated concrete culverts. A Direct Reimbursement Authority (DRA) will be established to enable reimbursement by the Mission to the GOK for these expenses. The MOW's financial management capacity for maintaining a separate accountability for eligible local costs incurred and for submitting timely claims for reimbursement has been reviewed and found to be adequate.

b. GOK Contribution

The $4,400,000 GOK contribution to the GBC component will support the operating costs and road improvement program of one GBC unit, including: petroleum oil and lubricants, local labor costs, equipment maintenance, field camp costs, construction of a provincial headquarters complex, inland transportation of AID financed equipment, materials and spare parts, construction materials and bridge construction.

The administrative and financial capacity of the MOW to provide these project inputs has been discussed in detail with MOW officials, particularly with respect to the MOW's budget planning for both project components. Three year forward budget estimates through the GOK FY 1980 have been prepared. These estimates provide a budgetary framework for the preparation of the annual development and recurrent budgets. Based on the MOW's current implementation of the CIDA financed gravelling units and the MOW planning for the RRSP, the GOK's contribution to the GBC component is reasonably well assured and the MOW's management of inputs is judged to be effective.

4. AID Grant Contribution to Project Costs

a. Long Term Technical Assistance

Total grant funding amounts to $1,748,000 and consists of three parts. The first sets aside $1,260,000 and provides 21 worker years of long term, technical assistance consisting of four positions. These are:

(1) Construction Superintendent, responsible for the day-to-day supervision of the operations of the gravelling unit.

(2) Master Mechanic, responsible for unit maintenance.

(3) Supervisory Engineer, to act as Deputy Project Leader, responsible for project planning and administration at the MOW level.

(4) Maintenance Engineer, responsible for devising more cost effective road maintenance techniques.

It is intended that AID will act as agent for the GOK to procure these services using established OPEX procedures. It is the view of the project committee that this procedure is consistent with Policy Determination No. 68, requiring the maximum use of host country contracting procedures since a contract will be entered into by the individuals and the GOK. We anticipate that such a recruiting plan will enable qualified individuals to be available quickly as required by the implementation schedule contained in Section IV.

The second part of the grant will finance a U.S. consulting services contract for $400,000 to design and manage an evaluation of the program to measure the economic and social effect of improved roads on the rural residents. The third part for $85,000 provides local engineering services to assist the USAID Project Manager monitor RAR construction work as described in Section 2a above.

b. Evaluation

The annual evaluations to be conducted under the project are fully described in Part IV-C. The evaluations will be carried out through a host government country contract with a U.S. consulting firm. The framework of sixteen worker months of short-term technical assistance in conjunction with the use of repeated field surveys for data collection were used as a basis to estimate costs. See Section 8 below.

5. Project Financial Management

Project accounting and reporting for AID inputs will be on an accrued expenditure basis with accrual criteria selected by project input rather than for the project as a whole. Following is a list of project inputs and the accrual basis to be applied:

	Project Input	Accrual Basis
1.	Rural Access Roads--Fixed Amount Reimbursement	Disbursement
2.	Construction Equipment	Constructive Delivery
3.	Spare Parts	Applied Cost
4.	Construction Materials	Applied Cost
5.	Technical Assistance	Constructive Delivery
6.	Evaluation	Constructive Delivery

Although constructive delivery was considered as an accrual basis for the Rural Access Roads construction element, disbursement was selected because of the concept of reimbursement being effected for a finished product of acceptable quantity and quality, and should the product (output) not be in conformity with AID's selection or engineering standards it would not qualify for reimbursement. In recognition of the foregoing, no accrual will be made for work in process and project financial management reports will reflect expenditures only for completed roads as previously outlined.

The use of constructive delivery as an accrual basis for the large equipment component may provide a distorted view of project progress in financial terms. However, the large cash outlay for this element, far in advance of output production, is of such significance that accrual should be recognized at the point at which the GOK assumes ownership of the equip-

ment. Further, the outputs of the gravelling operation are more tentative and difficult to quantify because of the high percentage of "spot" improvements versus whole road segments. Therefore, while the accrual basis will not provide a reflection of physical progress, it will recognize a significant sunk cost early in project life.

Discussions with the MOW concerning the control over AID imported commodities such as spare parts and construction materials have indicated that adequate procedures will be established to permit the timely reporting of inventory draw down. Based on this management planning and the desire to have accrued expenditure reporting reflect physical project progress where feasible, the "applied cost" accrual basis was selected for these project inputs. Therefore, even though funds will have been disbursed previously, no accrued expenditures will be reported until these commodities are issued from inventory to be consumed by the project.

For the technical assistance and evaluation grant financed project inputs, "constructive delivery" was selected as the appropriate accrual basis. Thus, project expenditure reporting will be reflective of the level of effort and timing of the delivery of these services. As both of these inputs will be financed by AID funded contracts, information requirements necessary for accrued expenditure reporting on the above basis will be included therein.

The projection of accrued expenditures of AID inputs, presented in Annex VIII, Table 8, have been calculated using the accrual methods noted above. This preliminary projection will form a basis for the initial Project Financial Implementation Plan (PFIP). However, a more accurate projection will be possible after the project approval process is completed and a Project Agreement entered into. AID's total project contribution, both loan and grant, will be obligated in FY 77.

6. Recurrent Budget Analysis of Implementing Agency

Upon completion of the RRSP, GOK recurrent budget requirements will be confined to road maintenance operations. In order to reach a conclusion as to whether the MOW will be able to effectively maintain the roads improved/constructed under the RRSP, it is necessary to examine the implications of the RRSP road improvement/construction on the MOW's recurrent road maintenance budget. The RRSP's impact on the GOK's road maintenance budget should not be viewed in isolation of the GOK's ability to cope with overall increased maintenance requirements. There will be an increased maintenance burden created by the activities of the IBRD, United Kingdom, Switzerland, Norway and Canada, who are participants in Kenya's rural roads program (RAR and GBC).

Project design took into consideration the importance of GOK budgetary resources for maintaining project roads after they have been constructed and improved. The proposed 3,000 kilometers of newly constructed and improved roads will certainly cause the already limited GOK maintenance resources to be further strained, unless alternative maintenance techniques are developed and implemented.

In addressing this problem, Louis Berger International has recommended to the MOW a set of alternatives, specifically a greater use of cheaper, casual labor in lieu of the current, relatively expensive and inefficient, permanent labor force of the MOW. The basic concept is to utilize the workers in the project area who are available in the off-agricultural season. Berger estimates that given current maintenance methods and costs, the effectiveness of the MOW maintenance operation for the Rural Access Roads Program alone could possibly be doubled.

The MOW has responded vigorously to the Berger-recommended alternative techniques and this is reflected in the project design. AID grant funds will provide the services of a road engineer who will design and test a pilot maintenance scheme in the project area over a five-year period. The recommendations stemming from this pilot scheme should result in actions being taken by the MOW that will lead to a savings of resources on one hand and improved maintenance on the other. Reflecting the MOW's keen interest in the pilot scheme, the MOW has agreed to a covenant in the Project Agreement requiring the MOW to submit periodic reports assessing the work undertaken pursuant to the pilot scheme and describing the extent to which the recommendations of the scheme have been or will be implemented into the MOW's overall existing maintenance program.

The MOW 1975/76 maintenance allocation for D and E roads in the project area was $1,950,000 or an average of $310 per kilometer per annum. The present procedure for allocating maintenance funds is based on road

traffic levels with maintenance allocations ranging up to $525 per kilometer.

A study of the maintenance operations of the MOW by Louis Berger International concluded that an additional $270 per annum would be required to properly maintain each kilometer of GBC improved road. Therefore, MOW annual recurrent maintenance costs will increase by 2,000 kilometers x $270 or $540,000 at project completion. In addition, major regravelling work, estimated at 35 percent of the cost of the GBC component, will be required after five years of wear (see Annex VI, Table 24).

Although there is less data available to estimate the cost of maintaining rural access roads, the consultant has estimated that maintenance costs would run as high as $125 per kilometer, inclusive of periodic major maintenance, even though average traffic levels are projected to be 2-5 ADT for RAR roads versus 40-90 ADT for class D and E roads. This proportionately high maintenance estimate reflects the current MOW practice of using permanent staff rather than locally recruited casual labor for its maintenance activities.

The pilot maintenance scheme can cut some of this recurrent cost by as much as 50 percent. To be on the financially conservative side, however, GOK budget implications are based on the "worst case" scenario with the pilot program having no impact on maintenance costs.

As illustrated in Annex VIII, Table 11, by 1985 the total maintenance requirement (constant prices) would be $1,290,000, or a 66 percent increase over the GOK FY 76 allocation for D and E roads in the project area. However, this requirement would represent only a 9 percent increase over the total MOW FY 76 maintenance allocation of $14,820,000, and on this basis, the added financial burden to the GOK of this project is manageable.

Given the consultant's preliminary findings, the expressed interest of the GOK in moving forward in this area, and the anticipated results of the project maintenance engineer's efforts, it is the conclusion of the project committee that adequate budget resources will be available to meet the maintenance requirements of this project and the GOK's GBC and RAR Roads Programs.

7. Conclusion

The investment package described in this financial analysis represents the cost of obtaining three necessary conditions critical to creating a viable rural roads network in the project area: the construction of 934 kilometers of rural access roads, the upgrading of 2,000 kilometers of existing D and E class roads and the improvement of the MOW's mainten-

ance program's cost effectiveness. Should any individual condition of the above three not be obtained, the expected project benefits would be jeopardized if not eliminated entirely.

In estimating the cost of the inputs necessary for achieving these conditions provision has been made for inflation and a relatively small but necessary amount has been included for contingencies. Given the foregoing, the project financial plan is deemed to be adequate and firm.

8. Project Cost Estimates

I. AID Loan Contribution

A. Rural Access Road Program - FAR

		Total U.S. $
1.	Construction Materials, Concrete Culverts made on site at $150 per km. x 1,008 kms.	151,200
2.	POL 1/	728,000
3.	POL Escalation 1/	197,400
4.	Sub-Total POL and Escalation	(925,400)
5.	Labor Costs 2/	1,728,000
6.	Labor Costs-Escalation 2/	469,000
7.	Sub-total Labor and Escalation	(2,197,000)
8.	Hand Tools Costs 3/	177,600
9.	Hand Tools Costs - Escalation	38,100
10.	Sub-Total Hand Tools and Escalation	(215,700)
11.	Soils Testing at K.Shs. 35,000.00/year or $4,200 for five years	21,000
12.	Unit Management - K.Shs. 345,800.00 per year or $41,600 by 24 unit years 4/	998,400
13.	Superintendents Staff - K.Shs. 64,833.00 per year or $7,800 by 24 unit years 4/	187,200
14.	RAR Engineers Staff - K.Shs. 33,400.00 per year or $7,800 by 24 unit years 4/	96,000

1/ See Annex VIII, Table 1
2/ See Annex VIII, Table 2
3/ See Annex VIII, Table 3
4/ See Annex VIII, Table 4

		Total U.S. $
15.	Special Projects Branch and MOW Overheads - K.Shs. 15,520 per year or $1,900 by 24 unit years 4/	45,600
16.	Construction Materials, POL, Labor, Hand Tools, Escalation, Road Reserve Acquisition, Soils Testing, Unit Management, Superintendents Staff, RAR Engineers Staff and Special Projects Branch, MOW.	
	For 934 km:	4,500,000
17.	Fixed Amount per kilometer to be reimbursed per kilometer	$4,762
	K.Shs. 8.30 = $1.00	K.Shs. 39,525

B. Gravelling, Bridging and Culverting Program

Equipment & Spare Parts	Qty.	U.S. $ @	Total U.S. $ (CIF Mombasa)
1. Motor Graders (CAT-130)	2	75,500	151,000
2. Dozers with Rippers (D-7)	2	125,000	250,000
3. Front End Loaders (2-cub yard)	3	55,000	165,000
4. Compaction Rollers (2 towed and 1 self-propelled)	3	42,000	126,000
5. Dump Trucks (5-7 cubic yards)	30	38,000	1,140,000
6. Water Tankers (1500/2000 gallons)	3	35,000	105,000
7. Fuel Tankers (2000 gallons)	2	35,000	70,000
8. Service Trucks (lubrication, etc.)	2	35,000	70,000

4/ See Annex VIII, Table 4

Equipment & Spare Parts	Qty.	U.S. $ @	Total U.S. $ (CIF Mombasa)
9. Pick-Up Trucks (3/4 tons 94 x 2)	2	9,000	18,000
10. Headquarters Project Manager's Vehicle (4 x 4)	2	12,000	24,000
11. Flat Bed Trucks (7 tons)	3	26,000	78,000
12. Office Van (towed)	1	15,000	15,000
13. House Trailer	2	25,000	50,000
14. Parts Van	2	15,000	30,000
15. Mobile Workshop (towed)	1	100,000	100,000
16. Air Compressor (150 cfm)	1	8,500	8,500
17. 300 Amp. Welder (towed)	1	5,500	5,500
18. Water Pumps (4 inch)	4	1,500	6,000
19. Fuel Storage Tanks - towed chassis (2000 gallons)	2	15,000	30,000
20. Fuel Storage Tanks - towed chassis (500 gallons)	2	5,200	10,400
21. Water Storage Tanks - towed chassis	3	5,000	15,000
22. 50 Ton Low Boy/Tractor	1	100,000	100,000
23. Miscellaneous Tools	Lot	100,000	100,000
24. Radios - one base unit and 9 sets	10	2,200	22,000

Equipment & Spare Parts	Qty.	U.S. $ @	Total U.S. $ (CIF Mombasa)
25. Rubber-Tired Tractors (80 HP)	4	22,000	88,000
26. Electric Generators - 15 KW	2	5,500	11,000
27. Office Equipment	Lot	5,000	5,000
28. Sub-total, Equipment			(2,793,400)
29. Price Escalation on equipment at 1.5 percent per month from January 1977 to February 1978 - 19.5 percent initial equipment costs			544,600
30. Sub-total, Equipment and Escalation			(3,338,000)
31. Spares, 60 percent manufacturer FOB (75 percent CIF) price for new equipment (5 year supply)			1,257,000
32. Spares, Transportation Costs (33 percent FOB)			415,000
33. Sub-total, Spares			(1,672,000)
34. Price Escalation on spares at 20 percent total CIF value over 5 years (1977-81)			334,000
35. Sub-total, Spares and Escalation			(2,006,000)
36. Sub-total, Equipment, Spares and Escalation			(5,344,000)
37. Plus 10 percent contingency			534,000
38. Sub-total, Equipment, Spares, Escalation and Contingency			(5,878,000)

Equipment & Spare Parts	Total U.S. $ (CIF Mombasa)
39. Culvert Piping, 2 cross drainage per 1 km., 42 to 72 inch. CMPC x 8.5 M (28 foot) length 2,000 Km. 5/	1,300,000
40. Steel Beams and Reinforced Steel Approx. 1,200 tons 6/	635,000
41. Sub-total, Materials	(1,935,000)
42. Escalation estimated at 15 percent over 5 years	290,000
43. Sub-total, Material and Escalation	(2,225,000)
44. Sub-total, Equipment, Spares, Materials, Contingency and Escalation	(8,103,000)
Procurement Service Fees, CIF Prices	
45. Equipment at 5.5 percent	184,000
46. Spares at 7.0 percent	140,000
47. Construction Material at 5 percent	111,000
48. Sub-total, Procurement Fees	(435,000)
49. Total GBC Program - Equipment, Spares, Materials, Contingency, Inflation and Procurement Fees	8,538,000
C. **Summary: Total AID Loan Financing**	
1. RAR	4,500,000
2. GBC	8,538,000
3. Total AID Loan	13,038,000
4. Total AID Loan - Rounded	13,000,000

5/ See Annex VIII, Table 5
6/ See Annex VIII, Table 6

II. AID Grant Contribution

		U.S. $
A.	Long Term Technical Assistance, OPEX Contract	
1.	Construction Superintendent - Duty Station Kisumu - family of four, five years	290,000
2.	Master Mechanic - Duty Station Kisumu - family of four, five years	290,000
3.	Road Maintenance Engineer - Duty Station Nairobi - family of four, five years	310,000
4.	Management Engineer - Deputy Project Leader - Duty Station Nairobi - family of four, six years	350,000
5.	Sub-total, Technical Assistance 7/	(1,240,000)
6.	Recruitment Fees at $2,000 per employee	8,000
7.	Administrative Support at $700 per employee year	15,000
8.	Local engineering contractual services	85,000
9.	Total Long Term Technical Assistance	1,348,000
B.	Project Evaluation Costs	
1.	Detailed design of evaluation system plus publication of completed design - one month at IQC rate of $10,000	10,000
2.	Senior Economist - three months per year at IQC rate of $10,000 per months x five years	150,000
3.	Field surveys - Baseline data survey plus periodic resurveys - Vehicle rental, local salaries, per diem and POL	200,000

7/ See Annex VIII, Table 7

	U.S. $
4. Other direct costs - air fares, per diem, secretarial services and vehicle rental for IQC contractors	40,000
5. Total evaluation costs	400,000
C. Summary: Total Grant Financing	
1. Total Long Term Technical Assistance	1,348,000
2. Total Evaluation Costs	400,000
3. Total Grant Financing	1,748,000
III. Summary Total AID Project Contribution	
1. Total Loan Financing	13,350,000
2. Total Grant Financing	1,748,000
3. Total AID Project Contribution	15,098,000
IV. Government of Kenya Contribution to Project Costs	
A. RAR	
1. Equipment - eight rural access construction units 8/	1,402,600
2. Spare parts requirement for above 8/	216,000
Total RAR	1,618,600
B. GBC	
1. POL - five year gravelling unit operation at $220,000 per year for POL	1,100,000
2. Escalation on POL - 50 percent over five years	550,000
3. Sub-total, POL and Escalation	(1,650,000)

8/ See Annex VIII, Table 10

		U.S. $
4.	Gravelling unit labor costs at $160,000 per year for labor force of 200 MOW salaried personnel	800,000
5.	Escalation on labor costs - 50 percent	400,000
6.	Sub-total, Labor and Escalation	(1,200,000)
7.	Equipment maintenance additional to AID funded spare parts (five year period)	200,000
8.	Camp operations - five year period	300,000
9.	Provincial Headquarters construction	100,000
10.	Bridge construction costs	800,000
11.	Equipment transportation, Mombasa to site	200,000
12.	Additional construction materials - bituminous material	400,000
	Total GBC	4,850,000
	Total GOK Project Contribution (A + B)	6,468,600

V. Summary Total Project Costs

	Amount	Percentage
AID Contribution	$15,098,000	70
GOK Contribution	6,468,600	30
Total Project	$21,566,600	100

D. SOCIAL ANALYSIS

1. Socio-Economic Characteristics of the Target Population

In comparison with the rest of Kenya, as well as other parts of Africa, the whole project area is quite densely populated and almost entirely rural in nature. The population density in the project Districts runs from 147 to 479 persons per square kilometer (area mean of 231 persons/km ^{2}) with the average parcel of land under cultivation ranging from 1.4 to 6.0 ha. (area mean of 2.4). Furthermore, between 16 percent and 49 percent of the small farmers cultivate less than 1 ha. (area mean is 28 percent). The estimated per capita annual income ranges between $96 and $160 with per family cash on farm income calculated at $106 per annum. The total population of the project area was estimated at 4.0 million in 1975. These people are clearly to be included among Kenya's working poor and as beneficiaries of the Rural Roads Systems Project they satisfy the spirit and letter of the Congressional Mandate. For further socio-economic characteristics of the target area and population refer to Annex VII .

2. Social Impact

The Rural Roads Systems Project is anticipated to result in a series of sociological, economic and cultural consequences all stemming from one fundamental alteration which the Project is bringing into the area: access. A network of all weather rural secondary, minor and feeder roads will provide the means by which government workers, tradesmen, and others can regularly penetrate into once isolated farmland to deliver their social or economic services to the target population. At the same time, a dependable rural road network will allow a significant increase in the bicycle, cart, and motor vehicle traffic permitting target area residents easy access to social and economic services located outside their immediate vicinity. It is the social impact caused by newly created access which lies at the heart of the social feasibility analysis.

3. Social Benefit Incidence

a. Selection of Target Group

The target beneficiaries form two groups which are not necessarily mutually exclusive: farmers and construction laborers. The farmers are recipients of a wide range of direct and indirect benefits, principal among which is an anticipated increase in agricultural production and income, as a result of the new rural access roads and improved secondary and minor roads passing through the farming area. The actual selection of roads to be constructed and the determination of

their general alignment will, to a large part, rest with the District Development Committees. In addition to farmers and laborers, Project benefits are expected to accrue to merchants and traders who will retain a portion of the cost savings realized by the improved transportation network. In addition to the selection of road alignments, benefit incidence is a function of complementary activities, such as ASL I and the IADP, aimed at improving agricultural output and marketing. The precise timing and location of benefit incidence depends both on road selection and complementary activities.

The rural access roads are to be constructed using labor intensive technologies, thereby providing employment opportunities for residents in the Project area. The selection of beneficiaries is a function of the labor hiring practices and terms of employment. For example, if wages paid for construction work fall below the opportunity cost of labor time for the more progressive farmers, then the poorer man has an opportunity to cash income without having to compete against the better-off farmers.

The distribution of vehicle operating costs which are saved due to the improvement of the present road network is directly related to the degree of competition in the rural transport sector. With no competition the savings accrue to the vehicle owners and operators while with a very high degree of competition the benefits accrue to the transport consumers: the farmer, trader, and merchant. The Scandia-Consult Study determined that rural transportation was indeed a highly competitive market and, therefore, the direct benefits from reduced transportation costs would, in the first analysis, accrue to the consumers of rural transportation.[1/]

Within a road's zone of influence (defined as a strip approximately 1-2 kms on either side of a road) residents benefit from the general improvement in access which accompanies either the upgrading of roads to an all-weather standard or the introduction of an access road. The actual selection of road alignments determines the potential beneficiaries.

b. Nature of Benefits to the Target Group

Benefits fall into three broad categories: construction wages, increased farm income, and improved access. In the first instance, construction wages are the principal benefit received by those Project area residents who are employed on the road construction

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1/ Scandia-Consult. Improvement of Roads in Kenya. April 1974.

crews. Income expenditure and consumption multipliers serve to increase area wide income.

As an indirect benefit of the road construction and maintenance programs, agricultural output is expected to increase through a process more fully described in the economic analysis. Incremental agricultural output and higher farmgate producer prices will increase cash income for farmers within the zones of influence.

As an identified but unquantifiable benefit, increased access plays a major role in assessing the social soundness of the rural access to social services, such as health and medical facilities, as well as reducing barriers to the physical movement of the Project area residents.

4. Social Consequences

a. Benefits to Women

There is a growing body of literature on the role of women in Kenya; a detailed bibliography is available in Annex VII. Potentially the most severe negative consequence of improved access and increased agricultural production is the increasing workload placed on the wife and the potential for increased stress in women. Against these factors must be placed the benefits of higher family incomes, improved access to health facilities and increased social and economic interactions.

As the family farm undertakes the cultivation of labor intensive cash crops the burden on the wife in the compound increases. In addition to the traditional maternal responsibilities of raising and caring for children and taking care of the homestead, a wife becomes the manager of the farm when her husband is absent and the chief field hand when he is home. As the family uses newly acquired cash income to send children to school, the wife's burden increases as the regular help of school aged children is lost.

Susan Abbott's study 1/ of stress in rural Kenya identifies the principal sources of stress for women as: (1) low cash income relative to the community norm, (2) farm decisions made by the husband even though he may not work at home but only sleeps there, (3) no formal education, (4) not joining women's organizations even though that is culturally expected, and (5) five or more children. Through the employ-

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1/ An expanded description of the study may be found in Annex VII.

ment of local farmers for road construction, the Rural Roads Systems Project will tend to increase the stress felt by women due to the day-time absence of the husband, with the woman required to carry out his instructions on farm management although he is not present to help out. On the other hand, his income will tend to reduce stress generated by a wife feeling poorer than her neighbors. Recognizing these problems, the Project will make a serious effort to recruit construction laborers from among the poorer farmers, thereby increasing the Project's impact on income related stress.

The prediction as to whether the Rural Roads Systems Project will contribute, directly, or indirectly, to stress in women cannot now be realistically made; the socio-economic evaluation should keep track of local trends so that appropriate GOK organizations can consider alternative measures if needed.

b. Migration

Employment on the road construction program and larger farm incomes will serve as a deterent to out-migration while improved access and transportation lower the physical barriers to out-migration. In the sum, however, it is not likely that this Project will increase that out-migration which is solely motivated by perceptions of expected urban income levels, since the primary Project benefit is incremental agricultural income.[1/]

c. Land Ownership

The anticipated transition of poor families from primarily subsistence farming to involvement in the market economy is not inevitable. The process of land acquisition and sale in parts of Kakamega District highlights this problem where an increasing disparity between rich and poor farmers has led to the development of a land owning class. The more progressive farmer is able to increase yields and therefore places a higher economic value on the land than does the less progressive farmer. Those farmers who do receive a high payment for their land run the risk of frittering away their proceeds. The Land Control Boards, formed under the Land Control Act of 1967, are charged with the duty of ensuring that no one sells land without the ability to buy more land at a later date. Since land values and attitudes towards land ownership

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1/ See M. P. Todaro. "Urban Job Expansion, Induced Migration and Rising Unemployment", Journal of Development Economics, September 1976, for a discussion of income expectations and migration in Kenya.

vary considerably over the project area, the monitoring unit will need to be aware of this issue so that the appropriate GOK bodies can plan corrective actions when and where necessary.

5. Spread Effects

The Project is conceived primarily as a means of promoting rural welfare and to help rural people. The "social" nature of the Project objectives is clear, the spread effect of the innovation and the way in which the processes set in motion by the innovation flow from the initial output is less easily predicted. The degree to which the desired spread effect will occur depends in large part on the soundness of Project assumptions. Assumptions about the role of DDC's, incremental agricultural output, increased involvement in the cash economy, the increased access to services and markets all need to be monitored and evaluated to determine the replicability of this system.

There is no component in the Project which will explicitly and systematically coordinate the intended benefits of the Project and direct them so that the spread effect will be achieved. A key characteristic of the Project is the reliance on other institutions to provide direct, or indirect, support to the processes of change which are anticipated in the objectives of the Project. To maximize spread effect the changes resulting from the Project must be carefully monitored and relevant data made available to Project staff. In this way initial Project effects can be consolidated and integrated with other ongoing programs and negative consequences can be identified early and, where possible, alleviated.

6. Social Acceptability

Lessons learned from similar rural roads systems programs under the SRDP have been incorporated into the Project design to ensure the maximum level of local participation in and acceptability of the road improvement and construction program. District Development Committees will be actively involved in determining the road improvement sites and selection of rural road links. In view of the target farmers' general responsiveness to market forces, and the local commitment to social infrastructure projects, one can conclude that the target groups' view toward the proposed Project will be nothing short of enthusiastic.

7. Overview

The Project is firmly based on knowledge gained from a number of localized studies as well as previous experiments in the Project area. The Project is being initiated in concert with other ongoing projects and activities in the area, thereby increasing the likeli-

hood that the positive social consequences of the program will be attained for the farm families and communities in western Kenya.

To be sure, there are certain sociological considerations which must be carefully monitored during the implementation of this Project. In general, however, the Project offers substantial socio-economic benefits to the isolated rural farmer: the farmer whose participation in the economic and social development of Kenya is required and desired by the Congressional Mandate. Furthermore, the installation of a socially and technically sound system of rural transport is a sine qua non for rural participation in the development process. A detailed Social Soundness Analysis for this Project is available in Annex VII.

IV. Implementation Planning

A. Administration Arrangements

1. Borrower

a. Implementation Responsibility

The GOK agency responsible for implementation for this project is the Ministry of Works (MOW). Direct responsibility for both the GBC and the RAR programs has been assigned to the Special Projects Branch (SPB) of the Roads Department, MOW.

b. Management Capability 1/

The Special Projects Branch, which was specifically established to manage these two programs, is headed by a Chief Superintending Engineer who reports directly to the MOW Chief Roads Engineer. The SPB Chief Superintending Engineer has directly below him a Senior Superintending Engineer and a Superintending Engineer, both of whom work directly on the RAR program. The GBC component will have four engineers assigned to the SPB, two provided by CIDA and two by AID for headquarters administration. Of the latter, one is provided under the Roads Gravelling Loan and one under this project.

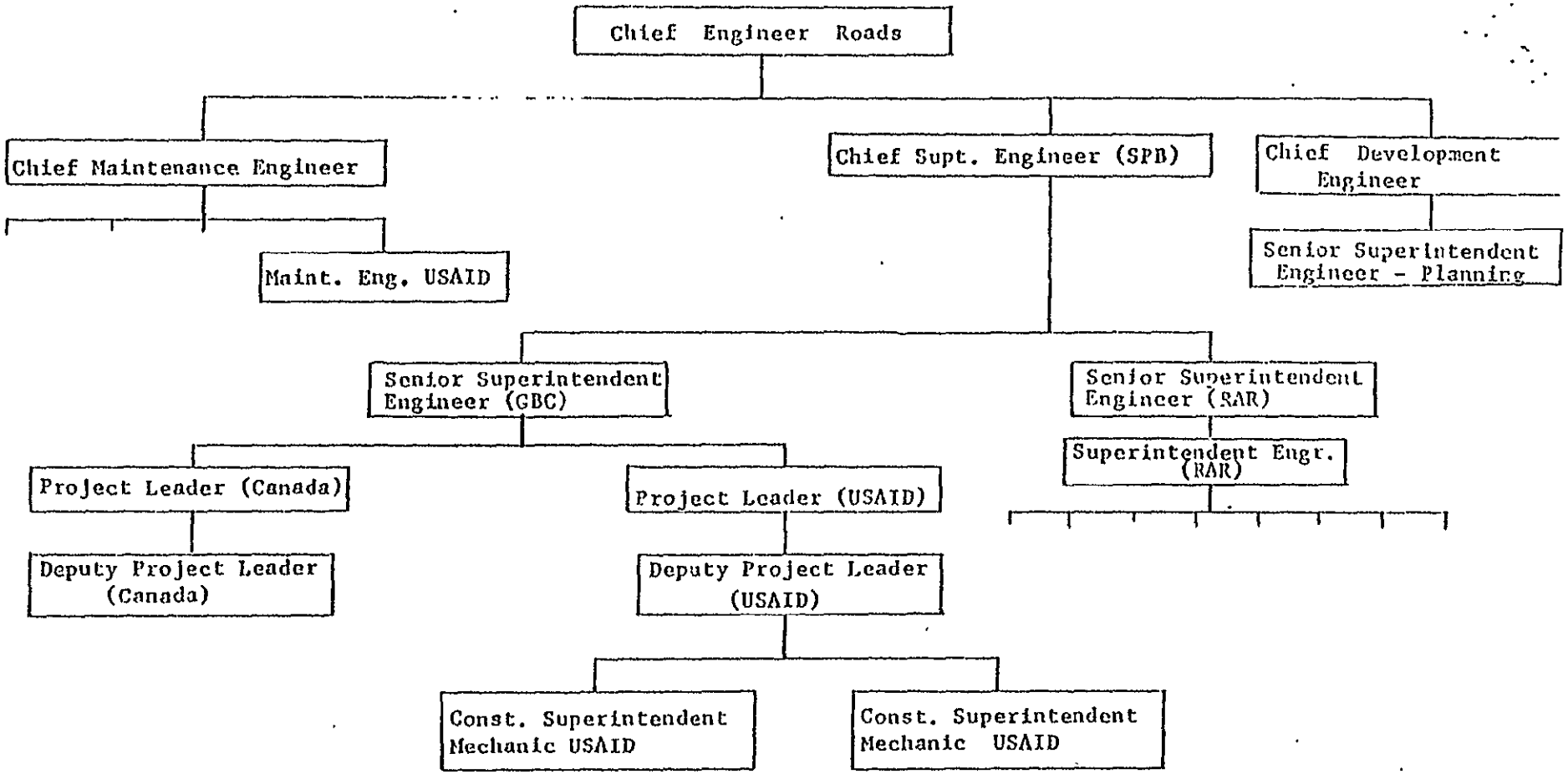
At the field level, each GBC unit will have a grant-funded construction superintendent and a mechanic. The remaining staff, including supervisory foremen, will be provided from MOW staff or through the Staff Training Department's programs.

The RAR component's field organization will consist of an engineer and two senior inspectors in charge of every five RAR construction units. The engineers will initially be expatriates provided by ODM, the Netherlands, Switzerland, UNDP and ILO. Additional funding on loan terms is available from the IBRD for more engineers if the above sources prove insufficient in numbers. Construction units will have assigned an inspector, four overseers, and a locally recruited casual labor force of about 270 workers. An organizational chart of the SPB down to field level is shown on the following page.

The MOW has a Staff Training Department (STD) which trains MOW sub-professional technical personnel (e.g., road supervisors, equipment operators and mechanics, etc.). However, the manpower demands of the GOK's GBC and RAR programs, and the normal growth of MOW highway activities will require the training or retraining during 1976-80 of some 3,500 employees, of whom 2,800 will be new recruits to the MOW. The training of these new recruits, as well as the retraining/upgrading of existing personnel, will necessitate a considerable expantion of STD.

1/ For a detailed analyses of MOW manpower capabilities, refer to Part III.A. For a description of the administrative lines of authority within the MOW, particularly the relationship between the Special Projects Branch of the MOW and the Provincial Engineer, refer to Annex V

ORGANIZATION CHART - MINISTRY OF WORKS



To meet this demand, the MOW has prepared a 5-year training expansion program estimated to cost about $5 million, and which is being financed by the World Bank and SIDA. This will involve the training of road supervisors, surveyors, storekeepers, mechanics, welder/auto-electricians, equipment operators and drivers. The physical facilities of the STD will be substantially expanded and the current staff of 44 instructors/administrators will be increased to 72. This training expansion is essential to the implementation of the GBC and RAR programs.

The Special Project Branch with its key expatriate personnel and access to existing and newly trained local staff, as mentioned above, is expected to provide the program with the level of managerial capacity required for successful implementation. Thus, the administrative arrangements are fully adequate to the tasks as designed. The MOW is recognized as one of the most efficient and well-managed ministries in the GOK and no significant problems are anticipated in project implementation related to the Ministry's capacity to administer.

2. AID

The USAID has the delegation of authority to implement the RRSP. A full-time engineer will be added to the USAID's Technical Services Staff and will serve as Project Manager. As such, he will be responsible for providing and coordinating AID backstop support to the project. Additionally, the USAID Project Manager will monitor the progress of the project and assure that work on both components is progressing as expeditiously as possible. To assist the Project Manager conduct on-site inpsections of RAR construction work, $85,000 in grant funds will provide the services of a local engineer. (See Part III, Financial Analysis.) The AID grant-funded engineers assigned to the project will provide continuous immediate supervision of the work under the GBC component. Until such time as the USAID engineer is on-board, REDSO will continue to provide engineering assistance. REDSO will also provide legal and procurement services.

B. Implementation

1. Schedule of Major Events

Annex X is the Project Performance Tracking Network, an execution schedule for the project showing in graphic form the major actions to be taken with their timing. The plan follows:

(Project Month)

(1) Project Paper submitted to AID/W

(Project Month)

(3)	Loan and Grant authorized
(4)	PIO/Ts prepared covering grant-funded technical assistance (OPEX)
	USAID/Kenya engineer on board
	Draft Loan/Project Agreement submitted to GOK
(5)	Loan/Project Agreement signed
(7)	Initial Conditions Precedent met

Rural Access Roads

(4-7)	DDC's identify first group of priority roads; MOW submits Evaluation Reports to USAID naming initial roads for construction. USAID approves report.
(8)	MOW procures off-shelf equipment
(10)	Construction unit 1 and 2 start work
(11)	14 Kms access roads completed
(13)	Construction units 3 and 4 start work
(16)	Construction units 5 and 6 start work
(19)	Construction units 7 and 8 start work
	First Annual Evaluation of overall program
(23)	266 Kms access roads completed
(26-27)	USAID approves MOW Evaluation Reports on construction units 1 and 2
(29-30)	USAID approves MOW Evaluation Reports on construction units 3 and 4
(31)	Second Annual Evaluation of overall program
(32-33)	USAID approves MOW Evaluation Reports on construction units 5 and 6
(35)	602 Kms access road completed

(Project Month)

(36)	USAID approves MOW Evaluation Reports on construction units 7 and 8
(38-39)	USAID approves final Evaluation Reports on construction units 1 and 2
(41-42)	USAID approves final Evaluation Reports on construction units 3 and 4
(43)	Third Annual Evaluation of overall program
(44-45)	USAID approves final Evaluation Reports on construction units 5 and 6
(47)	USAID approves final Evaluation Reports on construction units 7 and 8
	900 Kms access road completed
(50)	RAR component completed. Eight construction units have constructed 934 Kms. rural access roads. Total construction period: 3 years, 4 months.
(53)	Final disbursement of loan funds for RAR component. Actually, the terminal disbursement date under the Loan Agreement will be month 80, which is required to finance the GBC unit (see below).

Gravelling, Bridging and Culverting

(4-7)	MOW and AAPC prepare specifications and tender documents for U.S. equipment, spare parts and construction materials.
(8-9)	Project Leader and Deputy Project Leader (engineers) arrive.
(9-11)	Equipment bids reviewed; contracts awarded; USAID concurs
(12-21)	MOW develops list of candidate roads. MOW/USAID inspect roads. Road priorities made. DDC's and all parties approve. USAID approves.
(13)	Letter of Credit issued covering awarded equipment contracts
(17)	Equipment delivered to U.S. port
(18-22)	Transit time ocean shipment U.S. port to Mombasa

(Project Month)

(19)	Grant-funded construction superintendent arrives. First annual Evaluation of overall program
(21)	Construction mobilization begins. Kenyan staff assembled. Base camp set-up. MOW prepares first annual Work Plan
(22)	U.S. equipment arrives in Mombasa. Grant-funded mechanic arrives.
(22-23)	Inland shipment of equipment from Mombasa to Project site USAID reviews and approves first Work Plan, authorizes construction to begin
(24)	U.S. equipment arrives at Project site and warehouse
(25)	GBC unit operational; construction begins
(31)	Second annual Evaluation of overall program
(34)	MOW and grant-funded engineers prepare second annual Work Plan
(36)	USAID approves second Work Plan; construction continues
(43)	Third annual Evaluation of overall program
(48)	USAID approves third annual Work Plan; construction continues
(55)	Fourth annual Evaluation of overall program
(60)	USAID approves fourth Work Plan; construction continues
(67)	Fifth annual evaluation of overall program
(73)	Last order placed for U.S. spare parts and materials
(79)	Sixth annual evaluation of overall program
(74)	Terminal date for issuing commitment documents
(80)	Terminal disbursement date for Loan funds Total disbursement period: 6 years
(83)	GBC component completed: 2,000 Kms. of rehabilitated roads. GBC construction period: 4 years, 10 months. Total life of project: six years, 6 months
(91)	Final project evaluation

2. Disbursement Procedures

a. Loan

(1) Foreign Exchange

The GOK will select a procurement agent, probably the Afro-American Purchasing Center (AAPC), to purchase the FX component of the GBC activity. If the procurement agent is AAPC, disbursement will be made under the Direct Letter of Commitment method, which is now being used with AAPC. Otherwise, the standard Letter of Commitment method will be used.

(2) Local Costs

The Fixed Amount Reimbursement (FAR) method will be used for the local construction costs of the RAR component, as described in the Financial Analysis, Part III.C. Reimbursement is fixed in advance and is based upon cost estimates developed jointly by the MOW and USAID. Reimbursements will be made quarterly. Details of the FAR procedures agreed to by AID and the GOK will be described in Implementation Letter No. 1.

Local costs under the GBC component will follow the more traditional method of reimbursing the GOK for eligible project expenditures based on actual cost.

b. Grant

An AID grant will finance the technical assistance component of the Project under a host country contract. Full disbursement arrangements will be described in the Project Agreement.

3. Procurement Plan

In order to facilitate the procurement of equipment and spare parts from off-shore sources, it is intended that a procurement agent such as the Afro-American Purchasing Center, will be used by the GOK and funded under the loan. The authorized source for procurement will be AID Geographic Code 941 and Kenya, and will be carried out in accordance with the procedures set forth in the AID Handbook 11 - Country Contracting. Details of the procurement of the various commodities required for the project are as follows:

a. Equipment

All construction equipment will be procured from AID Geographic Code 941 sources, with the exception that all motor vehicles must be of U.S. manufacture. For purposes of standardization and the economies that will result in the ordering and maintenance of spare parts inventories, as well as the greater technical familiarity by operating and maintenance personnel, it is requested that a proprietary procurement waiver be authorized to permit the procurement of the same brand names of equipment as that financed by A.I.D. under the previously approved Roads Gravelling Project (615-0170).

b. Spare Parts

Spare parts equivalent to 60 percent of the FOB U.S. Port value of the equipment will be financed under the loan and be procured as follows:

(1) Fast moving spares equivalent to 15 percent of the value of the equipment will be included with the original equipment order.

(2) The remaining spare parts will be procured on a phased basis from the U.S., with the exception that certain urgently needed spares will be procured off-shelf in Kenya from the authorized dealers of the equipment. In this regard, it is anticipated that most spare parts procured off-shelf in Kenya will be of Geographic Code 941 origin, however, it is possible that a limited amount of required spares will have been imported from Geographic Code 899 sources, but not from countries included in Code 941. Also, it is anticipated that some individual transactions (e.g., engine and transmission components) of 899 origin will exceed the $2,500 transaction limitation specified in Handbook 11, Attachment H; therefore, it is requested that the transaction limitation for off-shelf items of Code 899 source/origin be raised from $2,500 to $5,000 per transaction.

(3) Certain urgently needed spares which may not be available in Kenya will be air freighted from the U.S. or bonded warehouses holding U.S. source spares.

c. Construction Materials

Construction materials, e.g. concrete culverts, etc. will be procured in Kenya by the MOW and will be of Kenya source/origin.

d. Utilization of Excess Property

In view of the anticipated approval of the request for proprietary procurement of all equipment for the project, excess property will not be utilized.

4. Reports

The GOK will submit the following reports required under the Loan:

a. Quarterly Progress Reports

b. Quarterly Shipping Reports

c. An Annual Audit Report of Program Expenditures

d. Final Report on Program Completion

e. Other reports that may be required by AID, including annual work plans and maintenance plans.

C. Evaluation

The first annual review will commence twelve (12) months from the date the initial conditions precedent to disbursement were met, and will focus on the initial implementation phase of the project, performance to date and whether any actions are required to head off problems that could arise at a later date. The initial evaluation will also review with the MOW the baseline data that is being collected under their selection criteria to ensure it is adequate for future evaluations.

The annual evaluations will be broken down into two parts: engineering, which, under the primary responsibility of the USAID Project Manager (engineer), will be carried out through the coordination of substantial inputs by the grant-funded engineers available to the MOW; and the economic and social evaluation, which will require outside consultation expertise.

The engineering evaluation will measure progress against input and output indicators which appear in the logical framework matrix. It will determine whether adequate human and financial resources are being made available by the GOK, equipment utilization, adequacy of cost projections, meeting of construction schedules, etc., all in the light of achieving all-weather access. The engineering/financial evaluation will evaluate the need for a revision of RAR costs vis-a-vis FAR arrangements about eighteen months after the start of construction.

The economic and social evaluation will determine if the forecast benefits are being achieved, the distribution of these benefits between farmers, traders and consumers, and whether distribution could be improved, the level of local participation in the project and the degree of coordination of AID programs and other GOK rural development programs.

After two years of GBC construction/improvement (Project Month 49), the annual evaluation will, in addition to standard engineering and economic evaluations listed above, focus on the construction methodology itself. Combining experience gained from the CIDA and the AID GBC units, it is expected that a comprehensive evaluation of the effectiveness of the spot improvement methodology can be undertaken in order to determine if the AID GBC unit should continue to focus most of its work on spot improvements or if the unit should concentrate on full length gravelling. This evaluation will need to consider the engineering realities encountered on the roads already improved with spot gravelling as well as the economic benefits and costs associated with various improvement methodologies.

Private socio-economic consultants will be required to test the hypothesis that the rural roads proposed for financing under this program have a direct economic impact on the target group. The geographic focus of the two proposed complementary rural roads components, aimed at establishing a reliable transportation and communication link between farm and market-service centers, offers a unique opportunity to test the hypothesis. The fact that the project area also contains significant inputs from other GOK and donor agriculture programs aimed specifically at small farmers enhances the value of such an evaluation. In most instances, the AID road programs, including the role of the District Development Committees, will be coordinated with these agricultural programs. However, road construction will also be carried out in some locations where these other programs will not yet be operating, thus affording the opportunity to determine the importance of rural roads in the development equation.

The MOW is interested in coordinating the proposed project evaluation with other evaluations that are being planned. For instance, the MOW plans using $400,000 of its IBRD rural access roads loan to finance an evaluation of the Rural Access Roads Program in the districts throughout the country where that program is to be conducted.

The IBRD has also contributed $400,000 under its IADP credit for an evaluation of that program. The IBRD has further indicated to the GOK in preliminary discussions that it would be willing also to support an in-depth analysis of IADP/NARP with the lead role being taken by the Central Bureau of Statistics.

The USAID's Roads Gravelling Loan commits $201,000 in grant assistance for a three-year evaluation effort to assess the performance of the GBC unit being funded under that loan (see page 130-135 of that Project Paper), as well as to determine benefits generated and whether they in fact reach the intended beneficiary--the low income agricultural producer. This proposed project adds a further $400,000 to extend the evaluation to roads constructed under integrated RAR/GBC activities. The latter amount will be used to conduct a comprehensive evaluation of the Project and will be carried out through a host country contract with a U.S. consulting firm. 1/ The consultant will assist the GOK in designing the evaluation scope of work and will conduct the evaluation using annual short-term visits to Kenya by home office personnel. Full-time Kenyan field personnel will be provided either through direct hiring or a sub-contract with a local organization to gather the necessary baseline data at the district level.

In order to assess the impact on the target population of rural road construction, field data will be gathered and tabulated to establish baseline information relevant to the following areas:

Employment

- Number of unskilled and skilled workers on average kilometers under contruction in both labor-intensive and non labor-intensive segments of the Project.

- Wage and net income effect on laborer and family.

Technology

- Extent to which hand tools used on roads are utilized for other purposes, such as farming.

- Extent to which new tools in technology introduced with road construction (hand tools) have been adopted for use on the farm.

- Disposition and final depository of tools and equipment initially used for road construction.

Standard of Living

- Extent to which new, different, and better foods are being introduced into rural roads.

1/ The MOW is anxious to avoid any duplication of effort in the area of evaluations and indicated there could be an opportunity to pool financial resources to better coordinate the various evaluations that are being planned. Before committing funds to a private consulting firm, the MOW has asked the USAID to consult with them first to determine the feasibility of a coordinated, joint evaluation effort.

- Extent to which employment/marketing generated by roads increases nutritional level.

Production

- Average farm size. and average form income.
- Average hectarage devoted to various crops.
- Percentage for consumption by farm family, percentage for animal consumption, percentage available for commercial sale.

Transport Costs

- Extent to which vehicle road use has increased.
- Increase, decrease vehicle registration in small rural communities.
- Change in cost of transport per unit of agricultural produce.
- Average count of trucks, small buses, and other modes of transport per day inclusive of animal transport.

Marketing

- Conversions of headloads to trucks.
- Increase, decrease, creation of new collection points for agricultural produce along roads.
- Change in demand for market space in city and rural markets.
- Number, kinds and total value of new and old crops.
- Conversion to higher value crops.
- Crops expanded in production; incremental tonnages.
- Relationship of rural market prices before and after road improvement.

Accessibility of Social. Educational, Health Services

- Number of visits of agricultural extension workers.

- Number of teachers assigned to rural areas.
- Number of doctors, other medical personnel, or access of supplies to rural areas.
- Number of other social services available.

D. Conditions, Covenants and Negotiating Status

1. Conditions Precedent

a. The Project Agreement will contain the standard conditions precent, including legal opinion and specimen signatures.

b. The Project Agreement will provide that prior to disbursement of any funds for the Gravelling, Bridging and Culverting (GBC) component of this project, AID must approve any contracts to be executed for technical or other services entered into by the Cooperating Country with regard to the GBC components.

c. Prior to any disbursement of funds under the Rural Access Roads (RAR) component of this project, the Cooperating Country will submit evidence satisfactory to AID that it will provide the requisite engineering services, and that such services will be available on a timely basis, for this component of the project.

2. Covenants

a. Road Selection

(1) The Cooperating Country will covenant that road selection for both the GBC and RAR components of the project will be made in accordance with the procedures and criteria set forth in Section III.A. of this Project Paper, which procedures and criteria will be incorporated as an annex to the Project Agreement. These procedures and criteria may be modified, as the parties see fit, to reflect periodic evaluations of the project.

(2) The Cooperating Country will covenant to submit, with regard to the Rural Access Road component of this project, an Evaluation Report of the roads selected for construction which would have, as one of its objectives, the demonstration that road selection procedures and criteria have been complied with. The report will contain cost/benefit analyses of the proposed roads. More specific details as to the content of this report as well as the timing for it will be given in Project Implementation Letters (PILs); however, the report will be required to be submitted to AID for its approval prior to commencement of work on

the roads which are the subject of the report. Unless otherwise agreed to by AID, no reimbursement under the RAR component will be made for any road which is not included in an approved Evaluation Report.

(3) The Cooperating Country will covenant to submit for AID review and approval annual work plans for the GBC component of the project. Such work plans will be submitted on dates agreed upon in PILs and will be adequate, at least, to identify:

(a) planned roads for upgrading and/or rehabilitating;

(b) types of planned upgrading and/or rehabilitating;

(c) sequence of the work to be undertaken.

Unless otherwise agreed to by AID, the initial work plan for the GBC component of the project will be submitted prior to the commencement of the work under the GBC component of the project.

b. Manpower Training

(1) The Cooperating Country will covenant to provide for both components of the project trained personnel adequate to upgrade, construct and maintain the roadwork financed by AID without detracting from non-AID financed roadwork and maintenance being undertaken, or projected to be undertaken, elsewhere in Kenya.

(2) The Cooperating Country will covenant, in order to achieve the purposes in item b. (1) above, to expand its existing training facilities for skilled construction and maintenance personnel in accordance with the guidelines set out in an annex to the Project Agreement to meet the requirements of this project and other non-AID financed, roads projects. Any adjustments necessary in the training program will be the subject of the required annual evaluations.

c. Project Funding

The Cooperating Country will covenant that it will supply funding adequate for the continued support of roads construction and maintenance work in the AID project area in addition to meeting other present and projected construction and maintenance requirements.

d. Road Maintenance

(1) The Cooperating Country will covenant that it will provide all personnel and funds required, and take all actions necessary to maintain the roads upgraded or constructed by this project. To this end,

appropriate officials of the Ministry of Works will discuss with AID representatives, at intervals which will be set forth in PILs, proposed maintenance plans and procedures, including the frequency of road maintenance efforts. The results of these discussions on the formal maintenance plans will be the subject of subsequent implementation letters.

(2) The Cooperating Country will covenant to submit reports, as required by PILs, which will assess the work undertaken pursuant to the Pilot Maintenance Program and which will describe the extent to which the recommendations of this program have been, or will be, implemented and integrated into the Ministry of Works' overall existing maintenance program.

e. Spare Parts Procurement

The Cooperating Country will covenant that it will establish an appropriate, timely and effective system for procuring and transporting spare parts provided in the AID project and that it will establish a separate warehouse/store for storage of spare parts provided in the AID project. To this end, the Cooperating Country will submit, prior to the arrival in Kenya of the first shipment of AID project equipment, a plan satisfactory to AID which describes in detail the proposed procurement storage, and transportation system.

f. RAR Equipment

The Government will covenant that, except as A.I.D. may otherwise agree in writing, all equipment required for construction under the RAR component which the Government is providing as part of its contribution to the project, will be procured and in-country four months after execution of the Project Agreement. The Borrower/Grantee will also covenant to have equipment for each RAR unit on the construction sets in accordance with a schedule to be mutually agreed upon in PILs.

3. Negotiating Status

This PP, and specifically the conditions and covenants outlined above, have been discussed with the Government of Kenya. The Government is in agreement as to the scope of the project and the requirements imposed on it by the above conditions and covenants.

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6C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?

   The RAR and GBC programs are designed to provide, in part, poor farmers access to larger urban service/market centers and, thus, help to improve farm performance. Kenya has not engaged in a consistent pattern of gross violation of human rights.

2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?

   No.

3. FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?

   No, as far as is known.

4. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?

   Kenya is not a part of or controlled by the international Communist movement.

5. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?

   No.

6. FAA Sec. 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

   6. In April 1974, John Saul, an American citizen, obtained a permit from the GOK for the mining of rubies. On June 18, 1974, he was expelled from Kenya and is still prohibited from entering Kenya and from carrying on mining operations. In November 1974, the GOK entered into discussions with Mr. Saul's representatives related to the appraisal of Mr. Saul's claim for compensation. At an interagency staff meeting on February 20, 1976, the U.S. Government made a tentative determination that an expropriation had taken place in the case of Mr. Saul but stayed action because it was believed an offer from the GOK for settlement might be forthcoming. In April 1976, GOK made an offer which Saul judged insufficient. In September 1976, Saul made counter-offer in form of proposal for joint venture. Proposed provided that monetary compensation acceptable to Saul would come out of first profits. Negotiations over joint-venture proposal are in progress, and Saul's representative in Nairobi has indicated interest in continuing talks.

7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos?	No.
8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	No.
9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?	There have been no instances in which it has been necessary for the GOK to take action in this connection.
10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?	The Government has instituted an investment guaranty program for the specific risks mentioned.
11. FAA Sec. 620(o); Fisherman's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters, a. has any deduction required by Fisherman's Protective Act been made? b. has complete denial of assistance been considered by AID Administrator?	Kenya has not seized, or imposed any penalty or sanction against, any U.S. fishing activity in international waters.
12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default?	No.
13. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).)	Approximately 5% of Kenya's budget (including development budget) is projected to be spent for military purposes in FY 77 (Kenyan fiscal year beginning July 1, 1976). About 10% of the military expenditures represents foreign exchange commitments for overseas purchases financed on credit term averaging 10 years. A substantial portion of the foreign purchases fall into the classification of "sophisticated weapons".

A

14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

Diplomatic relations have not been severed.

15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

Kenya is not in arrears in any obligations to the UN.

16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?

No.

17. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

No.

18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.?

No such equipment has been received.

19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate?

No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment.

B.1.a. Budgetary, implementation, demographic and developmental criteria are periodically applied to verify country's commitment and progress in involving the poor in development. Furthermore, international organizations such as the ILO and IBRD regularly assess and report on Kenya's commitment to the development of the country's poor.

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 208; 211(a)(4), (7). Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

(1) Commitment to food production is demonstrated in 1974-78 Development Plan and current budget allocations. See Sessional Paper No. 4 (May 1975). Note that between 1975-78, 44.3% of GOK budget for roads construction is to be devoted to secondary and minor roads.

(2) Kenya's economy and investment policies are conducive to private foreign investment. Presently, more than 125 U.S. business enterprises have investments in Kenya, a figure which has doubled since 1974.

(3) Increasing the public's role in the developmental process.

(3) Loan will integrate more farmers into national and regional economics. Additionally, decision making by the DDC's adds to local representational responsibilities.

(4) (a) Allocating available budgetary resources to development.

(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.

(4) Adverse economic conditions have forced the GOK to cut back the rate of growth in GOK expenditures on (Cont

(5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

(5) Since 1963, the GOK has operated a series of settlement schemes whereby large expatriate holdings have passed to African settlers. As of the end of 1973, 616,914 acres had been developed for 57,174 families.

(6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

(6) The Government has and is continuing in its policy and actions, as demonstrated by its support for the entire rural roads programs ..., to direct resources toward improving the social and economic condition of its people.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

Yes.

d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs?

No.

2. Security Supporting Assistance Country Criteria

N/A

a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights? Is program in accordance with policy of this Section?

b. FAA Sec. 531. Is the Assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

(4) (Cont'd) development to 7.8% and on the recurrent budget to 5.3% compared to 12.3% and 11.2% respectively in the original Development Plan. However, the pattern of expenditures has shifted, with expenditures on agriculture, water and rural development growing faster than proposed in the Plan. In FY 1976, total development expenditures were $325 million, and defense development expenditures $2.5 million. Total recurrent expenses were $654 million of which $44 million was for defense. Kenya maintains a foreign policy which emphasizes regional cooperation.

6C(2) - PROJECT CHECKLIST

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

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

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

(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 plus 10%)?	(a) Such notification will be made in accordance with the requirements of present legislation. (b) No.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	Yes.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No further legislation is required.
4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?	N/A
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	Yes. See Annex III of Project Paper.

A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?

6. Project will consist of road "construction" and rehabilitation in two provinces. For reasons of rapid implementation and fact that other donors will be (a) using different equipment and (b) operating in different time schedules and areas, the gravelling component is a self-contained unit. The RAR component will make use of other-donor supplied TA.

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

7. (a) By fostering production and providing easier access to market of crops with export potential.
(b) N/A
(c) Only to extent roads would give greater access to these services.
(d) N/A
(e) Encourage greater use of market facilities than at present; encourage use of inter and intraregional commerical facilities.
(f) N/A

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).

8. Standard AID procurement rules will be used. All major equipment for GBC component will be of U.S. source.

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.

9. U.S.-owned local currencies are not available. Kenya Government Agricultural Budget expenditures in FY 1976 were $87 million in local currency.

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

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

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

Project will increase access of rural poor to larger urban centers, thus bringing poor into contact with modern marketing, credit, extension services. Local representative agencies (DDC) will have crucial role in road selection. RAR component will be labor-intensive in nature and maintenance will also be effected by labor-intensive means.

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

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

Project is specifically designed to improve agricultural production of rural poor by providing all-weather rural road network providing year-round access from farms to markets. Poor road network is chief constraint to improving agricultural production; hence small farmer income.

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

N/A

(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;

N/A

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

N/A

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

(b) to help alleviate energy problem;

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

(d) reconstruction after natural or manmade disaster;

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

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

B1

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

c. FAA Sec. 110(a); Sec. 209(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

Of $21.5 million program, GOK will contribute $6.5 million (30.0%) and AID $15.0 million (70.0%). GOK will contribute in annual budgets assuring availability of project resources.

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

There will be no grant capital assistance.

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

The implementation of the loan will
(1) Foster the importance and growth of local level organizations for road selection, labor organization, and maintenance responsibilities.
(2) The project will assist in the development of an all-weather road network in Western & Nyanza Provinces. As such it will enable increased amounts of foodstuffs to be marketed and encourage food production
(3) The project will have the beneficial side effect of training Kenyans in the use of project equipment.
(4) N/A
(5) RAR program will impact substantially on employment problems.
(6) To the extent the expanded road net integrates all the rural poor in affected areas, women in such areas will similarly be integrated into the national economy.

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

The project will foster the growth of local decision-making through the DDC's, and thus, the representational processes. Road selection will be based, primarily, on meeting the socio-economic needs of the rural poor.

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g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(6). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

As more fully described in the PP, the project will directly contribute to economic development
The project aims at developing and improving a road net whose effect will be to foster agricultural production by the rural poor. It is consistent with other GOK development plans and activities as witnessed by the extensive multi-donor effort in the RAR program.

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

Of GBC component AID will finance $8.6 million in U.S. equipment amounting to 64% of component. Of RAR component AID will finance local costs due to labor-intensive techniques.

2. Development Assistance Project Criteria (Loans only)

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

Kenya has received development financing on reasonable terms from the United Kingdom, the Federal Republic of Germany, Canada, Italy, etc. However, additional resources are required. Private US sources do not provide financing of this type.

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

Loan terms are concessional and within Kenya's capacity to repay. Interest rate is 2% during grace period, 3% thereafter.

Loan meets the requirements of U.S. law and will be subject to CP with regard to legality under Kenyan law.

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

Yes

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

Yes

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

Of $21.5 million program $ 13.4 million is expected to go to private sector in form of equipment procurement and T/A contracts.

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

N/A

3. Project Criteria Solely for Security Supporting Assistance

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

N/A

4. Additional Criteria for Alliance for Progress

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

N/A

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

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

N/A

6C(3) - STANDARD ITEM CHECKLIST

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

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

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	Standard AID procedures regarding small business participation will be followed as applicable.
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	No. Of the $15 million in AID financing about 58% finances U.S. Commodity procurement. The balance finances local procurement and construction costs A.2
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?	Standard AID grant/loan provisions will so provide.
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	N/A
5. FAA Sec. 603(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	N/A
6. MMA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	The standard AID loan/grant provisions will so provide.
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,	Services will be furnished from private U.S. consulting firms.

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

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

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

Yes.

B. Construction

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

Any engineering services required will be provided by the GOK or other donors.

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

Yes, Contracts for constructing bridges and culverting will be let on a competitive basis

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

No.

C. Other Restrictions

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

Yes.

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

N/A.

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

Standard AID loan/grant provisions will so provide.

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

All AID financed vehicles will be purchased in U.S.

C.

5. Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions?	No.
b. FAA Sec. 620(c). to compensate owners for expropriated nationalized property?	No.
c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs?	No.
d. FAA Sec. 662. for CIA activities?	No.
e. App. Sec. 103. to pay pensions, etc., for military personnel?	No.
f. App. Sec. 106. to pay U.N. assessments?	No.
g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending).	No.
h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress?	No.

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REPUBLIC OF KENYA

OFFICIAL FILE

MINISTRY OF FINANCE AND PLANNING PROJECT 615-168

Telegraphic Address:
FINANCE-NAIROBI
Telephone: 24261-72
When replying please quote
Ref. No. DV.63/35/032/(23)
and date

THE TREASURY
P.O. Box 30007
NAIROBI
KENYA

7th February, 19 77.

ACTION COPY

Action taken:
No action necessary:
(Initials) (Date)

USAID DISTR. (2/8)
ACTION: TSS (w/Atch)
(DUE: 2/17)
INFO: DIR;A/DIR;PROG;CHRON;
CONT

Mr. Charles Nelson,
The Director,
USAID Mission to Kenya,
P.O. Box 30261,
NAIROBI.

Dear Mr. Nelson,

RE: ESTABLISHMENT OF CONSTRUCTION UNITS FOR THE GCB AND RAR PROGRAMMES

The Kenya Government has recognized the fact that the construction and improvement of the highway infrastructure is one of the basic pre-requisites for achieving the country's objectives of economic growth and social development.

Up to now, all of the provincial capitals and major district centres and areas of high economic activity have been made accessible, international connecting links with Kenya's neighbouring countries are either complete or in the process of being implemented, and road transport currently plays an increasingly important role in the rapid movement of passengers and freight.

Notwithstanding such a meritorious achievement, the Kenya Government still considers that emphasis should be placed on the developmental effects of road improvements and on what low-class roads can do to accelerate growth and to foster a more equitable income distribution within the areas they serve. Towards this end, the current 1974-78 Government of Kenya Development Plan calls for the improvement of Secondary, Minor and other low-class rural access roads which will provide not only year-round connections to small farms and marketing centres and social service facilities, but also the required linkage for an intergrated rural development effort.

The two companion programme which are intended to facilitate this strategy are the Gravelling, Culverting and Bridging Programme and the Rural Access Roads Programme, where the former will cater for the up-grading and improvement of some 12,000 kms of selected network of Secondary and Minor Roads, while the latter is an effort which will involve the construction of about 14,000 kms of unclassified roads in rural areas with the primary objective of linking farms to markets and also bringing the benefits of better health, educational and other social facilities to the isolated rural inhabitants.

It should be emphasized that both the GCB and RAR Programmes aim at similar objectives, despite the fact that they are essentially different in construction methods and were expected to attract different donors, and as such, they ought to be treated, in so far as their functional aspects are concerned, as parts of one and the same effort. This complementarity arises as a result of the following contributing factors:-

(a) Both programmes are intended to improve access to hitherto isolated areas and, thereby, to assist in rural developments and the uplifting of the quality of life for the small scale farmers and the rural poor;

(b) One programme will extend the usefulness of the other programme where, for example, bottlenecks exist at the present time in areas where rural access roads are planned to join with existing Secondary and Minor roads which, more often than not, are themselves unusable for a substantial part of the year and in such cases, the absence of the GCB programme will render the RAR programme useless;

(c) As the selection of roads for inclusion in the two programmes, especially the access roads, will be mainly undertaken by the DDC's in whose areas the roads are located, the two programme activities will enhance not only the extension of rural development exercise down to the grassroots level, but also the Government's as well as the donor agencies efforts in responding to this integrated approach taken by the local authorities; and

(d) The launching of the two programmes will partially help to meet the Government's objective of providing meaningful employment opportunities for the under-employed or unemployed rural population within the programme areas.

It is worthwhile to stress, at this juncture, that already a number of Donor Agencies have associated themselves with the RAR and GCB Programmes and these agencies represent the IBRD and the Governments of the United Kingdom, Norway, West Germany, Canada and Sweden. The two programmes are either in or moving to the implementation phase and it is the sincere hope of the Government of Kenya that the proposed AID financing will keep pace.

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As far as the USAID/Mission is concerned, it has specifically expressed its willingness to assist in the financing of GCB and RAR Programmes in Western and Nyanza Provinces, predominantly populated by small subsistence farmers, and these cover the following two major areas of work:-

(a) The establishment of one self-contained construction Unit which will improve and upgrade about 1300 km of Secondary and Minor Roads in Western Province; and

(b) The setting-up of eight labour-intensive construction units to build about 1000 km of all-weather rural access roads in six districts of the provinces of Western and Nyanza.

As shown in the attached Annex 1, approximately US $12.9650 million AID LOAN, together with a US $4.8266 million Government of Kenya contribution, will finance the construction of these two complementary, parallel road programmes over a five year period. In addition, the US $1.4350 million AID GRANT will provide supporting technical assistance to the Government of Kenya in the implementation of the said programme. As such, out of the total project costs of US $19.2266 million, an equivalent of 75% or US $14.400 million is USAID contribution, while the remaining 25% or US $4.8266 million is expected to come forth from Government of Kenya local contribution.

In view of the necessity to facilitate the phased delivery of U.S. equipment and also alleviate the possible strain on the country's human and financial resources, the AID/Washington is at the moment processing the financing of an GCB Unit. As previously stressed, the RAR and GCB Programmes are complementary parallel road programmes and since some work on RAR has already started in Nyanza Province, the Government is anxious to place the proposed GCB Unit in the Province, immediately. It is, further, the firm belief of the Ministry of Works that, in view of a large number of impassable Secondary and Minor Roads and the planned rural access roads, a second Gravelling Unit should be established for assignment in Western Province, as a complementary input, as early as possible.

By way of conclusion, therefore, we would like to reiterate the importance and urgency attached by the Kenya Government to these two programmes and request the USAID not only to release the required funds for the first GCB Unit as soon as possible, but also to seriously consider the additional financing for a second GCB Unit which has very high Ministry of Works priority intergrated with the Rural Access Roads Programme.

Yours sincerely,

(G.C.D. OKUNDO)

for; PERMANENT SECRETARY TO THE TREASURY

USAID LOAN AND GRANT
AND GOK CONTRIBUTION

FOR THE
R.A.R. AND G.C.B. PROGRAMME

1. USAID LOAN AND GRAND

1.1 G.C.B. PROGRAMME:

Purchase of equipment, spares, materials and procument fees-Home Country contracting (CIF).....US $8,130,000

1.2. RAR PROGRAMME:

Fixed Amount Reimbursement (F.E.C.).....US $4,835,000

1.3. Long Term Technical Assistance .....US $1,035,000

1.4. Project Evaluation Costs (Impact Study).....US $ 400 000

Sub-Total.....US$14,400,000

2. Kenya Government Contribution.....US$ 4,826,600*

Sub-Total US$ 4,826,600

3. Total Project Costs (Sub-Total 1 + 2).....US$19,226,600

4. PERCENTAGE BREAKDOWN

4.1 USAID Contribution.....l.....75%
4.2 KENYA Government Contribution..25%

NB: About $1.6 million will finance off-shelf procurement of the equipment for the R.A.R. Programme. The equipment is available in Kenya and will be purchased immediately if the Loan is signed to ensure that construction is started by November, 1977, as planned.

It is essential for the Government of Kenya to finance this input to avoid the delay (11 months) of having to import this equipment for the project through USAID channels.

A

Annex III

Kenya Rural Roads Systems Project

Certification Pursuant to FAA Section 611(e)

I, Charles J. Nelson, 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, the demonstrated capacity and willingness of the Government of Kenya to maintain its road network at a level above that of most developing countries, and the assistance provided by other donors specifically directed to the expansion of Kenya's construction and maintenance staff training department, do hereby certify that in my judgment the Government of Kenya has shown both the financial and human resources capability to effectively maintain and utilize the assistance provided under the Rural Roads Systems Project.

Signed Charles J. Nelson

Charles J. Nelson
Director

Date April 15, 1977

DEPARTMENT OF STATE

TELEGRAM

615-0168

ACTION: AID- PROG/REDSO UNCLASSIFIED
Classification

INFO: AMB DCM ECON ADM 8JAN76 0122

DIR A/D CONT TSS CH RF

ACTION TAKEN _____

DATE ANSWER DUE 1-12-76

INITIALS _____ DATE _____

R 072340Z JAN 76
FM SECSTATE WASHDC
TO AMEMBASSY NAIROBI 5583
BT
UNCLAS STATE 003987

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: KENYA: RURAL ROADS PRP
REF: STATE 302420
FOR USAID AND REDSO

1. ECPR MET DECEMBER 23. WHILE IT DETERMINED INCLUDE PROJECT IN 77 CP, ECPR DEFERRED PRP REVIEW UNTIL RECEIPT FOLLOWING MATERIAL: IBRD APPRAISAL ACCESS ROADS PROGRAM, RESEARCH TRIANGLE PHASE I METHODOLOGY REPORT, AND SCANDIA-CONSULT REPORT AND USAID/REDSO COMMENTARY REQUESTED REFTEL.

2. WHILE CONCUR ACCESS ROAD CONSTRUCTION AND GRAVELLING COMPONENT ARE PART OF SINGLE SYSTEM, BELIEVE FINANCING AND ANALYSIS CAN AND MUST BE DIFFERENTIATED [IF FOR NO OTHER REASON THAN AFR FUNDING CONSTRAINTS]. FYI. AS MISSION AWARE, FY 1976 OYB FOR ASL IS DOLS. 10 MILLION AND FY 1977 OMB REQUEST FOR RURAL ROADS IS DOLS. 13 MILLION. THESE LEVELS SIGNIFICANTLY BELOW THOSE REQUESTED BY MISSION. AFR ASSESSMENT PROBABLE AVAILABILITIES AND BALANCE IN BUREAU PORTFOLIO SUGGESTS LEVELS PROBABLY NOT SUBJECT TO REVISIONS UPWARDS. END FYI.

3. ECPR PARTICULARLY CONCERNED WITH ECONOMIC ISSUES INCLUDING BENEFIT INCIDENCE FOR GRAVELLING PROGRAM AND ISSUES OF TECHNICAL AND FINANCIAL CAPACITY GOK UNDERTAKE ROAD PROGRAMS OF MAGNITUDE PROPOSED [E.G. CONSTRUCTION, MAINTENANCE, TRAINING, STAFFING, FINANCING ETC.]. BELIEVE ECONOMIC ISSUE ALONE OF SUFFICIENT COMPLEXITY AS TO SUGGEST CONSIDERATION GRAVELLING COMPONENT IN FY 76 ASL BE DEFERRED AND AID CONSIDERATION OF ACTIVITY BE UNDERTAKEN WITHIN CONTEXT PROPOSED FY 1977 RURAL ROADS PROJECT. EVEN THEN, ECPR RECOMMENDED LIMITING AID PARTICIPATION TO INITIATION OF PROGRAM AT MORE MODEST [illegible] THAN PROPOSED IN-

Classification

11-72 FS-412(H)

TELEGRAM

CN: 0458

PAGE 2 UNCLASSIFIED
Classification

8 JAN 76 01:22

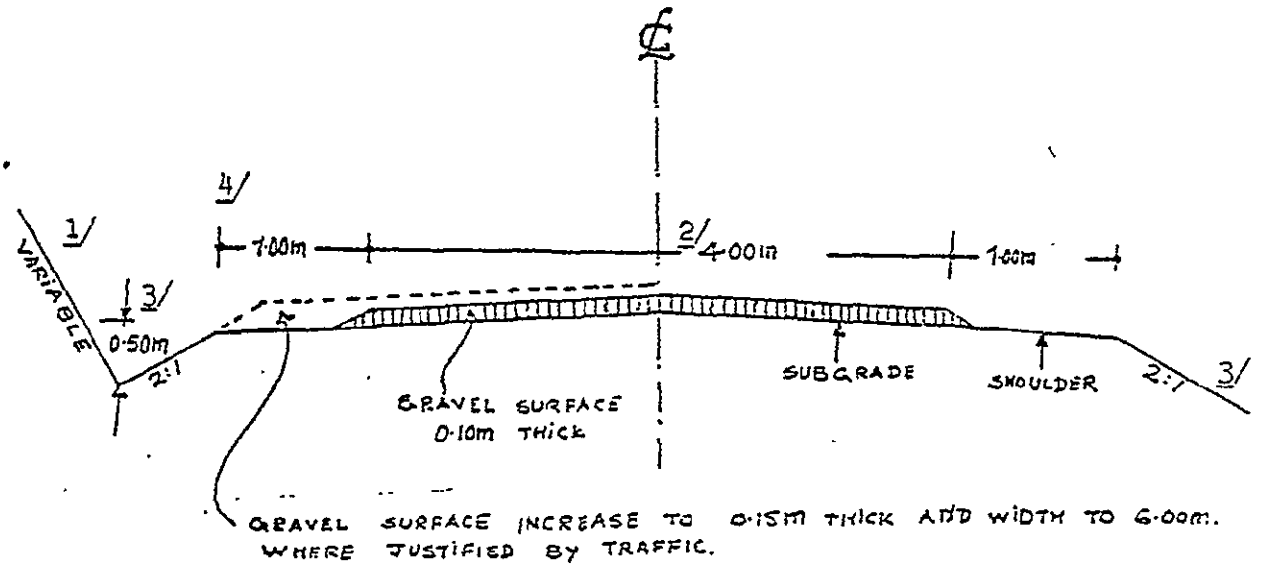
FY 76 ASL AND FY 77 RURAL ROADS PRP. FURTHER COMMENTS THIS REGARD WILL FOLLOW ECPR REVIEW OF MATERIAL REQUESTED PARA 1 ABOVE AS WELL AS REVIEW OF FY 76 ASL PP. KISSINGER

N.F

FORM FS-412(II)
11-72

RURAL ACCESS ROADS

Typical Road Section



1/ Backslope: variable with soil conditions

2/ Surface Cross Slope Minimum: 3 percent

3/ Ditch Section Minimum: 0.50-meter depth

4/ Shoulder Material to be in-situ material

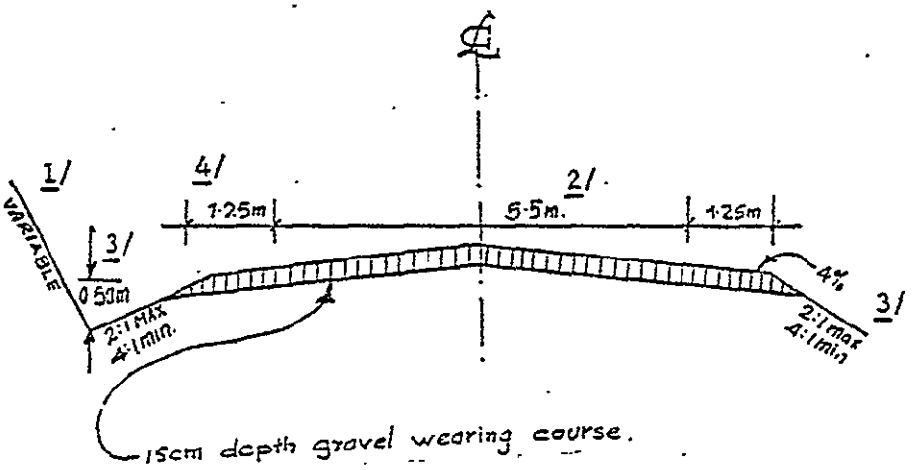
Note: USAID reports(Nairobi 7443 dated 7443 June 12-77) that RAR profile is 4%

Scale: 1 cm = 1 m

KENYA GRAVELLING PROGRAM

Secondary (Class D) Roads
Minor (Class E) Roads

Typical Road Section



1/ Backslope: variable with soil conditions

2/ Surface Cross Slope Minimum: 3 percent

3/ Ditch Section Minimum: 0.50-meter depth

4/ Shoulder Material: same as surface course depth of 15-cm at the edges of the roadway, tapered run-out.

Note: USAID reports(Nairobi 7443 dated June 12-77)that RAR profile is 4%

Scale: 1 cm = 1 m

Administrative Arrangements of RRSP 1/

A. MOW - Provincial Engineer Responsibilities

The Ministry of Works (MOW) is responsible for implementing the Government's construction and maintenance programs mainly for buildings, roads, plants and equipment. Most of design and construction of buildings and roads are handled by private consultants and contractors working under the supervision of the MOW. Maintenance of roads, buildings and equipment in the provinces is carried out by MOW forces under the direction of each Provincial Engineer.

All technical offices of the MOW, including the Provincial Engineer, are headed by the MOW Chief Technical Officer known as the "Engineer-in-Chief". Department heads such as Chief Engineer Roads, Chief Architect and Chief Mechanical Engineer report to the "Engineer-in-Chief". The Provincial Engineer is the chief technical officer in each province, and he has on his staff a roads engineer, a building engineer and a mechanical engineer. Under the provincial roads engineer there are divisional engineers, superintendents, district inspectors and overseers. The Provincial Engineer takes instruction from the relevant department heads such as the Chief Engineer Roads.

B. MOW - Special Project Branch Responsibilities

Both the Rural Access Roads (RAR) and the GBC programs are controlled by the Special Projects Branch (SPB) of the MOW. Mr. Paul Dennis is Chief Superintendent Engineer for the SPB reporting directly to the Chief Engineer Roads. The size and complexity of both programs necessitated the creation of the SPB instead of depending on the Provincial Engineer. The Provincial Engineer has no primary responsibility in connection with the RAR and GBC programs. However, he does provide some back-up services in the way of assistance in personnel matters, accounting and clerical services if needed. Since the Provincial Engineer is responsible for managing local provincial workshop facilities, he also provides repair services for SPB equipment when repairs cannot be handled by service personnel attached to each SPB unit. However, all major repairs are handled by the central

1/ For further information about Administration Arrangements, refer to Part III-A and Part IV-A4.

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workshop in Nairobi. Assistance such as personnel, clerical services and repair facilities provided by the Provincial Engineer to RAR and GBC units is accounted for separately and reimbursed from a special account for the units.

Thus, there is no direct connection between the SPB and the Provincial Engineer. The Chief of the SPB is actually one step above the Provincial Engineer. The SPB would have to go through the Chief Engineer Roads for any major directions.

C. Interrelationships

The Provincial Engineer (PE) is responsible for maintaining all classified roads in the PE's province. As it is upgraded or constructed, each road link under the RRSP will be handed over to the Provincial Engineer for regular maintenance and resurfacing as needed. The Provincial Engineering will provide logistic and technical support to the RRSP, especially in the identification of road sections, requiring spot improvement, and source of materials.

The SPB will make extensive use of the Provincial Engineers detailed knowledge of the locality, particularly with respect to maintenance problems and all weather operation of the GBC roads.

The AID-financed maintenance engineer will design and test a pilot maintenance scheme in the project area. He will not take over the routine maintenance responsibility of the Provincial Engineer. In fact, he will work with the Provincial Engineer under the general supervision of the Chief Maintenance Engineer.

The GBC and RAR program roads are not withdrawn from the control of the Provincial Engineer. The latter has the responsibility of maintaining these roads before and after they have been constructed or regravelled. For example, when a GBC unit starts work on a road link, this road link will be taken over by the SPB and after the work is completed it will be handed back to the Provincial Engineer.

ANNEX VI

ECONOMIC ANALYSIS

A. Rural Access Roads Component

1. Component Costs and Benefits

   a. Overview
   b. RAR Costs
   c. RAR Benefits

2. Supporting Tables

3. Zone of Influence

4. Labor Intensive Verses Capital Intensive Technology

5. IADP Farm Income Data

B. Gravelling, Bridging and Culverting Component

1. Overview

2. Program Benefits

3. Cost of Alternative Improvements

4. Benefit/Cost Analysis

5. Labor/Capital Intensive Technology

C. Benefit Incidence Analysis

1. Overview

2. Rural Access Roads Component

   a. Induced Agricultural Production
   b. Employment
   c. Access Benefits
   d. Incidence of Increased Output

3. Gravelling, Bridging and Culverting Component

   a. Estimation of Incidence
   b. Valuation of Benefit Incidence

Introduction - Economic Analysis

This annex presents the detailed analysis which is only summarized in Section III-B and this annex are companion pieces and, therefore, several topics which are discussed in Section III-B are not repeated in this annex, most notably among these topics is the integrated road network concept. Both the RAR component and the GBC component together provide the basis for an all-weather road network. This annex presents supporting material for the analysis of each component.

The project area can be subdivided into three zones, depending on the impact an access road network is expected to have on increasing agricultural production. These are:

1. Areas where lack of roads is clearly a constraint to agricultural development (parts of Busia and Bungoma).

2. Areas where "harambee" roads or Rural Works roads have already been built to ease a transport constraint (parts of South Nyanza and Siaya).

3. Areas where other constraints besides lack of roads appear to be critical.

The following cost-benefit analysis focuses on the majority of the project area where lack of roads is only a constraint if other factors are previously addressed (e.g., extension and credit).

A. Economic Analysis - Rural Access Roads Component

1. Component Costs and Benefits

a. Overview

An analysis of the economic costs and economic benefits generated by the Rural Access Roads (RAR) component indicates an internal rate of return of 17.9 percent and a benefit/cost ration of 1.48 when a 10 percent social rate of discount is used. The summary of component benefits and costs is found in Table 1 with supporting tables, and discussion to be found in sections 1,2 and 3 of the RAR component analysis.

b. RAR Component Costs

The estimated rural access road construction costs are summarized in Table 2 based on the technical and financial analysis presented in Sections III-A and III-C. The economic costs shown are derived from financial costs by subtracting taxes and using shadow costs for unskilled labor and for foreign exchange. The relevant assumptions are described in Table 8. The economic costs are K.Shs. 48,590 ($5,854) per kilometer of rural access road construction. 1/

1/ Total economic cost of $5854/km. verses USAID reimbursement of $4,762/km.

Annual maintenance costs are detailed in the technical and financial analysis, Sections III-A and III-C. These costs include overhead as well as variable maintenance costs. The annual economic costs of maintenance will amount to K.Shs. 1,041 (U.S. $125) per kilometer with the proposed labor-intensive construction methods.

Table 1

Summary: Rural Access Roads Component

Economic Benefits and Costs

(Summary of Tables 7 a-f)

(KShs '000)

Year (FY)	Economic Benefits	Economic Costs
1978	-	8,446
1979	447	15,793
1980	1709	16,136
1981	3816	8,041
1982	6409	1,049
1983	8897	1,049
1984	10,997	1,049
1985	12,322	1,049
1986	12,761	1,049
1987-1987	12,761	1,049

	Discounted at 10%	Discounted at 20%
Benefits	65,231	27,817
Costs	43,939	33,607
Prevent Value of Net Benefits	21,292	-5,790
Benefit/Cost	1.48	NA

Internal Rate of Return over 20 Years : 17.9%

Table 2

Basic Data

1. Road Construction Program (Kms)

(For illustrative purposes only, actual timing to be coordinated with District Development Committees)

District	FY 78	FY 79	FY 80	FY 81	TOTAL
Bungoma	77	84	49	-	210
Busia	56	84	29	-	169
Kakamega	35	84	81	-	200
Siaya	14	84	76	-	174
Kisumu	-	-	50	49	99
Kisii	-	-	51	105	156
Total—	182	336	336	154	1008

2. Project Costs (KShs '000)

a. Construction Equipment 1/	2424	4482	4482	2050	13438
b. Support 2/	7478	13496	13546	6283	40803
Total -	9902	17978	18028	8333	54241

1/ Cost incurred with equipment usage.

2/ POL, spares, materials, tools, management support, supervisors, and support.

c. RAR Component Benefits

The construction of rural roads yields two commonly identified benefits: (1) reduced transportation costs (vehicle user-costs and transportation time); and (2) induced incremental agricultural output through improved access to inputs, technology, credit and marketing.

Since the RAR component will not upgrade existing roads but rather construct new ones, the only reduction in vehicle user-costs attributable to the Project arises from the diversion of vehicle traffic from existing roads to the newer, and higher standard, Project constructed roads. Data from the Vihiga SRDP roads projects showed that average traffic amounted to only 2 vehicles per day on the more typical sample roads. Given this light traffic load, this analysis does not calculate vehicle operating costs that are saved due to the new roads.

The Vihiga data does show that there was a significant increase in bicycle trips from zero per day to an average of over 30 trips per day on each of the three sample roads within two years of construction. While the Vihiga data demonstrates a considerable latent demand for improved and speedier transportation, this analysis does not estimate the opportunity cost of a farmer's time nor does it place a dollar value on the savings in transportation time which are made possible by the construction of rural roads.

The primary component benefit identified and quantified is the incremental agricultural output attributed to the RAR component. Incremental agricultural output arises from three situations: (1) increased output on land presently farmed; (2) new output arising from land put under cultivation solely because of the project constructed rural access roads; and (3) incremental output anticipated from land not now cultivated, but which would eventually be put under cultivation, with or without the RAR component.

A baseline socio-economic survey indicated that transport is presently a major constraint only in parts of Bungoma and Busia Districts and that lack of other factors such as credit and extension knowledge are much more important constraints on agricultural development in other areas of Western and Nyanza Provinces.[1/] Given the existence of an Integrated Agricultural Development Program (IADP) which is to operate in the six districts and which has been recently financed by the IBRD in a 1976 loan agreement, and the existence of the AID-financed small farmer credit program, it appears that these non-transport constraints will begin to be eased in the next 2-3 years.

1/ LBII. Consultants Report. 1976.

This implies that in those areas where road transport is not presently the main constraint, the RAR component roads should be used to specifically support the IADP and small farmer credit program, and timed to be constructed in concert with IADP or other inputs, such as credit and extension programs, currently being introduced in the district. The economic analysis is based on the existence of the IADP and ASL-I in the Project area.

Social benefits, such as increased access to health and education services, also have indirect economic benefits and the MOW has calculated indices of need for access to these services. The economic monetary value of these benefits is not, however, calculated simply due to the insurmountable problems of quantification.

A complementary agricultural survey shows that the area under cultivation near the Vihiga rural access roads expanded significantly (15-70 percent) in the two-year period after the road construction.[1/] While much of this new production was not marketed, the road appears to have acted as a catalyst to expansion by improving access to agricultural technology and inputs as well as influencing the selection of home and farm sites. The entire net value of new cultivation can be counted as a Project benefit, if the decision to cultivate a particular piece of land can be completely attributable to the introduction of a new road. The Vihiga data supports the role of road construction in the farmland expansion process. Far less rigorous evidence is supplied by casual observation along newly constructed rural roads which indicates a high proportion of cropping on virgin land.

The specific assumptions used for the economic analysis are as follows:

i. The RAR component will complement the ongoing and planned activities of the IADP and USAID production and credit projects resulting in higher outputs than would have been possible without the RAR component. The IADP plans to significantly impact on approximately 40 percent of the farmland in IADP Project areas. It is assumed that the existence of the RAR component will allow the more efficient utilization of IADP resources (improved access to farms, lower transport costs of inputs, better access to markets) thereby permitting IADP induced incremental agricultural output to increase by 20 percent. The IBRD's assessment of the impact of rural roads on agricultural output concludes that <u>marketed</u> agricultural production would grow 10 percent faster with

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1/ MOA. IADP Loan Proposal. 1975.

the construction of a rural roads network.[1/]

An evaluation of access roads in Kirinyaga District further supports the complementarity parameters outlined above as well as the expansion of land under cultivation due to the introduction of rural roads.[2/]

ii. The RAR component will increase agricultural output in areas not in the IADP by approximately 3 percent. An estimate of vehicle-user costs and transportation time concludes that farm gate prices could rise by 5 percent and input prices fall by approximately the same amount if savings from reduced vehicle operating costs and transportation time were passed on to the farmer.[3/] Assuming some stickiness in the pricing of transport services, a farmer's production elasticity of less than 1, and some farm to farm transfer of IADP/ASL-I introduced technology, a 5 percent increase in overall output appears both reasonable and modest.

iii. The RAR component will be the catalyst for placing 20 percent of the cultivatable, but presently uncultivated land into production within two years after road construction is completed. This assumption is in line with observations made during the construction of rural roads in Vihiga. The remaining 80 percent of the cultivatable, but presently uncultivated land will come into production due to the natural expansion of population and mounting pressure on existing farming land, based on known and projected rates of development in western Kenya. It is assumed that this land will come into production over a period of ten years.

iv. The average percentage of land which is presently farmed in a district as well as the average district productivity, is assumed to hold true in the RAR zone of influence.

1/ Appraisal of a Rural Access Roads Project in Kenya. World Bank, June 1976. The World Bank's methodology affixes the complmentarity factor to the incremental annual agricultural output while the present methodology affixes the complementarity factor to the total output. Both methodologies produce similar results but it is felt that the World Bank's approach requires too many unsupportable assumptions concerning future growth rates.

2/ Rural Access Roads Programme Evaluation of Roads in Kirinyaga. Roads Department. Ministry of Works. October 1976.

3/ Scandia-Consult. Improvement of Roads in Kenya, April 1974.

The calculations resulting from these assumptions are shown in Tables 3, 4, 5, and 6 and summarized by district in Tables 7a - 7f.

The economic calculations are contingent upon the effectiveness of the IADP and ASL I Credit Programs in relieving constraints other than lack of roads in the Project area. However, in certain areas identified in the socio-economic baseline survey (parts of Busia and Bungoma) the lack of roads is presently a constraint and many of the above benefits could be achieved even if these programs were not commenced concurrently with RAR component in these areas.

For the sake of valuation, model farmer budgets prepared by the MOA in conjunction with the GOK's IADP loan application form the basis of the monetary values assigned to incremental levels of agricultural output. A summary of these model budgets is presented in Tables 10, 11, and 12. These model budgets are not, however, merely indicative of a specific type of farmer representing the IADP target group. A baseline survey of smallholder farmers participating in ASL I, Part C, (along with a control group) developed representational farm budgets which are very similar to those developed by the MOA for the IADP loan application.[1/] Therefore, while IADP model farm budgets are used throughout this analysis, these model budgets represent the typical small and medium holder farmer who may or may not live in IADP or ASL I target areas.

2. Supporting Tables

Table 3 - Estimates or IADP Benefits

Table 4 - Available Agricultural Land

Table 5 - Net Agricultural Benefits

Table 6 - Net Benefits Per Kilometer of Road

Table 7a - f - RAR Economic Analysis: By District

Table 8 - Shadow Pricing

1/ American Technical Assistance Corporation. Kenya-Smallholders Production Services and Credit Project Baseline Survey. Agricultural Year 1975-1976. January 1977.

Table 3

Estimates of IADP Benefits by District
(K.Shs)*

District	IADP Farm 1/ Farm Size ha.	IADP Farm 1/ Present Net Income ha.	IADP Farm 1/ Incremental net Income/ha.	IADP Project Area 2/ Average Farm Increase in Net Income/ha.
Bungoma	6.0	635	254	102
Busia	6.0	459	213	85
Kakamega	4.0	687	503	201
Siaya	2.5	425	326	130
Kisumu	2.0	620	341	136
Kisii	2.0	737	442	179

1/ MOA. IADP Loan Application. Tables 14.8 and 14.7, Annex 14. Appendix. May 1975. The non-IADP farm has a net per hectare income of 75 per cent of the IADP Farm.

2/ 40 per cent of farm land adopts new techniques. (IADP goal).
(Column 3 X .4 = Column 4)

*K.Shs 1/= US $.12

Table 4

Available Agricultural Land by District

(Square Kilometers)

District	Land Available for Small Holders 1/	% Reserved and Presently not Farmed 2/	% Presently Farmed 3/	% of Total Small Holder Land Brought into Cultivation by RARP 4/
Bungoma	2122	34	66	7
Busia	1627	35	65	7
Kakamega	2653	35	65	7
Siaya	2478	69	31	7 5/
Kisumu	1378	87	13	9 5/
Kisii	1918	30	70	6

1/ Central Bureau of Statistics Statistical Abstract. Table 5. "Available for Small Holder"

2/ 20% of land already registered plus unregistered land reserved for small holders. This estimate is based on detailed data gathered for Kisii District and assumed to hold for other districts.

3/ (100% less column 2)

4/ 20% of column 2

5/ For Siaya and Kisumu Districts, owing to large amounts of land uncultivatable under present technology, the RAR component cultivation inducement factor has been lowered from 20% to 10%.

Table 5

Net Agricultural Benefits Attributable to RAR Component

(KShs/ha)

Farmland Within RAR Component Zone of Influence

District	Land Presently Under Cultivation			New Cultivation Attributable to RAR Component			
	Incremental Benefits on Non-IADP Farm 1/	Incremental Benefits on IADP Farm 2/	Total	Initial Cultivation 3/	Non IADP Farm	IADP Farm	Total
Bungoma	14	20	34	508	11	16	535
Busia	10	17	27	367	8	14	389
Kakamega	15	40	55	549	12	32	593
Siaya	10	52	62	340	8	42	390
Kisumu	14	27	41	496	11	22	529
Kisii	17	36	53	590	14	29	633

1/ Table 3. Present Income per ha. anticipated to increase 5%, without IADP inputs, due to slight increases in producer prices, decreased input costs, improved accessability. Applies to 60% (Non-IADP) of farm land. (5%x 60% (75% x Present IADP Farm Per hectare income)). Phased over 5 years and shown above at full production.

2/ Table 3. RAR Complementarity factor of 20%. IADP benefits expected to increase with improved access on all-weather road network due to both higher farmer operating margins and improved access of IADP field technicians and IADP farm inputs. The complementarity factor is phased in over a 5 year period. This table indicates incremental benefits at full production.

3/ Table 3. 80% of present net income per hectare, to adjust for lower productivity anticipated from land presently not cultivated. Two factors are at work: 1) the higher productivity potential from virgin soil against 2) the lower potential of land which has not been cultivated, in part, because it has a lower agricultural potential under present technologies.

Table 6

Net Agricultural Benefits Per Kilometer of Rural Access Road Construction

District	I. Land Presently Farmed (K.Shs)			II. Newly Cultivated Lands (At Full Production) (K.Shs) A. RAR Induced Cultivation			B. Normal Population Spread		
	Ha/km 1/	Benefit/ha 2/	Benefit/km 2/	Ha/km 1/	Benefit/ha 4/	Benefit/km 3/	Ha/km 1/	Benefit/ha 5/	Benefit/km
Bungoma	145	34	4930	15	535	8025	60	27	1620
Busia	143	27	3861	15	389	5835	62	22	1364
Kakamega	143	55	7865	15	593	8895	62	44	2728
Siaya	68	62	4216	15	390	5850	10	50	500
Kisumu	29	41	1189	20	529	10580	15	33	495
Kisii	154	55	8162	13	633	8229	53	42	2226

1/ 220 ha (Zone of Influence) times approriate percentage of total available land in Table 4. Average area of the zone of influence of roads analyzed in MOW, RAR Evaluation Report So. Nyanza. (April 1976, p.5)

2/ Table 5, Column 3

3/ Column 4 X Column 5

4/ Table 5, Column 7

5/ Table 5, Columns 5 and 6

Table 7.a.

RAR Economic Analysis - Bungoma (KShs '000)

	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85/Other Years
1. Kms. Constructed 1/	77	84	49	-	-	-	-	-
2. RAR Economic Benefits 2/								
a. Existing Farms 3/	-	67	207	344	571	753	868	911
b. New Cultivation - RAR 4/	-	109	336	628	928	1226	1414	1483
c. New Cultivation-Normal 5/	-	22	68	130	188	247	285	302
Total Benefits	-	198	611	1104	1687	2226	2567	2696
3. RAR Economic Costs								
a. Capital Costs 6/	3575	3901	2276	-	-	-	-	-
b. Recurrent Costs-Maint. 7/	-	80	167	219	219	219	219	219
Total Costs	3575	3981	2443	219	219	219	219	219
4. Net Benefits	- 3575	-3783	-1832	885	1468	2007	2348	2477

Note: "See common footnotes last page of Table 7"

Table 7.b.

RAR Economic Analysis - Busia (KShs '000)

	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85/Other Years
1. Kms. Constructed 1/	56	84	29	-	-	-	-	-
2. RAR Economic Benefits 2/								
a. Existing Farms 3/	-	38	133	243	413	466	542	574
b. New Cultivation - RAR 4/	-	57	202	366	536	706	818	848
c. New Cultivation-Normal 5/	-	13	48	86	126	165	192	199
Total Benefits	-	108	383	695	1075	1337	1552	1621
3. RAR Economic Costs								
a. Capital Costs 6/	2599	3901	1346	-	-	-	-	-
b. Recurrent Costs-Maint. 7/	-	58	146	176	176	176	176	176
Total Costs	2599	3959	1492	176	176	176	176	176
4. Net Benefits	-2599	-3851	-1109	519	899	1161	1376	1445

Note: "See common footnotes last page of Table 7"

Table 7.c.

RAR Ecoromic Analysis - Kakamega (KShs '000)

	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85/Other Years
1. Kms. Constructed 1/	35	84	81	-	-	-	-	-
2. RAR Economic Benefits 2/								
a. Existing Farms 3/	-	47	208	478	749	1020	1244	1353
b. New Cultivation - RAR 4/	-	53	236	512	847	1153	1405	1529
c. New Cultivation-Normal 5/	-	16	72	166	259	353	431	480
Total Benefits	-	116	516	1156	1855	2526	3080	3362
3. RAR Economic Costs.								
a. Capital Costs 6/	1624	3901	3761	-	-	-	-	-
b. Recurrent Costs-Maint. 7/	-	36	124	208	208	208	208	208
Total Costs	1624	3937	3885	208	208	208	208	208
4. Net Benefits	-1624	-3821	-3369	948	1647	2318	2872	3154

Note: "See common footnotes last page of Table 7"

Table 7.d.

RAR Economic Analysis - Siaya (KShs '000)

	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85/Other Years
1. Kms. Constructed 1/	14	84	76	-	-	-	-	-
2. RAR Economic Benefits 2/								
a. Existing Farms 3/	-	10	82	293	333	459	575	630
b. New Cultivation - RAR 4/	-	14	108	274	441	608	762	835
c. New Cultivation-Normal 5/	-	1	9	25	40	55	68	75
Total Benefits	-	25	199	592	814	1122	1405	1540
3. RAR Economic Costs								
a. Capital Costs 6/	648	3901	3529	-	-	-	-	-
b. Recurrent Costs-Maint. 7/	-	15	102	181	181	181	181	181
Total Costs	648	3916	3628	181	181	181	181	181
4. Net Benefits	-648	-3819	-3429	411	633	941	1224	1359

Note: "See common footnotes last page of Table 7"

Table 7.c.

RAR Economic Analysis - Kisumu (KShs '000)

	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86/Other Years
1. Kms. Constructed 1/	50	49	-	-	-	-	-
2. RAR Economic Benefits 2/							
a. Existing Farms 3/	-	10	31	51	71	91	101
b. New Cultivation - RAR 4/	-	93	272	451	631	812	900
c. New Cultivation-Normal 5/	-	4	13	22	30	38	42
Total Benefits	-	107	316	524	732	941	1043
3. RAR Economic Costs							
a. Capital Costs 6/	2322	2276	-	-	-	-	-
b. Recurrent Costs-Maint. 7/	-	52	103	103	103	103	103
Total Costs	2322	2328	103	103	103	103	103
4. Net Benefits	-2322	-2221	213	421	629	838	940

Note: "See common footnotes last page of Table 7"

Table 7.f.

RAR Economic Analysis - Kisii (KShs '000)

	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86/Other Years
1. Kms. Constructed 1/	51	105	-	-	-	-	-
2. RAR Economic Benefits 2/							
a. Existing Farms 3/	-	71	290	510	728	948	1095
b. New Cultivation - RAR 4/	-	72	293	514	734	955	1104
c. New Cultivation-Normal 5/	-	19	79	138	199	259	299
Total Benefits	-	162	662	1162	1661	2162	2499
3. RAR Economic Costs							
a. Capital Costs 6/	2366	4876	-	-	-	-	-
b. Recurrent Costs-Maint. 7/	-	53	162	162	162	162	162
Total Costs	2366	4929	162	162	162	162	162
4. Net Benefits	-2366	-4767	500	1000	1499	2000	2337

Note: "See common footnotes last page of Table 7"

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TABLE 8

Assumptions Underlying Evaluation of Economic Costs

A. Shadow Pricing Factors:

1.	Unskilled labor	50%
2.	Skilled labor	100%
3.	Foreign exchange	130%
4.	Materials	100%
5.	Supervision cost	100%
6.	Camp cost	100%

B. Taxes

1.	Import duty on fuel (diesel)	27%
2.	Import duty on gasoline	52%
3.	Sales tax on gasoline	23%
4.	Import duty on landrover and trucks	25%
5.	Sales tax on landrover and trucks (inclusive of import duty)	10%
6.	Sales tax on construction machinery, cement, nonagricultural hand tools	10%
7.	Import duty on rollers and non-agricultural hand tools	10%
8.	Sales tax on trailers	2%
9.	No import duty or sales tax on agricultural tractors and agricultural hand tools	

Source: World Bank . Appraisal of a Rural Access Roads Project in Kenya 1976.

3. Zone of Influence - Methodological Note

Construction of a rural access road influences economic and social parameters of the population on either side of the road. The degree of influence is a negative function of distance from the road, with maximum influence being felt by the "roadside" population.

In the process of undertaking an estimation of a road's benefits it is necessary to determine the zone on either side of the road which experiences a significant influence attributable to the new road. Various studies in Kenya have addressed this issue and indicate that a reasonable zone of influence in western Kenya would be between 1 - 1.5 kilometers on either side of a road (200-300 hectares per kilometer of road).[1/] To allow for road alignments, a 220 hectare per kilometer zone of influence has been used in this analysis.

4. Labor Intensive vs. Capital Intensive Technology

The conclusion that the labor intensive technique is most appropriate is supported by an economic analysis using shadow pricing carried out by the IBRD in its Appraisal Report. Table 9 shows the results of this analysis.

The shadow prices used in this analysis are 50 percent of unskilled labor costs and 130 percent for items purchased with foreign exchange (IBRD estimate).

1/ LBII. Consultants Report. 1976.
World Bank. Appraisal of a Rural Roads Project in Kenya. 1976.
MOW. Loan Application of Rural Access Roads Programme. 1975.

Table 9

Comparison of Labor-Intensive and Capital-Intensive

RAR Construction Costs

	Financial Cost		Economic Cost	
	Labor-Intensive	Capital-Intensive	Labor-Intensive	Capital-Intensive
	(US $)			
1. Construction				
A. Earthwork	1,632	2,199	1,188	2,448
B. Gravelling	1,175	1,625	1,087	1,726
C. Culverting	334	334	267	267
D. Miscellaneous	126	208 1/	68	222 1/
E. Cost to ensure adequate compaction 3/	147	-	74 2/	-
Sub-Total	3,414	4,366	2,684	4,663
2. Overhead				
A. Cost of supervision	337	337	337	337
B. Camp cost	164	164	164	164
Sub-Total	501	501	501	501
3. Construction & Overhead (1 + 2)	3,915	4,867	3,185	5,164

1/ 5% of (A+B+C)

2/ Based on Use of casual labor and indigenous tools. This cost would increase to US $170 if mechanical light rollers are used for compaction.

3/ Increase in construction cost as a consequence of stipulating proper and sufficient compaction for earthworks and surfacing.

Source: Revised Loan Application, July 1975, and IBRD estimates of June 1976.

5. IADP Farm Examples Related to Project Models

The farm models have been devised as the basis for calculating Project benefits. Each model shows the size and cropping intensity of the most typical holdings, together with the range of crops commonly grown in each area. Each holding would not be growing the whole range of crops included in each model (either without or with the Project), but rather a selection from the range.

The IADP plans to begin activities in the RRSP Project area during FY 1977. Over the first few years there will be a gradual phasing down of ASL I activities as IADP activities increase.

For clarification a series of farm examples have been created, in Tables 11 and 12, to show the impact which should be expected by farmers in each area as a result of the IADP

Table 10 summarizes the scope of net benefits expected for participating farmers (as calculated in Tables 11 and 12).

Table 10

Net Benefits Examples for Project Participants

Example Farm Model Number	Area Covered	Total Net Income 1/	Incremental Net Income 2/
		(K.Shs./annum/holding)	
A	Kisii	2,368	895
B	Siaya + So. Nyanza	1,877	814
C	Busia	4,030	1,275
D	Kisumu	1,921	681
E	Kakamega	4,759	2,013
F	Bungoma	5,335	1,526

1/ Total benefit of IADP to domestic budget after meeting all farm costs (per annum).

2/ Farmer's additional income resulting from IADP

Table 11

INTEGRATED AGRICULTURAL DEVELOPMENT

FARM BUDGET EXAMPLES FOR PARTICIPATING FARMERS

Hectares

Model	A		B		C		D		E		F	
Area ha Total	2.0		2.5		6.0		2.0		4.0		6.0	
Cropping pattern 4/	I	II	I	II	I	II	I	II	I	II	I	II
Maize	0.35	0.35	0.50	0.56	1.00	1.15	0.40	0.40	1.50	1.62	1.42	1.61
Sorghum/Millet			0.25	0.25	0.50	0.50	0.10	0.10	0.20	0.10		
Beans (Cash crop)	0.16	0.16			0.25	0.30	0.15	0.15	0.25	0.25	0.20	0.20
Cotton			0.26	0.26								
Pyrethrum	0.05	0.05										
Sunflower									0.10	0.20		
Passion fruit	0.15	0.18										
Groundnuts							0.15	0.20	0.25	0.30		
Coffee											0.15	0.15
Bananas fruits	0.15	0.15			0.05	0.05	0.05	0.05			0.05	0.05
Cassava					0.25	0.25						
Vegetable	0.04	0.04	0.03	0.03	0.05	0.05	0.05	0.05			0.05	0.05
Total crop area	0.90	0.93	1.04	1.10	2.10	2.30	0.90	0.95	2.30	2.47	1.87	2.06
Total area cultivated 5/	0.74	0.77	0.63	0.66	1.50	1.65	0.50	0.53	2.00	2.14	1.56	1.76
Cropping percentage	120	120	165	165	140	140	180	180	115	115	120	120
Other farm land	1.26	1.23	1.87	1.84	4.50	4.35	1.50	1.47	2.00	1.85	4.44	4.28

INTEGRATED AGRICULTURAL DEVELOPMENT PROGRAMME

FARM BUDGET EXAMPLES FOR PARTICIPATING FARMERS.

KSH.

Model	A		B		C		D		E		F	
Area ha total	2.0		2.5		6.0		2.0		4.0		6.0	
Cropping pattern	I	II	I	II	I	II	I	II	I	II	I	II
Gross margin of Farm 1/												
Maize	246	571	352	913	703	1875	281	652	1055	2641	998	2624
Sorgum/Millet			80	80	160	160	32	32	64	32		
Beans	166	283			259	530	155	265	259	442	207	353
Cotton			61	373								
Pyrethrum	78	78										
Sunflower									53	215		
Passion fruit	7	528										
Groundnuts							152	402	253	604		
Cassava				263	263							
Coffee											120	120
Bananas fruit	180	180			60	60	60	60			60	60
Vegetables (subs)	140	140	60	60	80	80	150	150	80	80	60	60
Sub-total crops	817	1780	553	1426	1525	2968	830	1561	1764	4014	1445	3212
Livestock 2/ gross Margin	756	738	598	589	1440	1392	480	470	1200	1110	2664	2568
Farm gross Margin	1573	2518	1151	2015	2965	4360	1310	2031	2964	5124	4109	5785
Minus Overhead 3/	100	150	88	138	210	330	70	110	200	220	300	450
Net Cash income	1473	2368	1063	1877	2755	4030	1240	1921	2764	4904	3809	5335
Change of income	10	895		814		1275		411		2013		1546

Footnotes to Tables 11 and 12

1/ gross Margins for crops not included: Sorghum Shs. 320/- pyrethrum Shs. 1565/- Sunflower 350/-, Bananas 1200/- Vegetable Shs. 350/- per ha.

2/ Farms A, E, F Shs. 600/- G.M/ha, for B, C, D Shs. 320/- G.M/ha. assuming that all other land is used by livestock or is fallow.

3/ Farms A, E, F, = Shs. 50/- (I) and 75/-
(II) for B, C, D Shs. 35/-
(I) and 55 (II) per ha.

4/ I - without project - II with project
Increase in yield partly due to the change in cropping pattern and due to increased yield as a result of higher inputs. Increase of 10% in cropping area assumed on longer holdings.

5/ Total area cultivated is smaller than total crop area because of double or triple cropping.

SOURCE: MOA. IADP Loan Application

ANNEX 14, Tables 14.7 and 14.8

B. Economic Analysis: Gravelling, Bridging and Culverting Component

1. Overview

An analysis of the economic costs and benefits associated with the improvement of 2,000 kilometers of rural and secondary roads indicates that the Project component can realize an internal rate of return of 11.9 percent and a cost/benefit ratio of 1.04 with a 10 percent social rate of discount. The summary of component costs and benefits is presented in Table 13 with supporting data presented in sections 2, 3, and 4 of this analysis.

This analysis focuses on the economic costs and benefits associated with the introduction of one gravelling unit into the Project area. The total Project area requires the operation of two gravelling units in order to upgrade the approximately 4,000 kilometers of D and E roads for which upgrading to an all-weather standard is both technically and economically justified. Table 15 indicates that there are a total of 6,151 kilometers of D and E roads in Western and Nyanza Provinces. Of this total, approximately 1,200 have already been gravelled leaving a total of 4,951 kilometers of earthen surfaced D and E roads in the target provinces. In addition to a technical analysis, an economic traffic threshold analysis was undertaken on the subject roads and concluded, based on traffic flows, location of development projects, rights-of-way, soil structures and costs of various road improvement technologies, that 3,924 kilometers of road were both technically and economically eligible for the GBC road improvement program.[1/] One GBC unit has a lifetime output capacity of approximately 2,000 kilometers of improved road, when 75 percent of the improvements are performed on a spot basis. The Roads Gravelling Project (615-0170) provides financing for one GBC unit in western Kenya. In order to complete the road improvement task in western Kenya and to insure the successful use of the rural access roads, whose construction this Project will finance, it is necessary to provide financing for a second GBC unit. Failure to do so seriously jeopardizes the benefits expected to be derived from the RAR component and the first GBC unit financed under the Roads Gravelling Project.

2. Component Benefits

a. Direct Road User Benefits

These benefits are the user cost savings which accrue to the vehicle operators or owners whose vehicles use the road. These benefits

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1/ LBII. Consultant's Report. 1976.

have been estimated by the MOW in terms of standard road types based on an updating of a table in the Scandia-consult report.[1] The estimated average savings per vehicle are shown in Tables 17 and 18 below for each improvement type.[2]

Present road surfaces range from very poor to good on D and E roads in the Project area. For the purpose of this analysis, an average intermediate state of G1 was chosen as the base condition on good soils and G0 for poor soils. Future surface condition is assumed to be maintained at a G3 level (good) for gravelled roads and at G2 for those earth sections of a well-maintained link with spot improvements. Sealed portions of a gravel road are calculated at bitumen standard (although higher costs due to mountainous terrain are accounted for).

1/ SIDA, Improvement of Roads in Kenya - Technical Economic and Financial Evaluation (April 1974).

2/ Operator savings for bicycles and carts have not been calculated due to insufficient data. These savings are, however, important in the overall evaluation of the GDC component's economic and social feasibility.

Table 13

Summary: Economic Cost/Benefit Analysis of GBC Component

(K.Shs '000)

Fiscal Year	Component Benefits 1/	Component Costs 2/
1978	-0-	1,244
1979	579	15,259
1980	2,525	21,226
1981	4,921	22,115
1982	8,181	22,849
1983	11,435	23,688
1984	14,745	9,109
1985	16,151	8,704
1986	17,544	10,114
1987	18,902	10,322
1988	20,260	10,114
1989	21,728	10,223
1990	23,313	4,937
1991	25,025	8,704
1992	26,878	10,114
1993	28,873	10,322
1994	31,029	10,114
1995	33,359	10,223
1996	35,875	4,937
1997	38,592	8,704

	Discounted at 10%	Discounted at 20%
Present Value of Component Benefits	116,582	43,072
Present Value of Component Costs	111,854	65,881
Benefits/Costs	1.04	N/A
Present Value of Net Benefits	4,728	-22,809

Internal Rate of Return, over 20 years: 11.5 per cent.

1/ Table 22

2/ Construction and Recurrent Costs, Table 23 and Table 24

b. Indirect Benefits to Road Users

Indirect benefits to road users will come about through greater use of the access gained by road improvement. More trips will be made at a lower cost per trip by the inhabitants of the Project area, if user cost savings are passed on to passengers and farmers who ship produce. The evidence indicates that some part of the user cost savings will be passed on and that a higher frequency of "matatu" service on these roads will develop (a higher frequency of service on SRDP roads was noted in the field).

The origin-destination surveys proposed in the evaluation section and related data collection on transport price changes are the only way to obtain an estimate of these benefits. These benefits have been lumped with the estimate of benefits to non-road users described below. (See incidence of benefits for more discussion of this point.)

c. Indirect Benefits to Non-Road Users

There are many benefits in this category that are not quantifiable in the present state of the economic art. These include social impacts and political and administration benefits to the Project area residents and their government. There are also benefits to the USAID credit program under ASL I, Part C.

For the purpose of this analysis it was possible to estimate the additional agricultural benefit to the Project area on an area-wide basis, in relation to the Rural Access Road component and the Integrated Agricultural Development Program. The logic of this analysis is that the GBC component will provide the necessary all-weather connection to RAR component roads on the D & E roads to be improved which are presently non-all-weather.

In concert with the RAR component, the GBC component will provide an all-weather road network into presently isolated rural areas to facilitate the transfer of technology, the delivery of inputs and the marketing of agricultural production. The principal, but by no means only, development activity in the Project area is the Integrated Agricultural Development Project (IADP). The road network will complement the IADP by facilitating the delivery of IADP services to the farmers. It will similarly impact upon Part C, ASL I. The GBC complementarity factor has been estimated at 5 percent of the IADP benefits (IADP benefits increase 5 percent because of the GBC). Given an interlocking road network which connects rural roads constructed and rehabilitated under this Project to existing rural, secondary and primary roads, the distribution of aggregate incremental output is at best somewhat arbitrary.

3. Cost of Alternative Improvements

a. Alternatives

The cost of four alternative improvements are estimated in relation to the cost of the MOW standard improvement. The four alternatives are:

i. MOW standard (5.5 m. gravel surface with 1.2 m. shoulders and good drainage).

ii. A 3.5 m gravelled surface with the same drainage as above.

iii. Spot improvements averaging 20 percent of the length, based on two low sections with two culverts per km. and 100 m. of earth work and gravel with each.

iv. MOW standard with a bituminous seal on high grades (8 percent or more) in intensive rainfall areas.

The costs for each are shown in Table 14 below along with the key assumptions.

Table 14

Estimated Construction Costs by Alternative Improvement Technology

	MOW Standard	3.5 m. Gravel	Spot Improvement	MOW Standard With Sealed Grades
Derivation	1. MOW estimates of GBC program costs	1. 30% of gravel haul cost is saved or 12.5% of total costs	1. 20% of length improved 2. Unit costs 150% higher	1. 20% of length sealed 2. 10% higher unit costs due to terrain 3. 100% additional costs on sealed areas.
Cost/Km.[1/]	$7,700/Km.*	$7,100/Km.	$3,900/Km.	$10,200/Km.

* In poor soils such as black cotton soils this cost may be doubled due to addition of costs of excavation of the existing soil.

1/ These costs represent construction technologies presently in use in Kenya.

These costs are used in the following economic analysis except for the 3.5 m. gravel alternative. This alternative is only 8 percent cheaper than MOW standard and incurs other costs due to higher maintenance and accidents which offset this savings. Therefore, this alternative is eliminated on cost-effectiveness grounds.

b. Traffic Threshold Analysis

In order to estimate the traffic ranges where each alternative improvement technology would be economically feasible, a traffic threshold analysis was carried out.[1/] This calculation determined the traffic level in the opening year which would provide exactly enough user cost savings to equal construction maintenance and regravelling costs when discounted at a rate of 10 percent. The results are shown below:

i. MOW standard on good soils - 76 ADT

ii. Spot improvements on good soils - 43 ADT

iii. MOW standard with sealed grades - 61 ADT

iv. MOW standard on poor soils - 97 ADT

From these thresholds it can be seen that spot improvements can be justified with traffic levels near 40 ADT but that MOW standard requires around 70 ADT on good soils and 100 ADT on poor soils.

The implication of this analysis is that the GBC program should have stage-construction, by spot improvements on roads averaging 40 ADT, and that MOW standard can be applied to roads with 70 ADT or more. Roads with spot improvements can then be upgraded to MOW standard at some future point in time if traffic levels warrant. MOW standard improvements in poor soils (such as black cotton soils) areas require much more justification in terms of economic benefits than those in good soils.

These results are used to estimate the total kilometrage of each improvement level and the number of GBC units required as detailed in Tables 15 and 16.

1/ LBII. Consultants Report. 1976. Portions reproduced in Kenya - Roads Gravelling Project Paper, AID-DLC/P-2122, Annex IV.

4. Benefit-Cost Analysis

TABLE 15

Total Road Length Eligible for GBC Program
Western and Nyanza Provinces

1978-79 Traffic Range (ADT)	1973/1974 Traffic Range (ADT)	Total D & E Kms.	Kilometers already gravelled	Earth D & E Roads	GBC Category A 1/	B 2/	C 3/	Total Km Eligible for GBC
Over 180	Over 125	317	317	0	0	0	0	0
75-180	50-125	1096	783	313	125	188	0	313
20-75	10-50	2961	100	2861	600	2111	150	2861
0-20	0-10	1777	-	1777	0	750 4/	0	750
	Total	6151	1200	4951	725	3049	150	3924

1/ Non all-weather roads with a traffic level greater than 20 ADT in 1978 (assumed to be the same or greater than 10 ADT in 1973/74) on good soils.

2/ Non all-weather roads with traffic less than 20 ADT in 1978 but associated with a development project such as a rural access road, or all-weather roads in bad condition with traffic greater than 20 ADT in 1978.

3/ Roads on black cotton soils with a traffic level greater than 20 ADT in 1978 and associated with a development project such as a rural access road.

4/ Assuming half the lowest traffic, non all-weather links will be associated with a development project or will generate 20 ADT for other reasons within the 5 year project period.

Table 16

Kilometers of Improved Road by Type of Improvement Per Unit

Fiscal Year	MOW Standard	Spot	MOW-Sealed Grades	MOW Poor Soil	Total
1979	58	117	29	0	204
1980	20	400	30	0	450
1981	150	200	0	0	350
1982	50	400	0	0	450
1983	50	300	0	50	400
1984	42	83	21	0	146
TOTAL	370	1500	80	50	2000

Tables 17 and 18 detail anticipated VOC savings over given road conditions and for given types of motor vehicles. Scandia-Consult and the Ministry of Works have undertaken VOC savings estimates on sample D and E roads which are typical of those to be included in the GBC program. Drawing on their analysis (reproduced in Tables 19 and 20), it is possible to estimate potential VOC savings which are attributable to the GBC. These savings are detailed in Table 22.

Table 17

Vehicle Operating Costs for Differing Road Grades (Shs/Km)

Road Grade	Car	Light Vehicle	Medium Vehicle	Heavy Vehicle	Bus
GO	1.00	1.04	2.23	4.01	2.40
G1	0.90	0.96	2.02	3.65	2.19
G2	0.80	0.86	1.80	3.30	1.98
G3	0.71	0.78	1.61	2.95	1.78
G4	0.63	0.66	1.39	2.63	1.56
Bitumen I	0.56	0.59	1.26	2.43	1.42
Bitumen II	0.50	0.52	1.13	2.25	1.28

Source: Ministry of Works

Table 18

Weighted Average Use Cost Savings Per Vehicle

Improvement	Savings per vehicle per km.	
	K. Shs.	$U.S.
a) MOW standard (G1 to G3)	.250	.0298
b) Spot Improvement (G1 to G2-G3)	.189	.0225
c) Sealed Grades (G1 to G3 in mountainous terrain + 20% bituminized)	.405	.0482
d) MOW standard on poor soils (G0 to G3)	.354	.0421

SOURCE: LBII. Consultant's Report 1976.

Table 19

BENEFITS FOR A CLASS E-ROAD

BENEFITS IN (KShs '000)

Savings in VOC

Year	Improved constr. techniques	Unimproved constr. techniques.1/
1	104	104
2	112	56
3	126	-
4	146	-
5	160	-
6	174	-
7	190	-
8	202	202
9	228	114
10	260	-
11	286	-
12	312	-
13	346	346
14	382	190
15	418	-
16	460	-
17	490	-
18	556	556
19	604	302

1/ It is assumed that the savings in VOC will be maximum in the first year after gravelling but decline as follows:

1st year 100%
2nd year 50%
3rd year - (until next gravelling)

NB:

SOURCE: Scandia - Consult.

Improvement of Roadsin Kenya

Appendix 6 and 7

Table 20

BENEFITS FOR A MODEL CLASS D-ROAD 20 KMS

BENEFITS IN (KShs '000)

Savings in VOC

Year	Improved constr. techniques	Unimproved constr. techniques 1/
1	98	98
2	106	52
3	120	-
4	136	-
5	144	-
6	160	-
7	176	-
8	196	196
9	214	108
10	234	-
11	266	-
12	290	-
13	320	320
14	352	176
15	388	-
16	426	-
17	462	-
18	518	462
19	556	258

1/ It is assumed, that the savings in VOC will be maximum in the first year after gravelling but decline as follows:

1st year 100%
2nd year 50%
3rd year - (until next gravelling)

SOURCE: Ibid

Table 21

IADP Complementarity Benefits - GBC Component

(K Shs '000)

	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86	FY 87/Other years
GBC Generated Agricultural Benefits: 7 Districts 1/	112	427	995	1767	2515	3166	3621	3815
Benefits Attributable to One GBC Unit 2/	56	213	496	884	1258	1583	1810	1908

1/ Represents GBC component complementarity with IADP-type development efforts. GBC generated agricultural benefits represent 5% of total IADP benefits in the 7 GBC districts of western Kenya. The actual computation of benefits relies on estimates of induced agricultural output anticipated from the RAR component (which also serves to complement the IADP).

2/ Note that since two GBC units are proposed for operation in these 7 districts, the benefits attributed to one unit is one-half the total GBC complementarity benefit.

Table 22

BENEFITS FOR THE GBC Component

(K Shs '000)

USER COST SAVINGS 1/

FISCAL YEAR	MOW 2/ STANDARD	SPOT 3/ IMPROVEMENT	SEALED 2/ GRADES	POOR 2/ SOILS	TOTAL SAVINGS	IADP COMPLEMENT BENEFITS 4/	TOTAL BENEFITS
1979	256	178	145	-0-	579		579
1980	982	822	665	-0-	2469	56	2525
1981	1257	2254	1197	-0-	4708	213	4921
1982	2529	3563	1293	-0-	7685	496	8181
1983	3557	5492	1396	106	10551	884	11435
1984	4321	7171	1506	489	13487	1258	14745
1985	*	*	*	*	14568	1583	16151
1986					15734	1810	17544
1987					16994	1908	18902
1988					18352	1908	20260
1989					19820	1908	21728
1990					21405	1908	23313
1991					23117	1908	25025
1992					24970	1908	26878
1993					26965	1908	28873
1994					29121	1908	31029
1995					31451	1908	33359
1996					33967	1908	35875
1997					36684	1908	38592
1998					39621	1908	41529

* ALL VOC savings assumed to grow 8% p.a. after 1984. Only total is shown

1/ See tables 17, 18. Computed with construction targets detailed in Table 16.

2/ Average traffic of 90 A.D.T.

3/ Average traffic of 50 A.D.T.

4/ Table 21

Table 23

Summary of Construction Costs: GBC Unit

(K Shs '000)

Item	FY1978	FY1979	FY1980	FY1981	FY1982	FY1983	FY1984	Total
1. Capital Equipment 1/	-	8,988	14,264	14,264	14,264	14,264	4,943	70,987
2. Construction Expenses 2/	830	6,748	7,553	7,561	7,570	7,570	772	38,595
3. Technical Assistance 3/	548	1,162	1,220	1,162	1,170	1,054	108	6,424
4. Total Financial Cost	1,378	16,898	23,037	22,987	22,995	22,888	5,823	116,006
5. Total Economic Costs 4/	1,244	15,259	20,802	20,757	20,764	20,668	5,258	104,752

1/ Includes AID-Loan financed project inputs. Construction equipment is costed over its expected construction life time to reflect the real social cost (opportunity cost) of the equipment. See Financial Analysis Section III.C.

2/ Includes the GOK contribution of POL, labor, maintenance on equipment, construction materials.

3/ Includes AID-Grant financed technicians.

The Maintenance engineer is not included as a GBC cost since his work will encompass all GOK road maintenance operations. The evaluation is excluded from this economic analysis since it is not germane to the achievement of project outputs but is rather a donor-imposed (and financed) output which will examine a wide array of technical, social, and economic considerations relating to rural road systems.

4/ To reflect the shadow price of foreign exchange, and unskilled labor. Mean factor of adjustment is .903 of financial costs.

Table 24

Summary of Recurrent Costs: GBC Component (K.Shs '000)

Fiscal Year	Routine Maintenance 1/	Regravelling 2/	Total
1979	-	-	-
1980	424	-	424
1981	1,358	-	1,358
1982	2,085	-	2,085
1983	3,020	-	3,020
1984	3,851	-	3,851
1985	3,730	4,974	8,704
1986	3,219	6,895	10,114
1987	3,427	6,895	10,322
1988	3,219	6,895	10,114
1989	3,323	6,900	10,223
1990	3,851	1,806	4,937
1991	3,730	4,974	8,704
1992	3,219	6,895	10,114
1993	3,427	6,895	10,223
1994	3,219	6,895	10,114
1995	3,323	6,900	10,223
1996	3,851	1,806	4,937
1997	3,730	4,974	8,704
1998	3,219	6,895	10,114

1/ At $270/km of constructed road, (K.Shs 2,300/Km.). Economic cost of maintenance is K.Shs. 2,077/Km.

2/ Major regravelling work, at 35 percent of original construction/ improvement cost, estimated to be required after five years of road traffic.

5. Labor vs. Capital-Intensive Methods

An alternative improvement technique using labor-intensive methods has been evaluated and appears to be economically unfeasible due to higher costs and longer time periods needed to complete construction, thereby postponing the stream of benefits to a time when their discounted value would not cover the increased costs. Using a break-even criterion, substantially fewer road links would be eligible for improvement using a labor-intensive approach to construction.1/

Certain operations (e.g., brush clearing, ditching, gravel sorting and spreading) can be done by hand labor as well as by machines. The GBC component will employ labor-intensive methods wherever feasible for such tasks, since the MOW is abundantly supplied with labor in comparison to its equipment constraints. However, the MOW has also demonstrated a willingness to hire local day laborers when this decision is justified on a cost basis (i.e., the cost of local labor is less than the cost of transporting permanent employees from a base camp to the construction site). The MOW has shown considerable sophistication in evaluating such situations on the ground, and the responsibility for day-to-day decision making concerning the use of local labor and labor-intensive methods should remain with them.

The Scandia-Consult report analyzes the operations in the road gravelling program for additional labor that might be employed. A number of operations such as: bush clearing for roads and quarries; tree, stump and boulder removal; culverts and drainage construction; and bridge construction, might be done by labor-intensive methods, while other tasks such as compaction of roadbeds and gravel can only be effectively done by machine.. The report concludes that at a labor price of K.Shs. 5/day, these operations will cost more if done by hand. 2/

However, the report also notes that shadow pricing might make some of the operations economically feasible. But because there is no agreement within the Ministry of Finance and Planning on how to deal with shadow pricing, because it is highly probable that labor will not be available at less than K.Shs. 5/day and because there is a lack of foremen to handle additional laborers, it was concluded that additional labor-intensive operations are not feasible. The report also recognizes that time pressure (to finish the program in less than 15 years) favors capital-intensive methods.

1/ See above, 3.b. Threshold Analysis.

2/ The minimum wage level is now KShs 6/75 per day, further raising labor construction costs.

Increase in Total Cost When Using Labor-Intensive Methods

	Operation	Increase in Total Cost
1.	Preliminary shaping	10-20%
2.	Removal of top soil on quarry	1- 2%
3.	Digging out gravel	10%
4.	Loading gravel	30-40%
5.	Spreading of gravel	10%

While labor-intensive construction techniques are appropriate to the RAR component and supported by a pilot effort in western Kenya, the improvement of secondary and minor roads, over which between 40 and 90 vehicles are expected to pass everyday, is quite another engineering matter.[1/] Given the task of upgrading some 2,000 kilometers of D and E roads over a five-year period, there are very severe technical limits placed on the labor/capital trade-off. For example, upgrading D and E roads requires the placement of gravel on poor sections of road. Gravel is often not to be found in the immediate vicinity of the road under repair and must, therefore, be hauled, at the minimum, several kilometers to the work site. Such operations do not lend themselves to labor-intensive techniques.

An analysis of the GBC component costs indicates that the use of such terms as labor and capital-intensive can be misleading. The GBC component will cost $15,060,000, of which $1,663,000 is for technical assistance[2/] An additional $4,336,000 is required for construction materials, headquarters camps, bridging, and the like. These costs will be incurred regardless of the construction technique used, leaving $9,064,000 (60 percent) out of the total GBC component costs. Furthermore, the gravelling operation mandates the use of trucks. If the cost of trucks, their spares, POL, and escalation factors are removed from the total cost, $5,415,000 (36 percent) of total GBC component costs are subject to a trade-off. Of the remaining total, $1,200,000 (or 22 percent) is already allocated for labor leaving $4,215,000 for various equipment, spares, contingencies and POL.

1/ David and Hopcraft. Labor Intensive Road Construction Under SRDP. IDS. May 1975.

2/ AID plus GOK GBC component contributions total $15 million

An examination of the equipment listed in Section III-C-8 indicates several items on which the capital/labor issue could focus: the graders ($151,000), dozers ($250,000) and rollers ($126,000), plus their POL, spares, and contingency factors. This analysis helps put the labor/capital-intensive technologies question into proper perspective, indicating that even with just a simple analysis of Project requirements and input costs only 28 percent of total costs form the basis of a discussion on appropriate technologies.

After careful technical and economic analysis of the Project site, the work proposed, and the relevant costs, the LBII consultants recommended the road improvement technology presented in this Project Paper.

C. Benefit Incidence Analysis

1. Overview

The Rural Access Roads component and the Gravelling, Bridging and Culverting component will generate three quantifiable benefits: (1) incremental agricultural output; (2) road construction employment; and (3) reduced vehicle operating costs. These benefits are discussed fully elsewhere in this analysis. The benefit incidence analysis seeks to provide a link between identified benefits and the beneficiaries. Furthermore, the analysis incorporates some of the social considerations raised in the Social Feasibility Analysis. For ease of analysis the benefit incidence of the two Project components has been separately calculated.

2. Rural Access Roads Component

The principal component benefits are incremental agricultural output and road construction employment.[1/] Secondary economic benefits will be provided to farmers now renting animals or paying persons to carry goods to market which will be less expensive by bicycle or matatu after the road is built. For farmers carrying their own goods to market, there will be a possible savings in time and effort when using the road which would be available for another economic productive activity. Also transporters and traders will react to further opportunities with the existence of the access road. All-weather roads may also lessen real or imagined obstacles to government services personnel visiting remote sites. All these secondary benefits are considered negligible by comparison to induced agricultural production for the purpose of this analysis.[2/]

1/ Note that certain primary and secondary benefits are common to both components.

2/ This assumption is supported by the low traffic levels recorded on Vihiga SRDP roads, except in one case where an unusual opportunity existed to provide sand for construction activity.

a. Induced Agricultural Production

The induced agricultural production benefits are aimed principally at the farmers with holdings of between 2 and 6 hectares (1 hectare = 2.47 acres) depending on the district. The principal target group is not solely the subsistence farmer. The target group is also the small farmer who is presently growing some cash crops and has shown himself willing and able to respond to inducements to increase his productivity.

Table 25

Relative Farm Size and the IADP Target Farm

District	IADP Target Farm Size 1/	Average Farm Size ha. "Large" Small Farms	Subsistence Farm
Bungoma	6.0 ha.	11.1	2.1
Busia	6.0 ha.	9.4	3.1
Kakamega	4.0 ha.	9.9	2.8
Siaya	2.5 ha.	4.7	2.0
Kisumu	2.0 ha.	5.7	3.0
Kisii	2.0 ha.	4.1	1.9

1/ From IADP Phase I Loan Application, May 1975. Annex 14, Table 14:7 and 14:8.

One of the most critical questions regarding the incidence of benefits derived from the roads is whether--or in what ways--the very poor farmers will suffer or benefit. The poor farmer in a rapidly monetizing farm economy is in a particularly vulnerable position vis-a-vis farmers who are more sophisticated in their understanding of the competitive cash economy. It is now well established that the "trickle down" effect by which the laggard farmer moves along the same development track, but more slowly than his progressive neighbor, is by no means automatic. Research in the Nyeri SRDP (Ashcroft,et al, 1973), for example, addressed this question some five years ago in Kenya. The process by which poorer farmers in the access road areas realize the objective of becoming increasingly involved in the cash economy must be carefully monitored. It is assumed by the Project that opening up rural areas will bring benefits for large and small farmers. In some instances, preliminary data from the SPSCP operating in the RAR target districts bears this out. One of the key goals of the AID ASL I, Part C is to establish a number of new buying centers for the purchase of farmer produce in rural areas. The SPSCP is operating in 4 of the 6 districts in which access roads will be constructed. In a recent memographed communication from SPSCP/ Cooperative support staff in western Kenya, observations were made which support the view that there will be a large increase in the volume of produce marketed even in the first year. Unions have recently established markets for buying produce in remote areas, enabling farmers to have a local market which will motivate crop production in these areas. Collectively the ten unions participating in ASL-I, Part C opened a total of 116 produce buying stores in August 1976 (PCV Report: 1976). Five of the ten unions are located in Kakamega, Busia, Kisumu, and Siaya Districts. The report continues:

> "Overall, it is believed that the 116 produce buying stores opened up by coop unions participating in SPSCP is causing great excitement among farmers, union officials, and government offices. With 21 stores operating at Siaya District Union, the District Agricultural Officer and Crops Officer of Siaya District have stated that they were very encouraged with the union's initiative to establish marketing facilities throughout the district. And in their opinion nothing has ever happened in Siaya to motivate the farmer to grow crops more than opening the coop produce buying stores. In the past the farmer grew only enough for subsistence due to low market prices or no market at all. Now this has changed since coops are going into areas where they can afford to buy produce where other buyers would not enter because profit margins are too small. Having these coop buying centers so close to the farmers, they are excited about growing more crops next year."

In short, there has been a rapid response to the "opening up" of rural areas to buying centers which pay cash and provide transport for local produce, particularly maize.

b. Employment

The 8 units and 24 unit years proposed in this Project Paper are projected to provide short-term jobs for 6,210 man years. These jobs are offered at the Government required minimum wage scale (K.Shs. 6/75 per day) on a task basis, and they are evidently very attractive to local laborers (100-200 appear for 60-70 jobs in all areas including Vihiga and Migori in western Kenya), and are clearly answering a need for employment in the Project areas.

There is a possibility that these employment opportunities are attracting good workers from agricultural work, which has substantial labor needs during land clearing and harvesting, due to the higher wages paid (250 percent of the average casual labor wage for agriculture in the area). This effect is not very pronounced, however, due to the short time period of construction on any given RAR job (less than three months, usually).

There are also some training effects on local participants who will have developed some skills as a result of their work. This will have a carry-over into RAR maintenance. Maintenance of rural roads on a labor-intensive basis, as proposed in the technical section, will generate the equivalent of one full time laborer for each three kilometers of road.

There are also long term benefits in employment due to the increase in agricultural production in the zone of influence of the road. These are significant, but have not been quantified here.

c. Access Benefits

It is unlikely that transport competition on the more remote access roads will be as stiff as on the larger road arteries. In the areas, for example, where a teacher, government official or shop owner owns the single locally-garaged vehicle, night emergency trips to the hospital may well be the monopoly of the one car owner--the alternative being an overland stretcher trip to the nearest market or transport nexus. On most of the access roads, however, the two main factors determining fares will be distance and quality of road. Improved access roads, in such a situation, would lead to lower transport prices.

On balance, the overall effect of a single car owner in the community is likely to be positive. The owner will find it extremely

difficult, for example, to refuse to provide transport for emergency trips to maternity or outpatient clinics. In a small study of rural families' reasons for wanting improved access roads in Vihiga, Kakamega, hospital trips was a frequent response (Odulla, 1976). In Nyeri District it was found that: "Again the main emphasis on the benefits of the road by the local people were the transport of crops by hired vehicle rather than by head-load and the moving of sick people"(Morris, 1976).

In addition, it is arguable that access to "modern" medical facilities in time of emergencies increases community confidence in the hospital's efficiency. This should have an important positive impact on acceptance of preventive health and family planning practices promoted by those same medical facilities.

d. Incidence of Increased Output

i. Number of Beneficiaries

It is estimated that the RAR component will directly impact on some 130,500 residents of the rural access roads' zones of influence. By the very nature of road selection these people are among the isolated poorer rural farmers. These directly affected farm families represent approximately 4 percent of the total population in the six program districts or roughly one-third to one-quarter of those district residents now living more than five kilometers from an all-weather road, thereby indicating the high impact of this program on the isolated rural population.

Estimating numbers of beneficiaries is further complicated by the secondary beneficiaries; those farmers not living along the access roads constructed in this program but who are added to an efficient all-weather network due to the new roads. There are no reliable studies available which provide solid evidence as to how large this "secondary" beneficiary group might be. Rough estimates suggest orders of magnitude between two and five times the primary beneficiaries. The fundamental point, however, is to recognize the existence of this potentially large but as yet unquantified secondary beneficiary population.

ii. Magnitude of Benefits

Table 26 details a best estimate of Project generated incremental farm income, ranging from 77/ to 157/per capita (US $9-19) and representing increases of between 21 percent and 91 percent over pre-Project farm income.

iii. Incidence

The MOW is undertaking a surprisingly sophisticated economic analysis of each set of proposed access roads under the IBRD funded road construction program. Combining these studies with the District Development Committees' assessment of road requirements provides a reasonably sound system for the equitable solution of road alignments. The initial beneficiaries of the increased agricultural output are the small to medium sized isolated rural farmers who populate the zone of influence. Note that a medium sized farm averages 3.75 hectares against a small subsistence farm of 2.50 hectares, not exactly an enormous gap in wealth.

The social analysis has raised the issue of land sale and "roadside" elite. Given a wide diversity of attitudes toward land ownership any generalization on land sale is inapplicable to over half the Project area. This issue will require the attention of Project monitors, DDC, and the Land Control Boards.

Table 26

RURAL ACCESS ROADS COMPONENT

Benefit Incidence: Aggregates

District	Present Farm Income in Zones of Influence1/	Incremental Incomes in Zones of Influence2/		Population in Zones of Influence3/	Present Per Capita Farm Income4/	Incremental Farm Income Per Capita5/	
	(K.Shs.'000)	(K.Shs.'000)	% Increase		(K.Shs.)	(K.Shs.)	% Increase
Bungoma	13,260	3,063	23	17,900	741	157	21
Busia	7,672	1,841	24	14,300	537	118	22
Kakamega	13,446	3,819	28	32,100	419	109	26
Siaya	3,525	1,749	50	18,500	191	87	46
Kisumu	1,200	1,185	99	13,900	86	78	91
Kisii	12,000	2,839	24	33,800	355	77	22

1/ For all RAR roads in district.
Based on percent of land farmed, average farm income per hectare, and kms. of rural roads to be constructed.

2/ At full production in FY 1986. See District Analysis, Tables 7a-7f. Financial and not economic benefits have been used to reflect recipient's cash and kind income.

3/ Estimated 1975 population based on district densities and estimated population densities in zones of influence. Based on MOW evaluation in Kirinyaga District.

4/ K.Shs. (Col. 1/Col.4). Note that only farm income is represented in these figures and that all-off farm income is excluded.

5/ K.Shs.population levels adjusted by compounding 3 percent of population growth over 5 years. (Col. 2/Col.4).

3. Gravelling, Bridging and Culverting Component

a. Estimation of Incidence

An analysis of the immediate and ultimate benefit incidence of the GBC component requires a set of microeconomic assumptions in order to estimate benefit incidence. While the Scandi-Consult study, MOW reports, and other research in western Kenya provide some microeconomic data, this data can only serve as an indicator of most likely microeconomic relationships. The following analysis is a best estimate of GBC benefit incidence.

The direct economic benefits of the GBC component will be first received by vehicle owners in the form of lower operating costs for trips that would be made whether or not there is an improvement. The vehicles using the road are primarily (49 percent) matatus, "pick-ups" or buses; a significant number of cars or jeeps (31 percent); and some trucks (20 percent).

The cars or jeeps are owned mostly by relatively wealthy farmers or persons with high off-farm incomes, some traders and a number of government agents working in rural areas. Cars or jeeps will receive approximately 25 percent of the total savings.

The matatus, buses and pick-ups are mostly owned by transporters and are primarily used for public transport, by low and middle income farmers, lower income traders, and some representatives of cooperatives. To the extent that vehicles owned by cooperatives or traders make up this traffic, all the benefits go to the coop farmers or traders. (This is a very low proportion of vehicles, however.) The matatus owners are transporters, usually driver-owners who participate in a very competitive industry (as mentioned in the Scandia-Consult report). Therefore, some of the cost savings are likely to be passed on to the passengers. These vehicles will receive 40 percent of the savings.

The trucks on Project roads are owned by transporters and traders, and are used primarily to transport agricultural produce and consumer goods for stores; some trucks are rented by traders, cooperatives and more progressive smallholders. To the extent that these rental rates are competitive, much of the savings will be passed on. Trucks will receive 35 percent of the savings.

The exact proportion of vehicle ownership is not known but it is possible to estimate roughly the proportions as indicated above for the purposes of this Project Paper. The part of benefits passed on is

assumed to be 60 percent in this relatively competitive industry.[1/]

The indirect benefits in terms of increased agricultural output will accrue principally to the farmer. Since there are only 1 percent large farmers in the area, they are estimated to receive only 5 percent of these indirect benefits. Another estimated 10 percent will go to traders and transporters, and 20 percent to cooperatives in the Project area. Cooperatives, however, are overwhelmingly composed of smallholders who will receive a share of the benefits received by the cooperatives.

Table 27 contains a summary of the estimates described above. These preliminary estimates should be further verified and refined as part of the evaluation program described in Section IV.

1/ The speed of this passing on of savings is a pertinent concern. The mechanism is usually a slower rise of transport prices, rather than an outright reduction. Therefore, the rate of passing on depends on the inflation rate. The probable period in this case is 2-3 years.

Table 27

Estimated Distribution of Benefits from the GBC Components

	Recipient Group					
	Transporters	Traders	Government	Cooperatives	Larger Farmer	Smallholder
Direct Benefits						
a) Initial Savings-VDC						
Cars %group	-	30%	50%	15%	5%	-
(25%) %total	-	7.5%	12.5%	3.8%	1.2%	-
Pickups %group	75%	10%	-	10%	5%	-
(40%) %total	30%	4%	-	4%	5%	-
Trucks %group	85%	15%	-	-	-	-
(35%) %total	30%	5%	-	-	-	-
Total initial %	60%	16.5%	12.5%	7.8%	3.2%	-
Ratio passed on	.6	.6	0	0	0	-
Total passed on	-36%	-9.9%	-	-	-	-
Total received from traders	-	-	-	-	+3.3%	+6.6%
Total received from transporters	-	+10.8%		+5.4%	+1.8%	+18.0%
Net % received	24%	17.4%	12.5%	13.2%	8.3%	24.6%
Indirect Benefits Net % received	5%	5%	-	20%	5%	65%

The distributions indicated on Table 27 suggest the order of magnitudes anticipated for the incidence of benefits.

b. Valuation of Benefit Incidence

The smallholders favored by this program are off the main roads and have had less access in the past to inputs and services, than farmers located on the A, B and C roads. (Data indicates a lower-than-average percent of crops marketed and a lower-than-average income level for these farmers, compared to the Project area as a whole which has $94-150 average annual income per capita).

The emphasis on improving non-all-weather roads will shift the benefits even more in favor of the isolated smallholder. This emphasis will also favor those districts with lower per capita income: South Nyanza, Bungoma, Busia and Siaya.

Therefore, more than 80 percent of the smallholders favored by this Project are expected to have income below the $122 per capita poverty level determined by the IBRD, and more than 95 percent of this group are expected to be below the IBRD-calculated minimum acceptable income level of $196 per capita.

Based on Table 28 somewhere between 10 and 15 percent of the total population of the seven Project area districts will be directly affected by the improved access resulting from the GBC program. These potential beneficiaries number 500,000, most of whom are medium and smallholder farmers.

In undertaking an analysis of the benefit incidence it is important to point out that many of the members of cooperative societies in the Project district are the smallholder farmer.

Table 28

Population Served by D and E Roads

District	% of pop. more than 5 Km from A,B, or C road	% of pop. closer to a D or E road than to A, B, or C road
Bungoma	13.0	31.5
Busia	20.3	37.5
Kakamega	11.8	30.9
Kisii	11.0	34.4
Kisumu	8.0	19.8
Siaya	17.2	38.6
South Nyanza	21.2	31.1
Project Area	14.3	31.6

These figures reflect the density of the existing road network in the project area. 15% of the population now lives more than 5 Km. from a major road. Over 30% of the project area population lives closer to a secondary or minor road than to a major road.

Annex VII

Social Analysis

A. Introduction

B. Demographic Patterns

C. Cultural Patterns

D. Decision Making Institutions

E. Sociological Nature of Benefits

1. Selection of Roads
2. Rural Employment
3. Increased Participation in Market Economy
4. Role of Women
5. Nutritional Consequences
6. Health
7. Family Life

F. Spread Effect--The Diffusion of Innovation

G. Overview

H. Bibliography

Social Analysis

A. Introduction

The Rural Roads Systems Project is one of a set of programs addressing the problems of rural farmers in western Kenya. Other programs include the Rural Planning Project, IADP, and the SPSCP.[1] Both the RAR and the GBC components of RRSP will be implemented in Western and Nyanza Provinces by the Special Projects Branch of the Ministry of Works. South Nyanza District, for reasons explained elsewhere in this paper, has been omitted from the AID assistance to the GOK's rural access roads program. The socio-cultural and ecological backgrounds relevant to both the RAR and GBC components are similar. An improved all-weather road network introduces one socially fundamental alteration into the Project area: access. The GBC and RAR components are separate but not separable activities which in tandem insure the provision of all-weather linkages between small growth centers and the rural hinderlands. The social consequences of this new access is the focus of the social feasibility analysis.

In brief, there are an estimated 4,300,000 people living in these two provinces of western Kenya. The bulk of the population are sedentary smallholding subsistence farmers, living in compounds of small, extended families dispersed across the landscape. Marital residence is patrilocal. There are three dominant ethnic groups in the two provinces--the Luo, the Gusii, and the Luhya. Although there are important cultural, historical, and agricultural differences between these groups, the differences would not have direct significance for the Project. The RAR component, as designed, is based on district-level organization. Of the six districts concerned, four--one Gusii, one Luhya and two Luo--comprise over 90 percent from one group; the two remaining are predominantly Luhya (84 percent and 64 percent, respectively). These two districts probably present no problem of "mono-ethnic" domination given the present administrative structure and the design of the Project. More importantly, the entire Project region is more or less involved in a similar process of rapid change, and the effects of community-level adaptation to a range of different local micro-systems make environmental and specific locational considerations far more relevant to the achievement of the Project objectives than ethnic or cultural ones. Table I compares some selected features of the districts. It should be emphasized, of course, that the data are approximate and that the averages mask significant intradistrict variations.

1/ Smallholder Production Services and Credit Project under ASL I.

Table I: Selected District Level Comparisons

	Kisii	Kisumu	Siaya	Bungoma	Busia	Kakamega	Total
Population 1975	833,000	508,000	466,000	451,000	238,000	979,000	3,475,000
Population density per km. sq.	379	244	184	147	146	278	231
% Primary students of total population in 1974	26	21	21	25	22	24	23
Estimated % land under cash crop	23	9	9	10	10	10	12
Average parcel size of smallholders with registered land (ha)	1.8	3.5	2.6	5.0	6.0	1.4	2.4
% Small farmers holding less than 1 ha (1969)	26	49	38	3	16	27	28
Population per health facility (1972)	30,000	20,000	16,000	23,000	25,000	31,000	24,000

Sources:

1. MOA. IADP Loan Application, 1975: MOA Table 1.2
2. GOK. Statistical Abstract, 1975:192
   (NB: 1/2 the total population is under age 16)
3. IBRD. Agricultural Sector Survey, 1973
   Annex 1; Annex 20
4. GOK. Ministry of Health, 1972 Survey.
   Appendix 3, p. 79-80

The median per capita annual income in western Kenya ranges between $90 and $160 with per family on-farm cash income estimated at around $100 per annum ($17.00 per capita). Clearly the bulk of the population can be classified as the working poor. There are wide and crucial disparities within that category, however, as a review of Table I indicates. The really poor in western Kenya are those with little or no access to any reliable, productive resources. The Project is not likely to have significant immediate impact on this lower stratum, except under specific conditions, some of which are described below.

B. Demographic Patterns

Population growth in the Project area varies from substantially above the national average in Bungoma, Kakamega, and Kisii Districts to substantially below in Busia and Siaya Districts. High growth in Kisumu District is largely attributable to the growth of Kisumu Town, at 5.7 percent per year (within expanded municipal boundaries). This urban area absorbs some of the surplus population from surrounding districts.

Bungoma and South Nyanza Districts are relatively lower density areas which can absorb some immigration through more intensive agricultural activity. Kisii and Kakamega are currently high density areas which must export population in order to maintain current standards of living. Busia and Siaya are less densely populated but their agricultural potential is fairly fully exploited at current levels; swamp drainage and provision of water supplies could improve this situation, particularly in Siaya District.

A nationwide comparison of census data on province of birth and province of residence from the 1969 census shows a significant outflow (-8.8 percent) from Western Province and a very slight net inflow (+0.3 percent) to Nyanza Province. For social and cultural reasons, permanent migration into or out of the Project area is relatively rare, although there are major short-term and medium-term flows due to population pressure on the available land and to the presumed availability of better employment opportunities elsewhere. Population flows within the Project area undoubtedly exist but are not well documented at this time.

A comparison of population growth rates by district suggests that there has been some spillover into Bungoma District and South Nyanza District from more densely populated neighboring districts. The low average growth rates in Busia and Siaya Districts are due partly to out-migration and partly to the effects of periodic epidemics of sleeping sickness and cholera in this area.

C. Cultural Patterns

There are two major tribal groups in the area, roughly corresponding to the division between the two provinces. The Abaluhya in Western Province are a Bantu people who have occupied this area and exploited it with traditional agricultural techniques for at least five hundred years, possibly much more. The Luo, a Nilotic people, came into the area about two hundred years ago. Originally a pastoral and fishing people, the Luo have become more active in farming as population and land tenure restrictions have made it necessary for them to exploit land more intensively. Both population groups have been extremely receptive to education and the opportunity it offers to move into the modern sector of employment. Only recently, with the virtual closing of the urban job market, has this energy been redirected into implementation of a more modern approach to traditional agricultural activities.

The population of Kenya is made up of many tribes, whose homelands more or less correspond to the administrative units of the country. The Kikuyu are the largest single group (20.8 percent of the African population). The Luo and the Abaluhya are the next largest groups (14.3 percent and 13.6 percent of the African population, respectively). The inhabitants of Kisii District in Nyanza Province are members of a separate Bantu-related group, making up 6.6 percent of the country's African population, and there are smaller groups of the Nilo-Hamitic Teso and Kalenjin-speaking peoples in Western Province. Although tribal affiliations are important as a determinant of informal social relations as well as of property rights, there has in fact been a considerable intermingling of groups within these broad categories.

A very brief description of tribal customs and family life, focusing on the Luo and the Abaluhya, provides a general background for viewing the Project as it will relate to the people of the area.

Descent is traced through the male line (patrilineal), and leadership of clan, sub-tribe or modern political administrative units is overwhelmingly male. An age-set system involving a variety of political, social, military and economic functions is the dominant social system in traditional life among most Kenyan tribes, including the Abaluhya and Nandi. That system is weakly developed among the Gusii and non-existent among the Luo. Lineage or territorial units traditionally carried out these functions for the latter groups.

Family units live in "compounds" consisting of a cluster of houses, a kraal where cattle are kept at night, and a few small granaries. The number of structures in a compound changes as the family unit changes. Polygamous families are common, and most of the men aspire to have more

than one wife if they can raise funds to pay a "bride price" in stock or goods, or cash. Within the compounds each of the wives has her own house where she lives with her children.

Agricultural patterns are based on subsistence food crops to ensure family survival from one year to the next. A limited surplus of food crops and some cash crops are sold to obtain money to pay taxes and school fees, to acquire clothing, tools, kerosene, medicines, and other items. Money is also used to buy corn and other basic foods when home-grown provisions run low. Small farmers sometimes acquire additional cash by working on other farms or by casual employment in town or road construction during the seasons of slack demand for their labor on the farm.

Women carry most of the burden of labor. Although the men have traditionally undertaken the heavy tasks of clearing land and preparing it for planting, women grow almost all the food crops and provide labor for the cash crops as well. This entails regular weeding, watering as appropriate, harvesting and whatever post-harvest processing of the crops may be required. For example, only women pick or "harvest" tea, a task which must be done daily in the early morning hours. Women also undertake the transport of crops to local markets or collection points. They also prepare the food, fetch water for the home and farm (an often arduous and time-consuming task), and perform household duties. Many holdings are managed by women because large numbers of men are seeking work elsewhere.

As a result of great population pressure, continuous subdivision of a fixed amount of land among more and more people, and a lack of employment opportunities in the area, out-migration is substantial, particularly from Western Province. Men migrate far more frequently than women, and the likelihood of migration increases as the level of education rises. This selective migration leaves behind the very young, the very old, the uneducated, and a disproportionate number of women. According to the 1969 census, Kenya has 525,000 rural households headed by women, of which 400,000 or one-third of all rural households are estimated to be those whose male members are away from the area working in town or other rural sections.

Although most migrants send money home if they are successful in finding jobs and usually plan to return at a future time (large return migrations after the age of 45 have been documented), migration on such a massive scale quite obviously removes needed talent and leadership from the local level and changes social and family patterns enormously. Another result of migration is a pronounced labor shortage in the area at time of peak agricultural labor requirements, particularly in preparing land for planting.

Most of the people own their land, either in the legal sense of registry under which title may be certified for individuals or groups (both occur in the target areas), or in the sense of traditional tribal occupation rights firmly established by an individual's use and by custom. The majority of available land in the two provinces has been registered or is in the process of being registered. With a registered title farmers can secure loans to buy agricultural inputs and make farm improvements.

Titles are almost always allocated to men and distributed by them among their male heirs. However, women farmers, particularly farm managers, have some indirect influence on decisions concerning land tenure and land use. One possible negative aspect of the registration system is that it might be jeopardizing the security of women by undermining traditional "rights of access" to land. On the other hand, registration makes it possible for women to acquire their own land through purchase.

D. Decision Making Institutions

Present political and planning institutions represent a combination of traditional, colonial, and contemporary models for collective decision making. Administrative units descend from the province through the district and division to the location and sub-location levels, run by a tribal chief who is also a Government official. At the tribal or lineage group level, important decisions are discussed at a public meeting (baraza) in which the opinions of local leaders are expressed and a group consensus is determined. These meetings are usually too large and formal to function as effective planning institutions, however, and they are usually restricted to a consultative role in relation to centrally determined development plans.

At the district level there is a District Development Committee, composed of the district officers of the various ministries involved in development planning and the Members of Parliament from the district, and chaired by the District Commissioner. Each Committee prepares a District Development Plan through which the inputs of the various ministries are coordinated and local development priorities are established. The District Development Committees also have a certain amount of discretionary funds to be allocated to development projects; their use of these funds can be interpreted as another indicator of local priorities. Although much remains to be done to make the District Development Committees an effective link in the planning process, they represent an important step toward decentralization of decision making and local participation in planning activities.

At the provincial level, a Provincial Development Committee, similarly composed, brings together the district plans and provides a forum for discussing regional priorities. However, the District Development Plans are supposed to form the basis upon which national level projects and programs are formulated. These plans, initiated as part of the 1974-78 planning cycle, are updated annually to reflect changes in local and national goals and priorities as well as to accommodate changes in available resources.

E. Sociological Nature of Benefits

Listed below are a number of issues which should be appraised in attempting to achieve the objectives of this Project and to ensure that the sociological aspects of Project benefits are considered.

1. Selection of Roads

The selection of the roads to be built and/or improved is a key feature of the Project. As the Project is now designed, few spread effects can be anticipated for those persons not directly within the zone of influence of the road and, therefore, the use of the DDC in the selection process should certainly help to better the chances that a wide range of areas within each district will benefit from the roads and from the opportunities building them will provide. The main reason the SRDP 1975 evaluation team recommended that the DDC be involved in the road selection process was to achieve the most equitable selection method possible.

It was argued that the balance of locally elected members of Parliament, County Council heads, other selected leaders and representatives of each ministry involved in rural development constitutes the most representative body now in operation. There are potential disadvantages, however, which must be monitored. Locally-elected councillors, for example, may not equally represent the interests of their constituency. DDC Government representatives may have priorities which similarly do not maximize the distribution of benefits throughout the district. For example, ease of transport from district headquarters or ability to maintain surveillance on poachers may be important considerations for Government officials, but not for local road users. The technical constraints to road building, as well, may serve to promote an imbalance in the distribution of the road network. It is possible that a poor, relatively remote community, lacking representation, could easily be overlooked in the road selection process as currently designed.

There are other related development activities, however, that have the potential of reducing the problem of achieving an equitable

selection of roads in the six districts. The USAID-funded Rural Planning Project, for example, will give support to the District Planning Committees—to improve their ability to gather and utilize data relevant to planning and decision making; to increase local level involvement in the planning progress; and to provide in-service management training to District Planning Officers and others.

An example of the relevance of the selection process to the Project is found in the SRDP 1975 evaluation of the Migori, South Nyanza, access roads pilot project. The description included below shows how an area coordinator can positively affect the access road selection process:

> "While most of the problems in organizing the operations of labor-intensive road building were carefully studied during SRDP, little attention was given to the problem of planning and siting. Inadvertently, Migori became the locus of an unplanned experiment. As in all the other SRDP areas, plans for the road construction were initially laid out by technical experts, rather than by indigenous residents. Withdrawal of the planning team occasioned a complete rejection of the original road plans. Subsequent developments proved that local involvement in road siting can be extremely advantageous for rural access road development.
>
> After rejecting the original plans for Migori, the A/C (the SRDP area coordinator) asked the headmen in each sub-location to devise an alternate plan. Each headman formed a committee that drew up a new plan. The plans submitted far exceeded the funds budgeted for road development. The A/C then responded by asking how each sub-location could contribute to reduce the need for expenditures. As a result it was decided that each sub-location should use volunteer labor to clear the right-of-way. SRDP funds could be used to finish road development.
>
> Using committees at the sub-location level gave the entire community an opportunity to voice its opinion on road siting. Local needs that might not appear critical to a planner were included in the recommended plan. However, the A/C's requirement that self-help labor be used to undertake the clearing of a right-of-way forced some realism into the plan presented by local committees. Only those road segments that evoked serious commitment from the community elicited the volunteer labor needed for clearing. (IDS/OP/12)."

2. Rural Employment

One Project objective is the provision of rural employment through the use of labor intensive construction on the RAR component and labor intensive maintenance on the RAR and GBC component roads. Increased wage earning opportunities in the rural areas was a key recommendation of the ILO report (1972). It should provide a direct benefit to the persons who want and are able to get construction jobs, especially in the slack agricultural seasons. It can be argued, as well, that the incomes earned will have a multiplier effect and will improve family circumstances. Actual effects, however, are difficult to predict. Certainly, a proportion of the wages earned will be consumed in markets, bars and hotels. Such a consumption pattern has been described in a number of different studies carried out in Kenya.

It can be anticipated that some portion of the wages earned will go towards improving the farm and the home, and developing community services. Specific efforts, as well, will be made to increase farm productivity in the Project districts by the IADP and/or the SPSCP. As there is no provision in the Project for systematically promoting community welfare projects, however, the effect of the wages paid to laborers during the several months of road construction is difficult to predict.

A key issue in the labor intensive aspect of the Project is the wage laborers should be paid. At present, the official minimum wage paid by the Government is prescribed at K.Shs. 6/75 per day. There has been criticism of this rate, however; it is considered by several evaluators (e.g., SRDP 1972 and 1975; Harmon and Zalla, 1975) to be too high. These evaluators suggest that the wage be dropped to the level competitive with current occasional employment rates in the six districts. The reasons given are several. First, since the wage is higher than the going rate, there will be little turnover in the labor force. Fewer men, then, will benefit. Second, at a lower rate, poorer men will be given the opportunity to earn some cash, as they will not have to compete with better off farmers as well. Furthermore, it is arguable that lower wages spread out among more laborers increases the need for cheap, locally-made consumer goods vis-a-vis more expensive imports. This would further support the potential multiplier effect in the development of the informal sector (Muench, 1976). These recommendations notwithstanding, the MOW will be required to hire laborers at the officially set wage levels.

Given the official minimum wage, there will be competition for jobs. Devising a fair system for allocation of the jobs is difficult. There are always new ways being devised to "beat the system". For

example, in one area lottery tickets of those chosen to be road laborers were sold to others who wanted the job. Several systems have been tried in western Kenya to achieve an equitable system of labor recruitment. Adapted to local situations, these different systems may yet solve the problems; if so, the poorer farmer should stand to benefit.

There is also the possibility that work and non-work periods on the roads are not properly coordinated with agricultural seasons. In such a case, it is likely that agricultural production will lose out to the higher paying road construction and maintenance work. In the case in which a subsistence farmer fails to plant or weed his crop, however, because he wants the cash the laboring work may bring, he and his family may suffer in the long run.

A benefit of the labor intensive aspect of the Project was identified by a Development Alternative Inc. team in their analysis of the Vihiga SRDP Project: "the poorest men in the area are seeking employment for work on the roads rather than going to the urban centers" (DAI 1975: D.7). It is extremely difficult to generalize about the process of out-migration and/or its merits in western Kenya. In some areas it is well developed with over one half of men working away from the area (see Moock, 1972 and Staudt, 1975 for descriptions of high rates of out-migration in Kakamega); in other areas, it is rapidly increasing (Levine re Kisii, 1976). The effect of the rural access roads in increasing out-migration in such areas by lowering transport costs and "opening up" the area to more outside exposure is unlikely to have any noticeable effect, except in special cases (e.g., as J. Moock, 1976, has suggested, when a bus is routed through the new road stretch). It is likely that the increase in employment through road construction and maintenance and increases in cash crop production and marketing will more than balance the effect of opening up areas to more efficient out-migration. Local conditions and opportunities vary tremendously, however, making generalizations about such a general process as out-migration difficult.

An impact of the decision to utilize locally produced materials will be that some local producers will gain large benefits while others may miss out. The "opening up" of relatively isolated areas will also reduce the competitive advantage held by local suppliers. As rural farmers become more involved in the market system, they will be more selective in their purchase of services and materials. There will be mixed benefits from the road, then, for the emerging entrepreneurial class.

3. Increased Participation in the Market Economy

The opening up of an area to the market economy can have some negative consequences. The anticipated transition of poor families from primarily subsistence farming to involvement in the market economy is not inevitable. The process of land acquisition and sale in parts of Kakamega District illustrates this problem. Several recent studies have shown that there is an increasing disparity between rich and poor in the area and have described the development of a land owning class as an important and growing part of the process. According to Ssenyonga, for example, who has conducted research in the district in 1975, a disproportionately wealthy group of local farmers and businessmen and professionals is emerging in rural areas he studied. He terms the group "the roadside elite" because of their exceptionally favorable position vis-a-vis markets, an advantage which they use to better their own positions. Many in this "elite" are gradually buying up the more productive, valuable land lying alongside the roads--relegating poorer former occupants who have small plots, no capital and large families to the more remote areas.

According to Barclays, a researcher who has been studying the effects of the Mumias Sugar enterprise on the surrounding area, there have been a number of trends which have been accelerated by the sugar factory which make living and working conditions even worse for the rural poor in the area. The accumulation of land by the factory for production purposes and by a landed elite as well is but one process which has had negative effects on the poor. The problems he describes for the poor in the "catchment" areas of the factory might well be experienced by the poor in the areas of the rural access roads.

In brief, in several of the areas around the sugar factory in Mumias, Kakamega, poor farmers are gradually being bought out by the better off. Some are selling their land in order to meet needs like education and health care for their children. Others simply are unable to cope with food shortages, in part the result of unfavorable weather conditions. As land values rise rapidly the pressure to sell land for a substantial price increases. For those who do get a high payment for their land, however, there is great risk that the cash will be frittered away. The RRSP, SPSCP, and other Government and non-Government development efforts are jointly aimed in part at reducing the negative consequences of rapid involvement in a market economy. The impact of improved roads on land values and on the process of land acquisition, sale, and alienation, however, should be carefully monitored during and after the rural roads project.

4. Role of Women

Potentially the most severe negative consequence of the roads Project, with the anticipated involvement of some nearby families in road construction and of most in the emerging cash economy, will be experienced by women and children. There is a growing literature on the role of women in development in Kenya; several especially pertinent reports are listed in the appended bibliography including work done by: Abbott, Barnes, Bookman, Kershaw, Krystall, Levine, Llewelyn - Davies, Moock, Pala, Reynolds, Staudt, Wills, Wipper and the Whitings.

Most of the reports on the studies mentioned stress that one effect of involvement of a family in the cash economy is the increasing workload placed on the wife. As the family farm enterprise gradually takes on labor intensive cash crops like coffee, sugar-cane, or pyrethrum, poultry, pigs or dairy cows, the burden on the wife in the compound increases. In addition to the traditional maternal responsibilities of raising and caring for the children, taking care of the homestead, fetching water and fuel, producing, processing, and cooking food for the family, and maintaining the expected "good relations" with her inlaws, a wife becomes the manager of the farm when her husband is absent and a chief field hand when he's home. As the family begins to use their newly acquired cash to send children to school, the wife's burden increases further when she loses regular help of school-aged sons and daughters.

The negative consequences of a woman's increased workload are significant. A study by Susan Abbott of families fully involved in labor intensive cash cropping and animal husbandry in Nyeri District has attempted to measure these consequences on women. Abbott's dissertation is entitled Full-time Farmers and Weekend Wives: Change and Stress Among Rural Women. A main focus of her study is on the increased stress experienced by wives and husbands of farm families gradually entering the cash economy. Abbott reports that on the basis of a cross-culturally tested Health Opinion Survey designed to measure stress, rural Kikuyu men and particularly women had one of the highest average incidences of stress ever found. Only one population so far tested using the Health Opinion Survey had a higher mean score, and that was a South Vietnamese refugee camp (Abbott, 1974:2).

Based on her study, Abbott identified, among others, the following points at which stress results from women:

(1) when cash income is low relative to other members of the community;

(2) when a woman is not allowed to make decisions though her husband is not present to make them because he works in another place, or when a woman must make the decisions though her husband lives with her and thus should make the decisions;

(3) to have had no experience with formal education if a younger woman or to have had such experience if an older woman;

(4) to totally cut oneself off from the support of other women by not joining a women's organization when that is an age-appropriate behavior; and

(5) to have five or more children.

One condition that Abbott describes is directly related to the potential consequences of the recruitment of cash crop farmers for work on the access road crews. Women who report they customarily make many decisions on the farm find themselves in a very stressful position when their husbands sleep at home but work away. He is in a position, typically, of issuing many orders as the overall "farm manager", but has little time to help out. Especially in farm families whose children attend school and whose non-seasonal "crops" include livestock like pigs or dairy cows, the loss of the husband to an outside job but his continual presence brings high stress to the wife, although certainly his increased income would reduce the stress felt in the case of such a wife feeling poorer than her neighbors (see No. 1 above).

In sum, one can find further support in Abbott's study, and in other descriptions of the problems facing rural women whose families are entering the cash economy (e.g., Whitings & Wills), that the hiring of the poorer family men in a community as laborers would not only promote an equitable incidence of benefits among poorer families, and therefore would help relieve the stress on wives of cash crop farmers who must take over the dawn to dusk management of the farm in the case that the husband is hired on the road crew.

5. Nutritional Considerations

A related impact of increased involvements with a cash ecoromy which would be facilitated by a successful rural roads Project is a potential lowering of the nutritional level of the children in the communities concerned. The process of increased cash crop production on small farms leading to greater malnutrition among young children has been found in a number of studies, especially regarding monocrop cash cropping (such as sugar-cane). In Kenya, nutrition studies have shown great intra and intercommunity variability in levels of nutrition, especially among young children (see e.g., Blankhart, 1974 and Levine,

1976). An important factor is increased alcohol consumption, but the conditions contributing to such variability are not yet clearly understood. The prediction as to whether access roads may contribute indirectly to a raising or lowering of overall nutritional levels cannot be made, but issue should be carefully examined by the Project evaluators.

6. Health

Improved road access to health service facilities will benefit small farmers in two ways. On the one hand, it will make it easier to supply such facilities with needed drugs and equipment from the central stores usually found at district hospitals. On the other hand, it increases the probability that vehicle transport will be available to a person needing medical attention. Currently, in some parts of the Project area, mobile clinics make weekly visits to the harambee health centers which have not yet reached Ministry of Health standards. It is conceivable that better roads would encourage more activity in this nature.

Family planning education is conducted by rural nurses in conjunction with the maternal and child health clinic held at dispensaries and health centers. These nurses have no vehicles but go out on foot to villages within a 12-mile (20 km) radius. With vehicles it is estimated that such staff could cover a 50 mile (80 km) radius. However, many factors more important than road access constrain effective delivery of family planning services in the Project area.

7. Family Life

The impact of an increase in accessibility will almost certainly be to decrease the mutual dependence of previously isolated nuclear and extended family members in a single compound and to increase the number and extent of their contacts with the outside world. From a development standpoint this is a good thing, as it opens the door to modernization, defined as a change in the traditional way of doing things. Certainly, it will enhance the ability of outside change agents such as Government officials to impinge upon the way of life of rural smallholders. Whether or not this is a benefit from the small farmer's point of view is another question.

Increased access will facilitate the growth of more complex sets of social relationships, some of which may cross-cut the family, clan, and tribal units. On the other hand, it may also strengthen traditional social units such as age- and sex-based work groups, particularly in previously isolated areas. The quality of social life will be enhanced by greater opportunities for people to associate, to communicate, and to participate together in social events.

The process of specialization of labor, an inevitable consequence of conversion to a cash economy and the spread of formal education, is already well advanced in the Project area. The common pattern of absent husbands with salaried jobs (or looking for employment) in the city while the wife and children work the farm has already been described. Although this is by no means true of the majority of rural families now, it is a pattern which can be expected to increase as population pressure on the land becomes ever more severe. In this situation it is impossible to blame the roads for the fact that families are breaking up. Rather, it may be said that improved access--particularly if it results in a relative reduction in passenger transport costs--will make it possible for divided families to be reunited more frequently.

F. Spread Effect - The Diffusion of Innovation

The Project is conceived primarily as a means of promoting rural welfare to help rural people. The "social" nature of the Project objectives is clear; their social-cultural feasibility and some pertinent aspects of benefits have been discussed above. A third aspect of "social soundness"--the spread effect of the innovation, and the way in which the processes set in motion by the innovation flow from the initial input--is less easy to predict. The Project is structured to promote certain changes in a number of processes in the district, local, and family setting. At the district level, the participation of the DDC in site selections is intended to increase the DDC local planning capability. At the community level, the roads are meant to open up the areas which they serve, by increasing access to services and markets, and by raising overall incomes by providing wage labor opportunities and support in farm production. At the family level, increased incomes and exposure to the cash economy and access to social services should improve the family standard of living.

The degree to which the desired spread effect will occur depends in large part on the soundness of Project assumptions. It is assumed, for example, that by providing wage labor at 6/75 an hour and a fair labor recruitment process, that poor farm families will benefit in the areas concerned. It is assumed that the DDC will, in conjunction with the roads engineer, make road site selections which reflect local interests. It is assumed that improved all-weather roads will promote a greater involvement of farmers in the cash economy, and hence lead to improvements in their standard of living. It is assumed that the rural roads can make a contribution to bringing services and markets closer to the people who will use them.

Such outcomes, singularly and in combination, of course, are not automatic; nor can they even be predicted to happen regularly, or most

of the time. Some potential points of stress and negative consequences of the Project have been discussed above, and suggestions have been made which may reduce their impact or incidence. With any large intervention initiated from outside, there are bound to be undesirable effects. But from the "social soundness" point of view, a key characteristic of the rural roads Project as conceived and now structured is its reliance on other institutions to provide active support and direction to the processes of change which are anticipated in the objectives of the Project. A second characteristic of the Project is that although the key focus is on opening up rural areas to rapid change through a number of related interventions, the cumulative impact of the interventions is assumed. There is no component in the Project as it now stands which will explicitly and systematically coordinate the intended benefits of the Project and direct them so that a spread effect will be achieved. However, the road selection criteria have been designed to seek out those roads which provide the best chance for an optimal spread of benefits and innovations.

To maximize the spread effect, however, the changes resulting from the Project must also be carefully and continuously monitored, and relevant data made available to the Project staff and others involved in related development activities (e.g., staff of the Rural Planning Project and the SPSCP). In this way, initial Project effects can be consolidated and integrated with other ongoing programs and negative consequences can be identified early and, where possible, alleviated. For example, in certain areas where the planning process is not proceeding as desired, community or area-wide leaders might be formed into a committee to facilitate road selection. In other areas where the monitoring system might reveal the need for support of Harambee-type community efforts, governmental and non-governmental organizations active in western Kenya (and the number is considerable), could be encouraged to be involved.

G. Overview

Whether all of the Project objectives have an equal chance of being realized is open to some question. In general, however, the Project is firmly based--from the social perspective--on knowledge gained from a number of localized studies as well as previous experimentation in the Project areas. It is being initiated in concert with other ongoing projects and activities operating in the area. This will increase the likelihood that the positive social consequences of the rural access roads for farm families and communities throughout western Kenya will be attained. On the basis of social considerations, there is ample reason to expect the Project to make an important contribution in the districts in which it will be implemented.

H. Bibliography

ABBOTT, Susan
1974 Determinations of Stress Among Married Women in a Rural Kikuyu Community - Kenya. Staff Paper, Bureau of Educational Research, University of Nairobi.

1974 Full-time Farmers and Weekend Wives: Change and Stress Among Rural Kikuyu Women: Ph.D. Thesis University of North Carolina.

Ascroft, J.N. Roling, J. Kariuki and F. Chege
Extension and the Forgotten Farmer. Bulletin No. 37 Wageningen.

BARCLAY, A.H.
1975 A Rural Diaspora: Land Acquisition and Unplanned Resettlement at Mumias. Paper presented at Department of Sociology Seminar.

BARNES, Carolyn
1975 Women in Kenya's Rural Economy. Paper presented at the Conference on Assembling and Collecting Data on the Participation of Women in Kenya Society 11-15 August, Nairobi School.

BLANKHART, D.M.
1974 Two Surveys on the Nutritional Status and Feeding of Children Under Age. Three Around Chogoria, Meru. Nairobi: Medical Research Unit.

1974 See also, Report on the Nutrition Survey done in Kambo Sublocation, Iveti Location, Machakos District. Department of Community Health, University of Nairobi.

BOOKMAN, Ann
1973 The Changing Economic Role of Luo Women: A Historical and Ethnographic Approach. BA thesis, Radcliffe College.

DAVID, Martin and P. Hopcraft
1975 Labour Intensive Road Construction and SRDP, in SRDP: Second Overall Evaluation of the Special Rural Development Programme Occasional Paper No. 12, IDS, University of Nairobi.

Development, Alternatives, Inc.
1974 Strategies for Small Farmer Development, An Empirical Study of Rural Development Projects Vol. 2. Washington, DC.

Institute for Development Studies
1972 An Overall Evaluation of the Special Rural Development Program, University of Nairobi.

IBRD
1973 Agricultural Sector Survey, Kenya (2 Volumes)

International Labor Office
1972 Employment Incomes and Equality. A Strategy for Increasing Productive Employment in Kenya.

Kershaw, Greet
1975 "Decision Making in the Modern Kikuyu Family.", Mineo

Krystall, Abigail & Achola Pala eds.
1975 Women & Education, Kenya Education Review Vol. 2 No.2.

Levine, Robert
1975 "The Changing Life Cycle in an African Society" Preliminary Notes on the Adaptation of Middle-Age Gusii Men. Paper prepared for a meeting of the Committee on Work and Personality on the middle years of the Social Science Research Council New York, October 17-19.

1976 Personal Communication.

Llewelyn - Davis - Melissa
1976 Film entitled Pastoral Masai Women.

Manners, A.J.
1972 Community and Occupational Differentation Among Family Small-holders: A Parish in Central Kitutu, Kisii. Research Seminary Paper No. 41, Institute of African Studies, University of Nairobi.

Morris, J.C.H.
1975 "Note of a Visit to Nyeri with the IBRD Rural Access Roads Appraisal Team 11-12 September" (EADD).

Odulla, T.
1976 Personal Communication

OYUGI, W. Ouma
1973 Participation in Development Planning at the Local Level in Rural Administration in Kenya, ed. D. Leonard, East Africa Literature Bureau.

Pala, Achola
1974 The Changing Economic Position of Women in Rural Areas.

1976 Report of Peace Corps Volunteers to SPSCP, October 1, 1976.

REYNOLDS, D.R.
1975 An Appraisal of Rural Women in Tanzania for REDSO/EA.

Republic of Kenya
1975 Revised Loan Application in Respect of Rural Access Roads Programme, Roads Department, Ministry of Works.

1973 Appendices to A Proposal for the Improvement of Rural Health Services & The Development of Rural Health Training Centers in Kenya, Nairobi.

1975 Ministry of Health Statistical Abstract, Nairobi, Central Bureau of Statistics.

Scandiaconsult International
1974 Improvement of Roads in Kenya: Technical, Economic, and Financial Evaluation.

Ssennyango, Joseph
1975 The Cultural Dimensions of Maragoli Demographic Trends. Paper presented for a Conference on Across-Cultural Study of Population Growth and Rural Poverty 9-12 December, Institute of Development Studies, University of Sussex, England.

Staudt, Kathleen
1975 The Effects of Government Agricultural Policy on Women Farmers: Preliminary Findings From Idakho Location, Kakamega District. Working Paper 225, IDS, University of Nairobi.

U.S.A.I.D.
1975 Rural Development Vihiga P.P. Revision No. 5. Project Evaluations E. Harmon and T. Zalla.

WILSON, Gordon
n.d Rural Development Survey in Three Areas of Kenya: An Evaluation of three years of Rural Development and Change at Samia, Kabondo, and Bomet prepared for Ministry of Cooperatives and Social Services Department and Community Development Nairobi.

WIPPER, Audrey
1971 The Politics of Sex, in Africa Studies Review XIV No. 3.

Whiting, Beatrice
1972 The Kenyan Career Woman Traditional and Modern Staff Paper, Bureau of Educational Research, University of Nairobi.

1973 Rapid Social Change: Threat or Promise, in the Neglected Years, M. Miller Ed. New York, UNICEF.

1973 Work and The Family - Cross Cultural Perspectives presented at Conference on Women: Resources for Changing World.

WILLS, June
1967 A Study of the Time Allocation by Rural Women and Their Place in Decision-Making: Preliminary Findings from Embu District, Makerere Institute for Social Research, Kampala.

World Bank
1976 Appraisal of a Rural Access Roads Project: Republic of Kenya.

FINANCIAL ANALYSIS

SUPPORTING TABLES FOR SECTION III - C

Table	Description
1	POL estimates
2	Labor cost estimate
3	Cost of tools
4	Rural access road overhead
5	Culverting cost estimates
6	Steel bridge beams, reinforced steel costs estimates
7	Opex technical assistance
8	Summary: accrued expenses
9	Summary: cost estimate and financial plan
10	RAR component—equipment and spares
11	Maintenance budget
12	Costing of Project Outputs/Inputs

Table 1

POL ESTIMATE
KSHS 8.30 = $1.00

ITEM	TOTAL US $
1. Farm Tractors - KShs.18.00 per hour, 33 hrs/week, 42 weeks/year or KShs.25,200.00 per Tractor Year. 48 tractors at three years each or 144 total Tractor Years, or KSh.3,628,800.00	437,000
2. Trucks, Five ton - K.Shs.20.00 per hour 40 hrs/week, 45 weeks/year or KShs.36,000.00 per Truck Year. 8 trucks at three years each or 24 total truck years, or K.Shs.864,000.00	104,000
3. LandRovers - KShs. 18.00 per hour, 50 hrs/week, 48 weeks/year or K.Shs.43,200.00 per vehicle year. 12 vehicles at three years each or 36 total vehicles years, or K.Shs.1,555,200.00	187,000
4. Total POL estimates	728,000

POL ESCALATION ESTIMATE

Project Schedule in Unit Months:

Program Year	1	2	3	4	5	Total
1. Two Units begin Nov.1977	4	24	24	20		72
2. Two Units begin Feb.1978	-	22	24	24	2	72
3. Two Units begin May 1978	-	16	24	24	8	72
4. Two Units begin Aug.1978	-	10	24	24	14	72
Total Unit Months	4	72	96	92	24	288

Program Year	1	2	3	4	5	Total
POL cost est. at 1976 prices (US$ '000)	10.1	182.0	242.7	232.6	60.6	728.0
4. Year One Escalation at 7 percent	.7					
5. Year Two Escalation at 15 percent		27.3				
6. Year Three Escalation at 25 percent			60.7			
7. Year Four Escalation at 35 percent				81.4		
8. Year Five Escalation at 45 percent					27.3	
9. Total POL Escalation	.7	27.3	60.7	81.4	27.3	197.4

Table 2

LABOR COST ESTIMATE

1. Labor Force of 270, locally recruited at K.Shs.7.00/day at 312 paid days per year or K.Shs.589,680.00 per Unit Year of labor or $6,000 per unit month.

	Program Year ($000)					
	1	2	3	4	5	TOTAL
Unit Months by Program Year	4	72	96	92	24	288
2. Annual Labor costs at 1976 prices	24	432	576	552	144	1,728
Escalation Estimate						
3. Year One Escalation at 7 percent	2					
4. Year Two Escalation at 15 percent		65				
5. Year Three Escalation at 25 Percent			144			
6. Year Four Escalation at 35 percent				193		
7. Year Five Escalation at 45 percent					65	
8. Total Labor Escalation	2	65	144	193	65	469
9. Total Labor and Escalation	26	497	720	745	209	2,197

Table 3

COST OF TOOLS

(Based on Construction Unit Labor Force of 270)

Description	Unit Cost KShs.	Required No.	Total Cost KShs.	Estimated Life Months	Cost: Three Years KShs
Shovel	35	180	6,300	12	18,900
Wheelbarrow	400	40	16,000	12	48,000
Panga	10	60	600	6	3,600
Pickaxe	50	40	2,000	6	12,000
Rake	30	40	1,200	6	7,200
Sledgehammer	50	15	750	60	450
Axe	60	25	1,500	6	9,000
Crowbar	80	20	1,600	60	960
Jembe	30	150	4,500	6	27,000
Fork Jembe	35	100	3,500	6	21,000
Bow Saw	60	2	120	60	72
Hacksaw	50	4	200	60	36
Bucket	25	15	375	12	1,125
Karai	10	10	100	6	600
Tape Measure	250	6	1,500	60	900
Spirit Level	100	3	300	60	180
Mason Hammer	50	25	1,250	60	750
Mason Chisel	25	4	100	6	600
Mason Trowel	25	4	100	12	300
Oilcan	20	4	80	60	48
Pliers	20	4	80	60	48
Spanners	30	4	120	60	72
Jerry Can	50	3	150	30	180
Torch	30	4	120	30	144
Culvert Mould 24"	4,500	4	18,000	60	10,800
" " 18"	4,250	6	25,500	60	15,300
" " 12"	4,000	2	8,000	60	4,800

Total hand tools per unit, life of Project KShs184,065
U.S$ 22,200

B. Total Hand Tool Costs and Escalation

1. Per unit cost of $22,200 for Eight Units,
Total Hand Tool Cost 177,600

Program Year (000$)

	1	2	3	4	5	TOTAL
2. Construction Schedule in Unit Months	4	72	96	92	24	288
3. Estimated Projected Expenditures, 1976 prices	30,000	52,200	63,000	21,600	10,800	177,600
4. Escalation Percentage	7	15	25	35	45	
5. Total Escalation	2,100	7,830	15,750	7,560	4,860	38,100

Table 4

RURAL ACCESS ROAD OVERHEADS

KENYA SHILLINGS

1. CONSTRUCTION UNIT MANAGEMENT

Permanent Staff — Each Unit

TITLES	No.	SALARY	CAMP AND FIELD ALLOW.	TOTAL ANNUAL OVERHEAD
Inspector	1	19,600	4,900	24,500
Drivers (III + II)	2	7,720	1,930	19,300
Clerical Officer	1	10,000	2,500	12,500
Accounts Clerk	1	10,000	2,500	12,500
Storekeeper	1	5,000	1,250	6,250
Timekeeper	1	5,000	1,250	6,250
Mechanic III	1	6,480	(Including Equipment Cost)	
Mason	2	6,000	(Included in Culverting)	
Blacksmith	1	6,000	1,500	7,500
Carpenter	1	6,000	1,500	7,500
				96,300

Transport-Each Unit

1.5 10T Truck

312 days @ 6.5 hrs/day = 2000 hrs/yr or 250 x 560 — 140,000

1-Landrover

338 days @ 7 hrs/day = 2400 hrs/yr or 300 x 365 — 109,500

.95

345,800

2. SUPERINTENDENTS STAFF

Permanent Staff — Each 3 Units

Senior Inspector	1	2,600	6,500	32,500
Survey Assistant	1	18,000	4,500	22,500
3 Chairmen	3	5,000	1,250	18,750
Driver (II)	1	9,000	2,250	11,250
				85,000
				1.0
1-Landrover	2400 hrs/yr			109,500
				.95
				194,500
			÷3 =	64,833

Table 4.

3. R.A.R. Engineers Staff

Engineering Staff — Each 6 Units

TITLES	No.	SALARY	CAMP AND FIELD ALLOW.	TOTAL ANNUAL OVERHEADED
Supt. Engineer	1	44,400	11,100	55,500
Senior Clerical Officer	1	14,000	3,500	17,500
Senior Accts. Clerk	1	14,000	3,500	17,500
Driver (I)	1	11,500	2,875	14,375
Clerk-Typist	2	9,000	2,250	22,500
				127,375
1- Landrover 1600 hrs/yr	200 x 365			73,000
				200,375
			÷6 =	33,400

4. Special Projects Branch and M.O.W. Overheads

SPECIAL PROJECTS BRANCH — Each 50 Units

CHF SUPT. ENGR.	1	80,000	20,000	100,000
Sen. Supt. Engr.	1	52,000	13,000	65,000
Accountant II	1	22,000	5,500	27,500
Accounts Asst.	1	18,000	4,500	22,500
Senr. Clerical Off.	1	12,000	3,000	15,000
Copytypists	3	9,000	2,250	33,750
Drivers I	2	11,500	2,875	22,500
				286,250
FOR STAFF TRAINING + TECHNOLOGY STUDY ETC. ADD 100%				286,250
2 LANDROVERS @ 1600 kms/yr				146,000
				718,500
ROADS BRANCH O/H 2% + GEN ADMIN. 6% of 9% TOTAL				57,500
				776,000
			÷50=	15,520

Table 5

Culverting Cost Estimates

1. Improving 2,000 KM of road via spot improvements would require an average of two cross drainages each kilometer or approximately 4,000 cross drainages in all.

2. One culvert in ten will require a diameter in excess of 36" which will require use of CMPC or 400 CMPC culverts, while the remainder (3,600) will be constructed of concrete.

3. CMPC of varying diameters, 42" to 72" is estimated to cost an average of $200.00 per meter CIF Mombasa. Each cross drainage will be approximately 8.5 meters in length and total CMPC costs will be 400 x 8.5 x $200.00 or $680,000.00

4. Concrete culverts of varying diameters, 18" - 36" will cost an average of $20.00 per meter (locally purchased). Estimated cost will be 3,600 x 8.5 x $20.00 or $612,000.00. Approximately 200 of these cross drainages will be box culverts requiring an estimated three tons of reinforcing steel each (see Section III-A).

5. Summary:

CMPC Costs	$680,000.00
Concrete Culverts	612,000.00
Total Culvert Costs	$1,292,000.00
Rounded	$1,300,000.00

Table 6

Steel Bridge Beams, Reinforced Steel Cost Estimates

A. Steel Bridge Beams

The improvement 2,000 KM of road will require the construction of approximately twenty bridges and of the twenty, five will have spans requiring the use of steel girders (as opposed to concrete girders). It is further estimated that each bridge will require four firders 45 feet in length or 180 linear feet per bridge. At 500 pounds per liner foot, five bridges will require 450,000 pounds or 225 tons of steel girders. At an estimated cost of $600 per ton CIF Mombasa, the cost of steel bridge beams would be $135,000.00

B. Reinforced Steel

It is estimated that in addition to the above steel girders the construction of twenty bridges and large box concrete culverts (in addition to smaller diameter perfabricated concrete culverts) will require an additional 1,000 tons of steel reinforcing rods at an estimated cost CIF Mombasa of $500 per ton or $500,000.

C. Summary:

Steel Bridge Beams	$135,000.00
Reinforcing Steel	500,000.00
Total	$635,000.00

Table 7

OPEX Technical Assistance
Cost Estimates

A. Construction Engineer, Five Worker Years,

Duty Station - Kisumu

1.	Salary	125,000
2.	Post Differential	12,500
3.	Organizational benefits allowance	5,000
4.	Travel to Post/return	8,000
5.	Air freight/return	5,500
6.	Medical disability insurance	2,500
7.	Temporary lodging	3,000
8.	Quarters allowance	20,000
9.	Education allowance	41,250
10.	Home leave/return	12,000
11.	Guard services	5,000
12.	R&R travel	12,000
13.	In country travel	6,250
14.	Furnishing allowance	7,250
15.	Storage	10,000
16.	Miscellaneous and contigency	20,750
	Total	296,000

B. Master Mechanic, Five Worker Years

Duty Station - KISUMU

1.	Salary	125,000
2.	Post differential	12,500
3.	Organizational benefits allowance	5,000
4.	Travel to post/return	8,000

B.	5.	Air freight/return	5,500
	6.	Medical disability insurance	2,500
	7.	Temporary lodging	3,000
	8.	Quarters allowance	20,000
	9.	Education allowance	41,250
	10.	Home leave/return	12,000
	11.	Guard Services	5,000
	12.	R&R travel	12,000
	13.	In country travel	6,000
	14.	Furnishing allowance	7,250
	15.	Storage	10,000
	16.	Miscellaneous and contingency	20,750
		Total	296,000

C. Maintenance Engineer, Five Worker Years,
Duty Station - Nairobi

1.	Salary	150,000
2.	Organizational benefits allowance	5,000
3.	Travel to post/return	8,000
4.	Air freight/return	5,000
5.	Medical disability insurance	2,500
6.	Temporary lodging	4,000
7.	Quarters allowance	35,000
8.	Education allowance	41,500
9.	Home leave/return	12,000
10.	Guard Services	7,500
11.	In country travel	6,500
12.	Furnishing allowance	7,250
13.	Storage	10,000
14.	Miscellaneous and Contingency	20,750
	Total	315,000

D. Deputy Project Leader, Six Worker Years

Duty Station - Nairobi

1.	Salary	150,000
2.	Organizational benefits allowance	6,000
3.	Travel to post/return	9,000
4.	Air freight/return	5,500
5.	Medical disability insurance	3,000
6.	Temporary lodging	3,500
7.	Quarters allowance	42,000
8.	Education allowance	49,500
9.	Home leave/return	24,000
10.	Guard Services	10,000
11.	In country travel	8,000
12.	Furnishing allowance	7,500
13.	Storage	12,000
14.	Miscellaneous and Contingency	26,000
	Total	356,000

Table 8

SUMMARY
PROJECTED ACCRUED EXPENDITURES
($000)

Project Inputs	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	Total
A. AID-LOAN FINANCED								
1.Construction Equip.	3,465	385						3,850
2.Spare Parts		320	480	480	480	480	124	2,364
3.Const. Materials		312	468	468	468	468	152	2,336
4.Rural Roads - FAR	867	1,600	1,600	733				4,800
Sub total	4,332	2,617	2,548	1,681	948	948	276	13,350
B. AID-Grant Financed								
1.Deputy Proj. Leader	67	51	63	51	63	61		356
2.Maintenance Engineer	72	56	68	56	63			315
3.Const. Engineer	33	53	61	53	54	42		296
4.Master Mechanic		62	53	62	54	52	13	296
5.Evaluation	90	77	77	78	78			400
6.Local Engineering contract services	15	24	24	22				85
Sub total	277	323	346	322	312	155	13	1,748

Project Inputs	FY 78	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84	Total
C. GOK Contribution								
1. POL		220	330	330	330	330	110	1,650
2. Labor		160	240	240	240	240	80	1,200
3. 3. Equipment Maitenance		27	40	40	40	40	13	200
4. Camp Operations		41	60	61	61	62	15	300
5. Provincial HQ Const.	100							100
6. Bridge Const. Costs		110	160	160	160	160	50	800
7. Equip. Transportation		200						200
8. Const. Materials		55	80	80	80	80	25	400
9. Const. Equipment	1,403							1,403
10. Equipment Spare Parts	39	72	72	33				216
Sub total	1,542	885	982	944	911	912	293	6,469
Total Project	6,151	3,825	3,876	2,947	2,171	2,015	582	21,567

Table 9

SUMMARY COST ESTIMATE

A N D

FINANCIAL PLAN

Source	A.I.D.						GOK			TOTAL		
	LOAN			GRANT								
	FX	LC	TOTAL	FX	LC	TOTAL	FX	LC	TOTAL	FX	LC	TOTAL
USE:												
1. Construction Equipment	2,977		2,977				964	256	1,220	3,941	256	4,197
2. Spare Parts	1,450	362	1,812					183	183	1,450	545	1,995
3. Construction Materials	1,404	642	2,046					400	400	1,404	1,042	2,446
4. Rural Roads FAR		4,095	4,095								4,095	4,095
5. Technical Assistance				1,196	85	1,281				1,196	85	1,281
6. Evaluation				200	200	400				200	200	400
7. POL								1,100	1,100		1,100	1,100

Table 9

Source	A.I.D.						GOK			TOTAL		
	LOAN			GRANT								
	FX	LC	TOTAL	FX	LC	TOTAL	FX	LC	TOTAL	FX	LC	TOTAL
USE:												
8. Labor								800	800		800	800
9. Equipment Maintenance								200	200		200	200
10. Camp Operations								300	300		300	300
11. Provincial H.Q. Const.								100	100		100	100
12. Bridge Const.								800	800		800	800
13. Equipment Transportation								200	200		200	200
14. Inflation	1,009	865	1,874				146	1,020	1,166	1,155	1,885	3,040
15. Contingency	502	44	546	67		67				569	44	613
Total	7,342	6,008	13350	1,463	285	1,748	1,110	5,359	6,469	9,915	11,652	21567
Percent			62%			8%			30%			100%

Rural Access Roads Component
Equipment and Spares

Table 10

	Item	Quantity	Each U.S.$	Total U.S.$
1.	Farm Tractors	48	11,500.00	552,000.00
2.	Tipping Trailers	64	2,750.00	176,000.00
3.	Trucks - five-ton	8	24,000.00	192,000.00
4.	Water Tanks	16	5,000.00	80,000.00
5.	Water Pumps	16	1,500.00	24,000.00
6.	Land Rovers	12	10,300.00	123,000.00
7.	Vibrator Rollers	8	9,000.00	72,000.00
8.	Sub total: Equipment			(1,219,600.00)
9.	Escalation (from January 1977) on equipment estimated to be at 15 percent			183,000.00
10.	Sub Total: Equipment and Escalation			(1,402,600.00)
11.	Spare Parts at 15 percent Equipment Costs			183,000.00
12.	Spare Parts Escalation at 18 percent for 5 years			33,000.00
13.	Sub Total: Spares and Escalation			(216,000.00)
14.	Total Equipment, Spares and Escalation			1,618,600.00

Table 11

ROAD MAINTENANCE BUDGET

PROJECTED INCREMENTAL BUDGET REQUIREMENTS (KShs.000)

FISCAL YEAR	RRSP GBC PRODUCTION	PROJECTED MAINTENANCE BUDGET INCREASE	RAR PRODUCTION	PROJECTED MAINTENANCE BUDGET INCREASE	TOTAL PROJECTED BUDGET 1/ INCREASE
1978			182		
1979	204		336	189	189
1980	450	471	336	539	1,010
1981	350	1,507	154	889	2,396
1982	450	2,314		1,049	3,363
1983	400	3,352		1,049	4,401
1984	146	4,274		1,049	5,323
1985		9,660		1,049	10,709
1986		11,225		1,049	12,274
1987		11,456		1,049	12,505
1988		11,225		1,049	12,274
1989		11,346		1,049	12,395
1990		5,479		1,049	6,528
1991		9,660		1,049	10,709
1992		11,225		1,049	12,274
1993		11,456		1,049	12,505
1994		11,225		1,049	12,274
1995		11,346		1,049	12,395
1996		5,479		1,049	6,528
1997		9,660		1,049	10,709
1998		11,225		1,049	12,274

1/ No additional inflation contingencies have been built into maintenance costs as it is assumed that tax bouyancy is at least 1 and therefore additional maintenance costs due to inflation will be matched by increased tax revenues.

COSTING OF PROJECT OUTPUTS/INPUTS
($000)

PROJECT INPUTS	OUTPUTS 1/ No. 1	No. 2	No. 3	No. 4	Total
AID					
1. Rural Access Roads - FAR	4,800				4,800
2. Construction Equipment		3,850			3,850
3. Spare Parts		2,364			2,364
4. Construction Materials		2,336			2,336
5. Technical Assistance	85	948	315		1,348
6. Evaluation				400	400
Sub total	(4,885)	(9,498)	(315)	(400)	(15,098)
GOK					
1. POL		1,650			1,650
2. Labor		1,200			1,200
3. Equipment Maintenance		200			200
4. Camp Operations		300			300
5. Provincial H.Q. Const.		100			100
6. Bridge Construction		800			800
7. Equipment Transportation		200			200
8. Construction Materials		400			400
9. Const. Equipment	1,403				1,403
10. Equipment Spare Parts	216				216
Sub total	(1,619)	(4,850)	-	-	(6,469)
Total	6,504	14,348	315	400	21,567

1/ OUTPUTS:
1) Construction of 1,008 KMS of Rural Access Roads
2) Rehabilitation of 2,000 KMS of class D and E roads
3) Improved road maintenance systems
4) Evaluation data

AID 1020-16 (11-72)
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.)

Life of Project: From FY 1977 to FY 1984
Total U.S. Funding $15,100,000
Date Prepared:

PAGE 1

Project Title & Number: Rural Roads Systems Project 615-0168

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal. The broader objective to which this project contributes: (A-1)	Measures of Goal Achievement. (A-2)	(A-3)	Assumptions for achieving goal targets: (A-4)
To assist the smallholder and poorer rural residents to attain increased real income and improved general welfare.	1. Net real incomes of smallholders in project area will increase 18% by FY 1984. 2. Number of bicycles in project area rises 15% by FY 1984. 3. Percentage of school age population in project area attending school rises 10% by FY 1984. 4. Infant mortality during first year of life falls 10% in project area by FY 1984.	1. Central Bureau of Statistics' integrated rural household survey. 2. MOA statistics on production, gross farm revenue, farm management data. 3. Project Evaluation.	1. Increased use of factors of production (inputs), technology (extension services) and markets will raise agricultural output and real farm income of rural poor. 2. Increased use of social services will increase general welfare of rural poor.

AID 1020-28 (5-72)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 1977 to FY 1984
Total U.S. Funding: $15,100,000
Date Prepared:

Project Title & Number: Rural Roads Systems Project 615-0168

PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: (B-1)	Conditions that will indicate purpose has been achieved: End-of-Project status. (B-2)	(B-3)	Assumptions for achieving purpose: (B-4)
To provide isolated rural areas with improved accessibility to public and private factors of production and social services.	1. MOA per-farm extension agent visits increase up to 50% by FY 1984. 2. Volume of marketed crops increases by 20% in FY 1984. 3. Volume of farm inputs increases 15% by FY 1984. 4. Average rural family in project area will increase use of social services by 10% by FY 1984 (user days). 5. DDC develops road selection plans for 3,000 kms. of rural roads by FY 1981.	1. MOW Records on the Road Network. 2. Project Evaluation. 3. MOW/CBS assessment.	1. Improved road network will increase access to factors of production and social services. 2. Increase access provided by a reliable all-weather road network will provide economic/administrative impetus for increased provision of agricultural production factors and utilization of social services, inputs, technology and markets.

AID 1020-24 (5-73) SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Rural Roads Systems Project 615-0168

Life of Project: From FY 1977 to FY 1984
Total U.S. Funding $15,100,000
Date Prepared:

PAGE 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Outputs. (C-1)	Magnitude of Outputs: (C-2)	(C-3)	Assumptions for achieving outputs: (C-4)
1. Class D & E roads rehabilitated (2,000 kms.) 2. Rural access roads constructed (934 kms.) 3. MOW introduces maintenance innovations stemming from grant-financed pilot project ensuring improved maintenance project area at reduced cost to MOW. 4. Socio-economic evaluation of impact of rural roads network on rural population.	1. Up to 934 kms. of farm access roads in six districts of Western and Nyanza Provinces connecting with D & E class roads by FY 1983. 2. 2,000 kms. of D & E class roads will be rehabilitated by FY 1984. 3. Improved maintenance procedures implemented in western Kenya by FY 1984. 4. A comprehensive end-of-project evaluation prepared.	1. MOW Records and Statistics. 2. Mission Assessment of Progress. 3. Evaluation report.	1. Authorization will be provided by May 30, 1977. 2. AID Loan signed by July 30, 1977 and fully disbursed by September 30, 1983. 3. GOK resources allocated in amounts not less than these estimated and in projected time frame. 4. IBRD/SIDA financing for STD expenses available. 5. ODM, UNDP will provide expatriate engineering assistance for implementation RAR program.

AID 1025-28 (11-73)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1977 to FY 1984
Total U.S. Funding $15,100,000
Date Prepared:

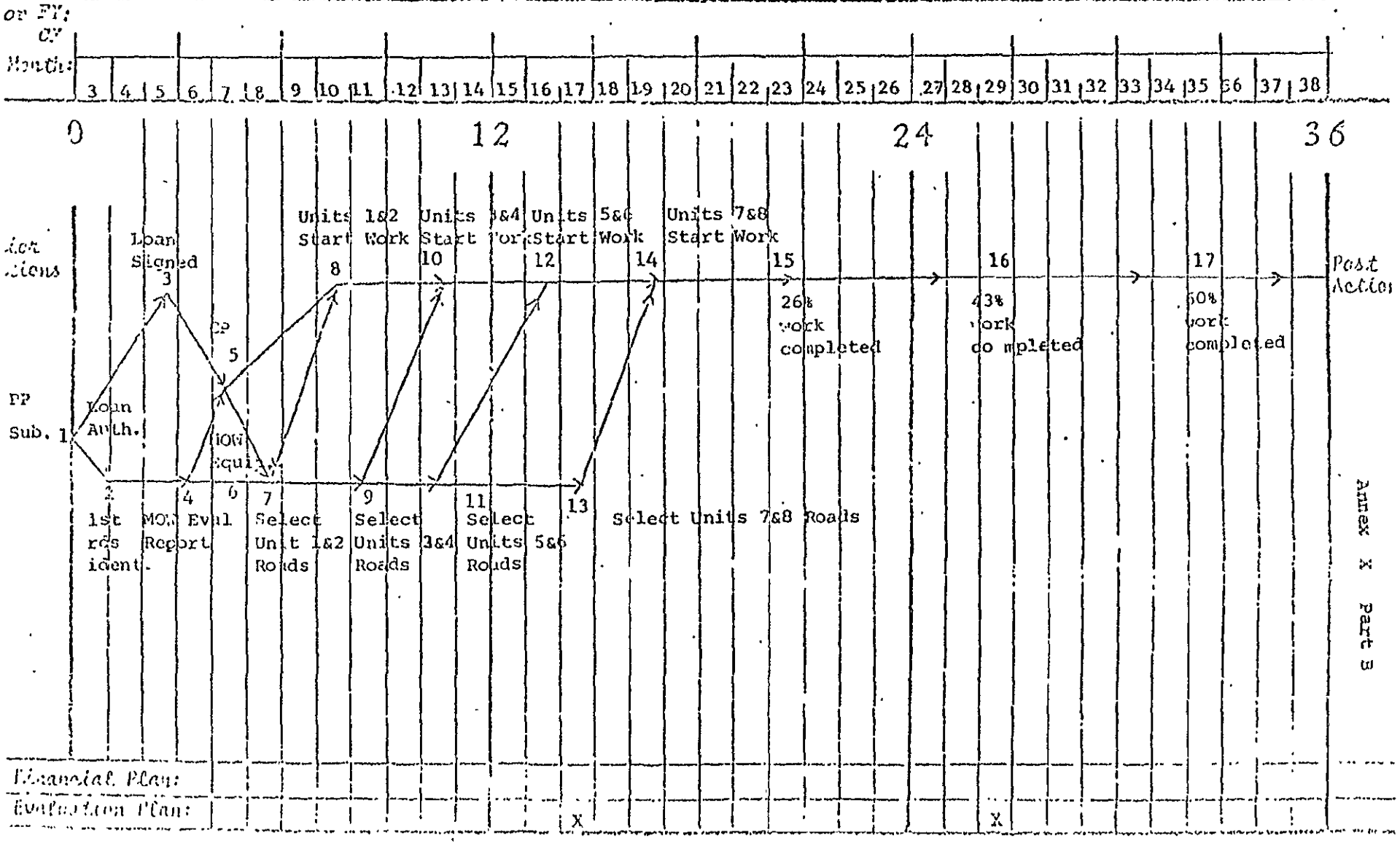
Project Title & Number: Rural Roads System Project 615-0168

PAGE 4

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs: (D-1)	Implementation Target (Type and Quantity) (D-2)	(D-3)	Assumptions for providing inputs: (D-4)
AID: 1. Reimbursement to GOK under loan for financing 100% of the local construction costs of 934 kms of farm excess roads. 2. Loan financing for: (a) U.S. procurement of capital equipment and spares for GBC unit; (b) off-shelf spares. 3. Grant financing of technical assistance for GBC unit, pilot maintenance scheme evaluation components and local engineering services. GOK: Logistical cost support, staff and equipment.	AID: 1. FAR for 100% local construction costs of 934 kms. @ $4,762 per kilometer. 2. Heavy equipment, construction estimates, procurement, services fees: $8.5 million. 3. Deputy Project Leader (engineer) for six years: $350,000. 4. Construction superintendent for five years: $290,000. 5. Master mechanic for five worker years: $290,000. 6. Engineer road maintenance for five years: $310,000. 7. Evaluation contract for five years: $400,000. 8. Local engineering services for three and half years: $85,000.	1. AID Financial Records. 2. GOK Financial Records.	

PPT RM
(May be Expanded as Appropriate)

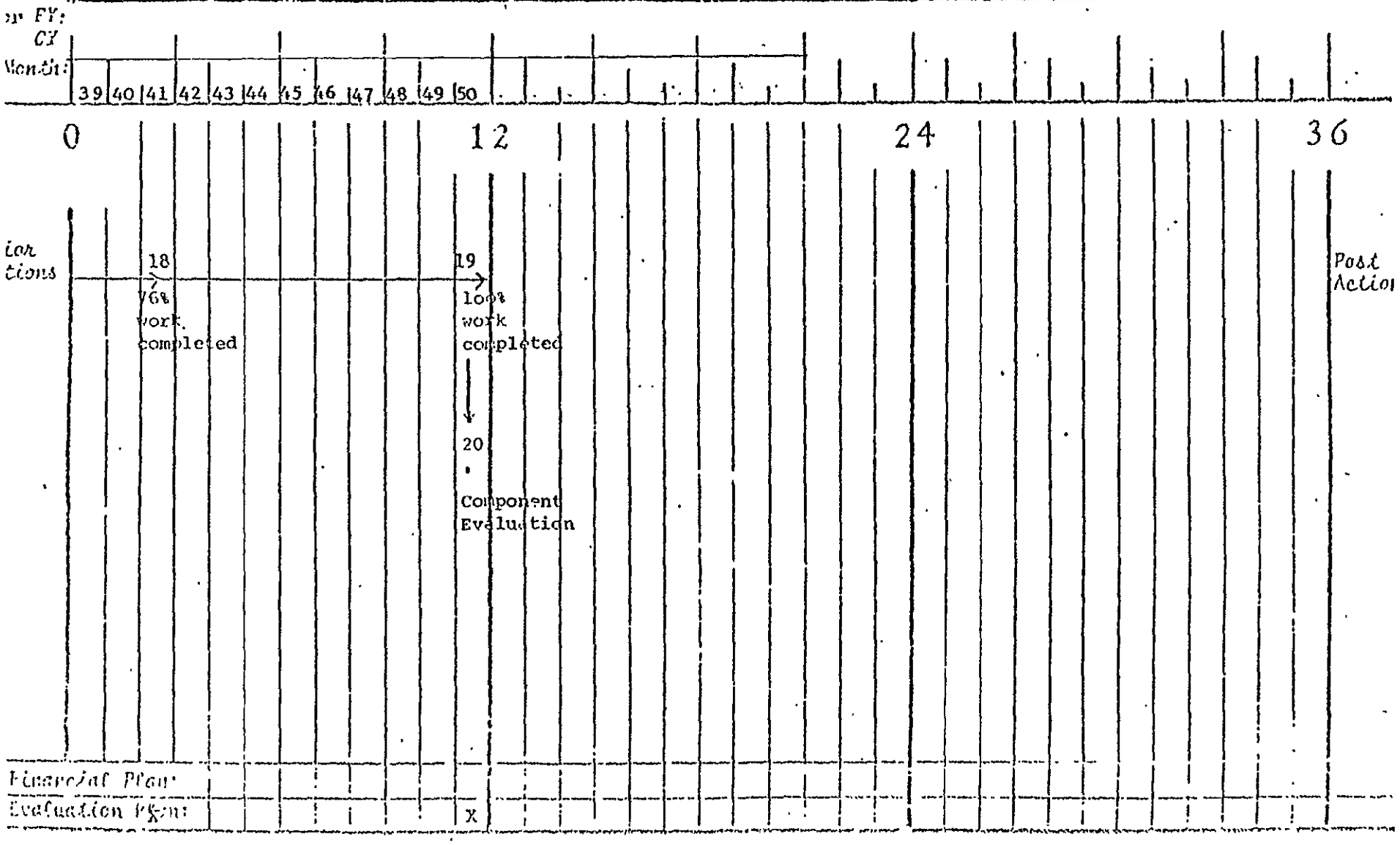
Country:	Project No:	Project Title: Rural Roads Systems Project	Date:	/ X / Original	PPT appr.
Kenya	615-0168	Rural Access Roads (RAR) Component	Mar-77	/ / Revision #	



Annex X Part B

PPT KM
(May be Expanded as Appropriate)

Country:	Project No:	Project Title:	Date:	/ X / Original / / Revision #__	PPT appr
Kenya	615-0168	Rural Roads Systems Project Rural Access Roads (RAR) Component	Mar-77		



PROJECT PERFORMANCE NETWORK

Rural Access Roads

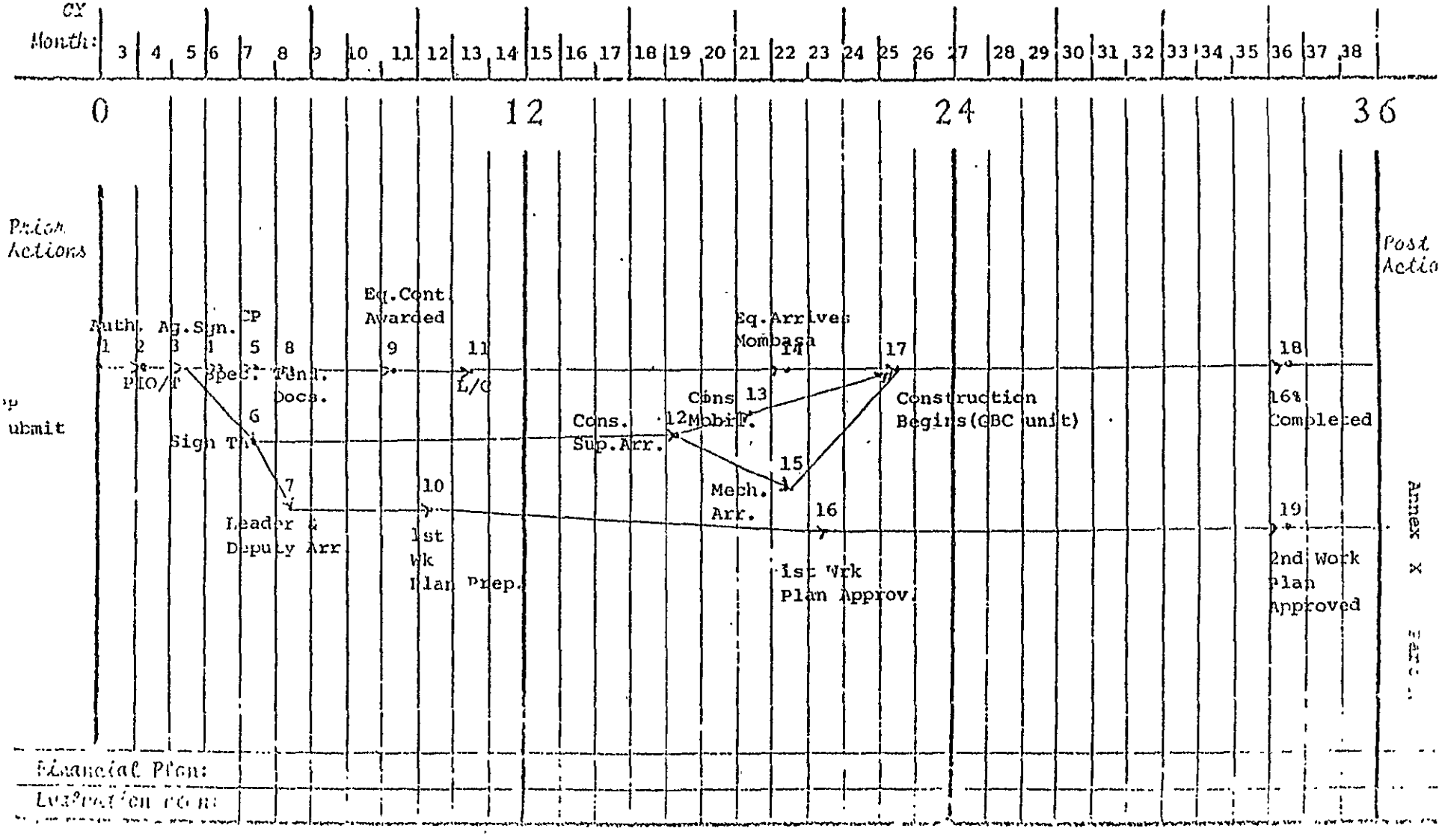
CRITICAL PERFORMANCE INDICATORS

CPI No.	Project Month	Description	Action
1	3	Loan authorized	AID/W
2	4	DDC's identify first group priority roads	MOW
3	5	Loan Agreement signed	AID/GOK
4	6	MOW submit Evaluation Report to USAID naming specific roads for construction	MOW
5	7	Initial Conditions Precedent met	USAID
6	7	MOW procures off-shelf equipment	MOW
7	8	DDC's/MOW select roads units 1 and 2	MOW
8	10	Construction units 1 and 2 start work	MOW
9	11	DDC's/MOW select roads units 3 and 4	MOW
10	13	Construction units 3 and 4 start work	MOW
11	14	DDC's/MOW select roads units 5 and 6	MOW
12	15	Construction units 5 and 6 start work	MOW
13	16	DDC's/MOW select roads units 7 and 8	MOW

CPI No.	Project Month	Description	Action
14	19	Construction units 7 and 8 start work	MOW
15	23	266 kms. roads completed (26%)	MOW
16	29	434 kms. roads completed (43%)	MOW
17	35	602 kms. roads completed (60%)	MOW
18	41	770 kms. roads completed (76%)	MOW
19	50	1,934 kms. roads completed (100%)	MOW
20	50	Project Evaluation	USAID

PPT KM
(May be Expanded as Appropriate)

Country:	Project No:	Project Title:	Date:	/ x / Original / / Revision #	PPT appr
Kenya	615-0168	Rural Roads Systems Project GBC Component	Mar-77		



PROJECT PERFORMANCE NETWORK

PPT RM
(May be Expanded as Appropriate)

Country:	Project No:	Project Title:	Date:	/ x / Original / / Revision #_	PPI appr.
Kenya	615-0168	RRSP GBC Component	Mar-77		

or FY:
CY
Month: 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74

0 12 24 36

Prior Actions

20 → 37% Completed

21 → 3rd Work Plan Approved

23 → 56% Completed

22 → 4th Work Plan Approved

Post Actio

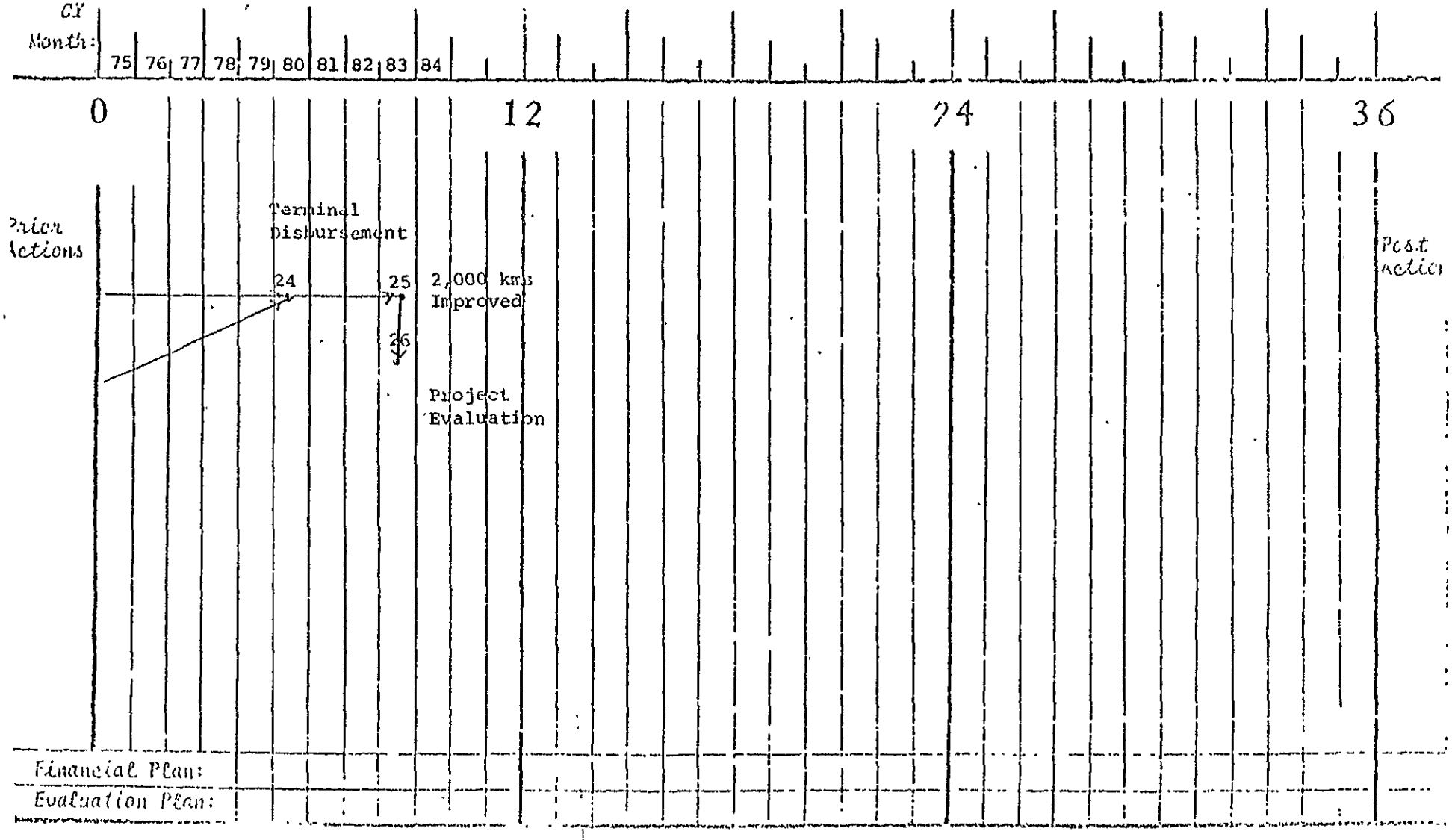
Financial Plan:

Evaluation Plan:

PROJECT PERFORMANCE NETWORK

PPT R:
(May be Expanded as Appropriate)

Country:	Project No:	Project Title:	Date:	/ x / Original / / Revision #__	PPT appr
Kenya	615-0168	RRSP GBC Component	Mar-77		



PROJECT PERFORMANCE NETWORK

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE		APPROVED
Kenya	615-0168	RRSP GBC COMPONENT	March 1977	[X] ORIGINAL [ ] REVISION # ____	

PROJECT PURPOSE (FROM PRP FACESHEET)

To provide isolated rural areas with improved accessibility to public and private factors of production and social services.

CPI DESCRIPTION

No.	Project Month	Description
Prior Action 1		Project Paper Submitted to AID/W(USAID).
1.	3	Loan and Grant Authorized (AID/W).
2.	4	PIO/T's prepared covering grant-funded T/A (USAID/MOW).
3.	5	Loan/Project Agreement signed (USAID/GOK).
4.	6	Specifications and tender documents prepared for U.S. equipment (MOW).
5.	7	Initial Conditions Precedent met (USAID).
6.	7	Sign T/A contract (USAID).
7.	8	Project Leader and Deputy Project Leader (grant-funded engineers) arrive (USAID).
8.	8	Tender documents reviewed and approved (USAID).
9.	11	Equipment contracts awarded(USAID/MOW).
10.	12	First Work Plan being prepared (MOW).
11.	13	Letter of Credit issued covering award equipment (AID/W).
12.	19	Construction Superintendent arrives (USAID).
13.	21	Construction mobilization begins, base camp set up (MOW).
14.	22	Equipment arrives in Mombasa (AID/W).
15.	22	Mechanic arrives (grant-funded) (USAID)
16.	23	First Work Plan approved, construction authorized to being (USAID).
17.	25	Construction begins, GBC unit operational (MOW).
18.	36	Project about 16% completed (MOW).
19.	36	Second Work Plan approved; construction continues (USAID).
20.	48	Project about 37% completed (MOW).
21.	48	Third Work Plan approved; construction continues (USAID).
22.	60	Fourth Work Plan approved; construction continues (USAID).
23.	60	Project 56% completed (MOW).
24.	80	Terminal disbursement date for loan funds (USAID).
25.	83	2,000 kms. roads constructed; project 100% completed (MOW).
26.	83	Project evaluation (USAID).

Draft Project Description

(Annex A to the Project Agreement)

Pursuant to the Borrower's Development Plan (1974-78), the Borrower is concentrating its road construction activities in developing an all-weather rural network of "low" class roads: a major constraint to improving small farmer agricultural productivity. The principal objectives of this rural development strategy are to provide to small farms year-round access to marketing centers and to better health and educational facilities and to create more employment opportunities in the rural areas.

The two road programs which are to implement this strategy are the Rural Access Roads (RAR) activity and the Gravelling, Bridging and Culverting (GBC) effort, which together form the backbone of a rural road network, effectively linking farms to markets.

The $13,000,000 AID loan, together with a $6,500,000 Borrower contribution, will finance a portion of these two complementary, parallel road programs over a six-year disbursement period in two provinces of western Kenya (Western and Nyanza). A $1,700,000 AID grant will provide supporting technical assistance to the Borrower in the implementation of the $21,200,000 project described below:

AID Loan

RAR Component: The loan will assist in the financing of eight labor-intensive construction units which will construct from existing tracks and rights-of-way in remote semi-isolated farming areas approximately 934 kms of new all-weather access roads in certain districts of the Provinces of Western and Nyanza. This work is expected to cost $6,019,000, of which $4,400,000 will be financed by AID covering local costs due to labor-intensive construction methods to be employed, and $1,619,000 by the Borrower. The disbursement of AID loan funds to finance local project costs will utilize Fixed Amount Reimbursement (FAR) procedures.

GBC Component: The loan will assist in the financing of U.S. equipment and construction materials to equip and operate one self-contained construction unit which is to improve and upgrade 2,000 kms of secondary and minor roads through the gravelling and spot improvement of selected sections of these roads. The work is estimated to cost $13,500,000, of which $8,600,000 covering U.S. equipment and spare parts will be financed by AID, and $4,900,000 covering local construction costs will be financed by the Borrower. This construction unit is in addition to the one to be financed under AID's Roads Gravelling Project (615-0170).

AID Grant

The AID loan will be supported by a grant for $1,748,000, consisting of three parts. The first will assist the GBC program by providing the services of a Deputy Project Leader (engineer), a construction superintendent and a maintenance mechanic. The Deputy Project Leader will be headquartered at the MOW office in Nairobi. The others will be in the field with the GBC unit. This part of the grant will also provide the services of a road engineer to design and test a pilot maintenance scheme in the project area. The second part of the grant will finance a U.S. consulting services contract with the MOW for $400,000 to design and manage an evaluation of the program to measure the economic and social effect of improved roads on the rural residents. The third part provides $85,000 for local engineering services to assist the USAID Project Manager monitor RAR construction activity.

NOTE: The Project Description which will be an annex to the Project Agreement will also include, as shown in the Project Paper, final road selection criteria and procedures and a financial plan.

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country: KENYA Name of Project: Rural Roads System Program
Number of Project: 615-0168

Pursuant to Part I, Chapter I, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan and a Grant to the Government of Kenya (the "Cooperating Country") of not to exceed Fourteen Million Seven Hundred Fifty Thousand Dollars ($14,750,000) (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 A.I.D. Loan will assist in the financing of (a) construction units which will construct approximately 934 kms. of new all-weather access roads in certain districts in Kenya (the "RAR" component) and (b) construction equipment and materials to equip and operate one self contained unit which will upgrade approximately 2,000 kms. of secondary and minor roads in certain districts of Kenya through the gravelling and spot improvement of selected sections of these roads (the "GBC" component) (both components hereinafter referred to as the "Project"). The A.I.D. Grant will be used to finance (a) the services of technical assistance personnel for the GBC component, (b) the cost of consulting or other services for the evaluation of the Project, (c) the services of a road engineer to design and test a pilot maintenance program and (d) other services as required for the implementation and monitoring of the Project.

Of the Authorized Amount, Thirteen Million [illegible] dollars ($13,000,000.00) ("Loan") will be loaned to the Cooperating Country to assist in financing certain Foreign Exchange and local currency costs of goods and services required for the Project; and One Million Seven Hundred Forty-Eight Thousand dollars ($1,748,000) will be granted to the Cooperating Country for the foreign exchange costs of the services set forth herein. The entire amount of the A.I.D. Loan and Grant herein authorized for the Project will be obligated when the Project Agreement is executed.

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. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Goods and services financed by A.I.D. under the Loan shall have their source and origin in the United States or in countries included in A.I.D. Geographic Code 941 (and Kenya), and services financed under the Grant shall have their source and origin in the United States, except as A.I.D. may otherwise agree in writing.

c. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, the Borrower/Grantee shall furnish in form and substance satisfactory to A.I.D:

(1) An opinion of the Borrower/Grantee's Attorney General that the Project Agreement has been duly authorized and/or ratified by and executed on behalf of the Borrower/Grantee, and that it constitutes a legally binding obligation of the Borrower;

(2) A statement of the names, and specimen signatures, of the authorized representatives of the Borrower/Grantee for purposes of implementing the Project Agreement.

d. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement for the GBC component of the Project, A.I.D. must approve any contracts entered into by the Borrower/Grantee providing technical and engineering services to the GBC component, except as A.I.D. may otherwise agree in writing.

e. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement for the RAR component

of the project, the Borrower/Grantee shall furnish in form and substance satisfactory to A.I.D., documentary evidence that it will provide the requisite engineering services, and that these services will be available on a timely basis, for this component of the Project.

f. The Project Agreement shall contain the following covenants:

(1) Road Selection

(a) The Borrower/Grantee will covenant that road selection for both the GBC and RAR components of the project will be made in accordance with the procedures and criteria set forth in Section III.A. of the Rural Roads System Project Paper, which procedures and criteria will be incorporated as an annex to the Project Agreement. These procedures and criteria may be modified, as the parties see fit, to reflect periodic evaluations of the project.

(b) The Borrower/Grantee will covenant to submit, with regard to the Rural Access Road component of this project, an Economic Report of the roads selected for construction which would have, as one of its objectives, the demonstration that road selection procedures and criteria have been complied with. The report may contain cost/benefit analyses of the selected roads and analyses of the economic development effects of the proposed roads. More specific details as to the content of this report as well as the timing for it will be given in Project Implementation Letters (PILs) but, however, the report will be required to be submitted to A.I.D. for its approval prior to commencement of work on the roads which are the subject of the report. Unless otherwise agreed to by A.I.D., no reimbursement under the RAR component will be made for any road which is not included in an approved evaluation report.

(c) The Borrower/Grantee will covenant to submit for A.I.D. review and approval annual work plans for the GBC component of the Project. Such work plans will be submitted on dates agreed upon in PILs and will be adequate, at least, to identify:

(i) planned roads for upgrading and/or rehabilitating;

(ii) types of planned upgrading and/or rehabilitating;

(iii) sequence of the work to be undertaken.

(2) Manpower Training

(a) The Borrower/Grantee will covenant to provide for both components of the project trained personnel adequate to upgrade, construct and maintain the roadwork financed by A.I.D. without detracting from non-A.I.D. financed roadwork and maintenance being undertaken, or projected to be undertaken, elsewhere in Kenya.

(b) The Borrower/Grantee will covenant, in order to achieve the purposes in item (2)a above, to expand its existing training facilities for skilled construction and maintenance personnel in accordance with the guidelines set out in an Annex to the Project Agreement to meet the requirements of this project and other, non-A.I.D. financed, roads projects. Any adjustments necessary in the training program will be the subject of the required annual evaluations.

(3) Project Funding

The Borrower/Grantee will covenant that it will supply funding adequate for the continued support of roads construction and maintenance work in the A.I.D. project area in addition to meeting other present and projected construction and maintenance requirements.

(4) Road Maintenance

(a) The Borrower/Grantee will covenant that it will provide all personnel and funds required, and take all actions necessary to maintain the roads upgraded or constructed by this project. To this end, appropriate officials of the Ministry of Works will discuss with A.I.D. representatives, at intervals which will be set forth in PILs, proposed maintenance plans and procedures, including the frequency of road maintenance efforts. The result of these discussions, in the form of maintenance work plans, will be the subject of subsequent implementation letters.

(b) The Borrower/Grantee will covenant to submit reports, as required by PILs, which will assess the work undertaken pursuant to the Pilot Maintenance Program (see Section III.A. of the PP) and which will describe the extent to which the recommendations of this program have been, or will be, implemented and integrated into the Ministry of Works' overall existing maintenance program.

(5) Spare Parts Procurement

The Borrower/Grantee will covenant that it will establish an appropriate, timely and effective system for procuring and transporting spare parts provided in the A.I.D. project and that it will establish a separate warehouse for storage of spare parts provided in the A.I.D. project. To this end, the Borrower/Grantee will submit, prior to the arrival in Kenya of the first shipment of A.I.D. project equipment, a plan satisfactory to A.I.D. which describes in detail the proposed procurement storage, and transportation system.

(6) RAR Equipment

The Borrower/Grantee will covenant that, except as A.I.D. may otherwise agree in writing, all equipment required for construction under the RAR component which the Borrower/Grantee is providing as part of its contribution to the project, will be procured and in country 4 months after execution of the Project Agreement. The Borrower/Grantee will covenant to have equipment for each RAR unit on the construction site in accordance with a schedule to be mutually agreed upon in PILs.

g. The following waivers to A.I.D. regulations are hereby approved:

(1) an increase in the per transaction limitation on shelf-item procurement of Code 935 origin from $2,500 to $5,000.

(2) an increase in the life of project and life of project funding limitations, as set forth under AIDTO Circular A - 466, Handbook 3, Chapter 3, to six years and six months.

(3) proprietary procurement of the same brand names of equipment as that financed by A.I.D. under the previously approved Roads Gravelling Project (615-0170).

Attachment B

(Annex XIII of PP)

INITIAL ENVIRONMENTAL EXAMINATION

Project Location.....Nyanza and Western Provinces
Republic of Kenya

Project Title.....Rural Roads Systems Project

Funding.....$15,100,000

Life of Project.....Six Years

IEF Prepared Jointly by.....AID/W and REDSO/EA Engineers

Date.....April 15, 1977

Environmental Action Recommended.....Negative Determination

Concurrence.....
Charles J. Nelson
Director

Date.....April 15, 1977.....

Assistant Administrator Decision.....

Date.....23 September 1977.....

Signature .....[illegible].....

INTENTIONALLY
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I. Description of Project

The objective of the Government of Kenya (GOK) Ministry of Works (MOW) road program is to provide farm areas with access to markets, agricultural program inputs, and health, education and extension facilities and services. The program is national in extent and is supported by a multi-donor group including USAID. USAID's contribution will assist the Gravelling, Bridging and Culverting program (GBC) and the Rural Access Roads (RAR) program in the western provinces of Western and Nanya. The gravelling unit of this project will supplement the unit proposed in a separate PP (615-0170) and each province will be assigned one unit. The contribution to the RAR program will be restricted to six of the seven districts of Western and Nyanza provinces (excluding South Nyanza district).

AID financing for the GBC program includes the purchase of equipment and spares for a second gravelling unit to be used in improving and otherwise upgrading selected lengths of 2000 kms. of existing secondary and minor roads in one of the two provinces. Also to be financed are materials for the construction of approximately 20 bridges and 4000 cross drainages. The improvements to surfacing and drainage conditions will allow an all-weather standard for these roads that connect the primary roads of the National Classified Roads (NCR) system to the RARs. Upgrading by the GBC units is capital intensive.

The RAR program involves Fixed Amount Reimbursement (FAR) financing to the GOK for 75 percent of the construction costs for upgrading up to 1008 km. of existing tracks in the two provinces to farm access road standards. Each rural access road will be approximately 10 km. in length, 4 m. wide, with 1 m. shouldres and will have a 10-15 cm gravel (laterite) surface. The road profile will provide for a quick runoff which together with an adequate drainage system will maintain a passable road under all weather conditions. For most locations the average daily traffic will not exceed ten for the first few years so design will be flexible and will be adapted to local conditions. Land will be either existing GOK right-of-way or donated by local farmers, so significant realignment of existing tracks is not expected. Tracks to be upgraded to RAR standards will be selected by local committees to provide the best connection between the farm areas and the GBC roads. Construction of RAR's will be largely labor intensive.

With the exception of the relatively narrow plain areas around Lake Victoria, the two provinces are hilly, varying from gentle slopes to very steep escarpments. Soils vary from black cotton in the plains to massive rock outcropings in the Vihiga area.

The provinces have a high population density averaging in excess of 400 persons per square kilometer and reaching as high as 700 persons per square kilometer in the Vihiga area. The population is made up of several tribal groups, the largest being the Luo but there are also large numbers of Kisii and Abaluhya.

Farm sizes in the densely populated and fertile areas average 1 1/2 hectares. In less densely populated areas with poorer land, the average rises to 6 hectares per farm. Land titles in some areas are held by farmers but in the recently settled areas this is less prevalent. Most farming is done by women; in the Vihiga area, 65 percent of working age males work off farms in other parts of Kenya and send money back to their families.

The project will significantly improve the access of approximately 500,000 persons to markets and service centers. The majority of these persons (96 percent are making a living from small holdings) represent the most isolated 12 percent of the total population of the two provinces. The improved access to agricultural program inputs such as seeds, fertilizer, credit, extension services, applied crop research, storage facilities and marketing services is expected to encourage a shift from subsistence farming to successful cash cropping. The improved income earning opportunities will encourage more working males to remain on the farms. More income coupled with better educational and health services will result in an improved standard of living for farm families.

The environmental impact of the overall project will not be significant, as determined in the detailed analysis below. The GBC component will basically be providing spot improvements on already existing gravel roads. The roads on which improvements will be made have been located but specific roads to be improved will be identified under the project. Engineering techniques will be selected so as to minimize any potentially negative environmental impact; e.g. installing structures so as to minimize soil erosion. It is not expected that the road improvements will generate a significant increase in traffic, but will enable farmers and traders to have access to services and markets on a year-round basis. It is, therefore, recommended that a negative determination be approved for the GBC component.

The RAR component will primarily focus on improving some of the existing tracks to the rural feeder road classification. It is determined that, based on the detailed analysis presented hereunder, that this component will not have a significant impact on the environment. Because the actual sites for constructing rural access roads have not been located, unlike in the GBC component, it is more difficult to estimate the probable environmental impact of the RAR component. Knowing the kinds of roads to be constructed, the engineering standards and techniques and the general terrain over which these roads will traverse, USAID/Kenya and REDSO/E judge that there will be no significant environmental impact and recommend that a nagative determination be approved for this component. However, to satisfy AID environmental regulations and ensure that each road will not have a significant environmental impact, the Mission and the GOK will undertake an Initial Environmental Examination for each cluster of roads identified under each year's work/evaluation plan. To minimize the probable negative impacts, the Mission has determined not to support the construction of roads which have been identified, as a result of the IEE, as having significant negative impacts. If, however, the benefits from constructing the road far outweigh the negative environmental impact, the Mission will do an environmental assessment on the road in question before supporting its construction.

II. Gravelling, Bridging, Culverting Program

The AID program is part of a large GOK undertaking in road gravelling for which AID will be providing two construction units, CIDA will provide three construction units. This project was initiated by the Kenya Government's 1972 request - CIDA/SIDA/IBRD as well as AID will be supporting this program. The analysis contained here is derived from reports prepared by these organizations, completed by USAID/GOK/ REDSO reviews.

This program is restricted to returning to an all weather condition roads, which had deteriorated through lack of maintenance, thereby degrading the standard of living of the people in the adjacent areas and villages served by them. The greatest concentration of the project will be in spot repairs, there will be no new alignments. Drainage will be replaced or improved to insure more lasting service

Summary of Environmental Assessment:

There are six major categories of environmental impact areas to be considered within this project. The areas are:

1. Effects of improved access routes into previously less accessible areas and resulting increased level of noise.

2. Protection of wildlife, rangelands, migration routes, etc.

3. Effects of improved road on industrial, commercial or other urban land use patterns.

4. Effects of minor changes in the existing alignment concerning land use, land marks, archaeological sites, etc.

5. Effects of improved drainage patterns.

6. Effects of air pollution from dust.

7. Effects of borrow pits used for surface material.

Environmental Impact Areas:

1) The road networks selected for improvement in the two provinces are not associated with areas designated for wildlife protection, such as rangelands or migration routes. In fact, because of the population densities involved, these areas are devoid of the wildlife which is characteristic of other parts of Kenya. The areas for road improvement are also devoid of bird sanctuaries or lake sanctuaries as found in other parts of Kenya.

2) The proposed two provinces are located in the western part of Kenya containing productive agricultural land. These provinces are densely populated by small farmers primarily involved in subsistence type agricultural operations. Therefore, it is not envisioned that the gravelling of these roads will have a large impact on industrial and commercial development in the area. The only effect expected is that the improved surfacing of roads will facilitate movement of agricultural products to markets which in turn may encourage more intensive cultivation in the area.

3) The roads designated for improvement already exist as a network secondary and minor roads. These roads presently are surfaced with earth, with a limited amount of gravel or laterite. The intention of this program is to upgrade these roads by adding select surfacing material. The minor proposed changes in the vertical and horizontal alignment does not infringe upon or involve historic sites, natural landmarks, archaeological sites, etc. nor does the project destroy timberland, cropland or other resources.

4) It is expected that the regravelling program, which includes shaping parallel ditches and stream crossings, will change the drainage patterns now existing on the unimproved road network. The change is anticipated to result in an improvement of water run-off control by channeling and controlling water into designated ditches and thus minimizing erosion effects. Due to erosion, the improved drainage areas will have some minor environmental impact until the disturbed areas are re-established with vegetation.

5) There will be a certain amount of dust problem during the construction period. This temporary environmental impact is unavoidable. The anticipated increase in the traffic volumes will also contribute to increased dust in the areas. However, the roads are proposed to be improved by surfacing with select gravel material, thus an overall reduction of dust in the areas is anticipated.

6) The gravelling program will be implemented by use of suitable gravelling material from borrow pits. The pits will be selected in areas where it is not densely populated. Borrow pits will ultimately be graded to drain and the natural condition will be restored. These pits are not expected to shelter malaria mosquitos or other water borne insect disease vectors. Therefore, it is expected that this phase of the operation will have very little effect on the environment.

Other possible environmental impact categories suggested in AID's Environmental Assessment/Guidelines Manual were carefully reviewed and found not to be effected by this project. Hence, it is assessed that the overall environmental impact caused by this project is insignificant.

III. Rural Access Roads.

Even though relatively minor, all infrastructure changes affect the human and physical environment to some degree. Careful consideration has been given to the affects of this project. The considerations are summarized below:

A. Resource Linkage.

-- Effect of new or improved access routes into previously inaccessible or barely accessible areas.

The new access routes from the farm to an all weather road will provide mixed benefits.

Pro:

- Animal drawn vehicle and/or motor transportation will substitute for the physical porterage of farm produce to an all weather road.

- Transportation costs will be lower, thereby making farm input costs closer to farmer ability to pay.

- Lower Transportation costs will provide a higher profit on crops produced encouraging more output.

- Easier access to markets will give to farmer better information on food demands, adding to the variety of crops produced.

- Easier access to technical services and credit put the farmer in a stronger position vis-a-vis the merchant.

- School is more accessible.

- Health care will be more reliable.

- Women, who do most of the farming and marketing will have the physical burdens lessened.

Con:

- There will be increased noise because motor vehicles are noisy, initially the frequency of vehicles will be low, maybe one to five per day.

- Dust from construction will be limited because of the labor intensive nature of the project but dust during the dry season will always be a problem, however, the low frequency of motorized vehicles will minimize the volume. There is no economical answer to this cost.

- Easy access will make government demands and interference easier. Pressures from society will increase.

- Maintenance of the road will depend on the beneficiaries, though some reimbursement will be provided by the government.

- Socially children will be less disciplined and family ties will relax.

-- Land-use considerations for multiple use of R/W.

Access road locations will be chosen locally. The project will try to keep alignments on existing trails to avoid changing land use. Where alignments must be chosen in new areas, or for technical reasons, must be different from existing trails, the design will minimize use of productive land. This problem can be dealt with by careful choice of alignment. Alignment will be chosen by the Project Engineer in conjunction with the local people and provincial officials and with the approval of the GOK.

Land use may change due to easier access by transportation. Most areas will have a similar but more intensive agricultural use. However, some roads may give rise to commercial enterprises or of a movement of residences close to the road. Until individual roads are chosen, it is impossible to judge the benefit or cost of such a change. In general, change will be gradual with no dramatic change in land use. The area is heavily populated so no large forests exist except in a few places.

-- Protection of wildlife, rangelands, migration routes, etc.

The dense population, varying from 400 to 700 persons per square kilometer, has already reduced wildlife to a minimal level. Since all access roads will be located in populated areas the likelihood of a change in the

wildlife pattern due to the roads is negligible.

-- Effect of road on agriculture, industrial, commercial or other urban land-use patterns.

The access roads will change the agricultural pattern. It is expected that agriculture will change from a subsistence basis to a cash crop basis over a period of time. Crops will undoubtedly vary in response to a better appreciation of market demands, however, soil characteristics will ultimately limit changes.

It is not anticipated that any significant use of the land away from agriculture, when considering the project as a whole. This may not be true for specific road selections and must be examined at the time of selection.

-- Effect of alignment on other resources such as timberland, mineral deposits, navigable waterways, lakes, streams, etc.

Access roads are designed for low volume farm use. They would not be adequate for development of mineral deposits. This project would not directly affect a mineral resource extraction.

There are no navigable waterways or lakes in the project area. Appropriate design can limit alignment effects. In this project existing trails will be used to the greatest extent possible. Dense settled population constrains alignment. Only in the northern portion of Western Province is new land being opened on the slopes of Mount Elgon. Even this area is already heavily populated but often with very little, if any, access to markets.

-- Protection of historic sites, religious or spiritually-hallowed ground, natural landmarks and archaeological sites.

The selection criteria and methodology guarantee that sensitive sites will be avoided. Road choices and priorities are set by the local people through the DDC. Only where existing alignments are not feasible for technical reasons will changes be made. In these cases local approval will be obtained before commitments are made to the choice.

B. Physical Aspects.

-- Potential for and consequences of strip or squatter development along R/W.

There is a potential for strip development along the R/W. This usually occurs where commercialization seems profitable. Most rural access roads will be in relatively remote areas serving a limited agricultural population. In certain locations it seems reasonable to expect that there would be shops and residences built alongside the road. Such development would indicate the growth of a cash economy and the capability of the local agricultural sector to support local business.

-- Effect of changed drainage patterns and configurations.

Most of the two provinces covered by this project are hilly and drainage patterns are determined by the major topographical pattern of the area. Provided that alignments are not changed major drainage patterns would not be affected. Road design and culvert placement can insure that existing drainage ways are used. Changes in alignment can change drainage patterns if ditches carry water from one area to another. This can be prevented by designing ditch outlets in such locations that little runoff crosses natural drainage boundaries.

The major adverse affect of earth roadways in hilly areas is erosion. There is no way short of paving the road to prevent gullying and rutting as the result of heavy tropical downpours. The same problem arises in a more serious form in ditches with high grades. Ditches erode and can undercut the road. The project proposes to riprap ditches shich may be expected to have severe erosion.

-- Considerations given to borrow pit and waste area siting and restoration.

The nature of the labor intensive low volume road design is such that most of the material required will be taken from alongside the road, where this is so the ditches and borrow area can be all part of the design. For lateritic material, locations of suitable sources will have to be found and a borrow pit excavated. There are two concerns with such pits (1) drainage to avoid standing water and (2) land scars. In this project, it would be expected that most borrow pits will be in rolling hilly areas. The design of the pit drainage will avoid standing water or water discharges which might be damaging to downstream areas. The design of borrow pits will include plans for a final contouring of the pit into the adjacent area.

-- Effect of air pollution including both fuel combustion and dust.

There will be both fuel combustion products and dust, which at present may not exist in the immediate areas of the proposed rural access roads. However, in the provinces as a whole the traffic is heavy. On the Rural Access Roads themselves the low frequency of vehicle passage will insure that no concentrated build up of road related pollutants will accumulate.

C. Socio-cultural Aspects.

-- Effect on primitive cultures by providing access to previously inaccessible areas.

There are no primitive cultures in the area of the project. There are several indigenous tribal cultures which are already interacting continuously with the fast growing modern sector. It is unlikely that this project would have any significant effect on current trends. To avoid undesirable changes to local , the road selection process was placed with the local District Development Committees.

-- Dislocation of population by new or widened R/W's.

No dislocation of any persons is anticipated. Most land in the area is held under title, the local district committees will arrange for any land needed with the individuals affected.

Dislocation is possible, but will be minimal because of the use of existing tracks as the alignment for most of the roads. The localized selection procedures should insure that local interests are carefully weighed against the interests of the individual to be affected.

-- Aesthetic considerations of alignment and grade.

Only where excessive grade exists will there be any change from present alignments and grade. The design will avoid major changes from location of existing tracks. It is expected that because of local participation in selection procedures aesthetic issues will be considered, however, this is not one of the criteria for selection.

-- Effect of increased noise level.

Noise is of a concern at two stages (1) during construction and (2) day-to-day operations. The project is primarily labor intensive in nature and few pieces of motorized equipment are being used. The temporary additional noise

due to this small equipment input will have no significant affect. There will also be increased noise level resulting from motorized traffic. It is expected that initial traffic volume will be low and increase at a very slow rate. Traffic frequency is expected to be low enough that noise generated will be little and seldom with no continuous objectionable or harmful effects.

-- Potential for new pathways for disease vectors, including human, animal and plant diseases.

While the new roads provide easier transportation access to locations difficult or impossible to vehicles, the population density, and limited wild areas mean that disease vectors presently have free pathways. The area does from time to time have outbreaks of endemic diseases, such as cholera. In so far as the roads will increase the frequency of human and animal contacts, the possibility of vector movement increases, on the other hand, it provides easier access to public health personnel. The population can be assured of better health care and a greater opportunity to recognize infectious possibilities early. It is recognized that professional and technical personnel will go to outlying areas if relatively easy transportation is available.

A more general discussion of the social effects is presented in the following section.

IV. Discussion of Impacts: Cultural and Socio-Economic

A. Introduction

1. Overview

The Rural Roads Systems Project is one of a set of programs addressing the problems of rural farmers in western Kenya. The cultural and socio-economic impacts of the roads project are directly related to the provision of new and improved access. The project plans to upgrade 2,000 kilometers of existing secondary and minor roads as well as construct 1,000 kilometers of new rural access roads.

The RRSP contains two components: the Gravelling, Bridging, and Culverting (GBC) component which will upgrade secondary and minor roads and the Rural Access Roads (RAR) component which will construct five to ten kilometer lengths of feeder roads which will link up with the GBC roads.

2. Social Setting

The target area is densely populated and almost entirely rural in nature. The average density is 231 persons/square kilometer, the average parcel of cultivated land is 2.4 hectares and 28 percent of the farmers cultivate less than one hectare. The estimated per capita income ranges between $96 and $160 per annum. The population is estimated at slightly more than four million, representing approximately one-third of Kenya's total population.

Western Kenya is already deeply involved in the economic development process with numerous aspects of increasing individual modernity readily apparent. With respect to most developing countries, western Kenya alreasy has a rather extensive rural roads network. This project will bring a portion of that network up to an all-weather standard as well as constructing additional rural roads into those areas now poorly served by the road network. Within the context of the existing road network and the existing pattern of increased modernity, the introduction of an all-weather road network is not expected to generate significant alterations in the socio-cultural fabric of the project area. The road network will, however, accelerate - as opposed to introducing - the pact of economic and social change in the project area.

There are three dominant ethnic groups in the two provinces - the Luo, the Gusii, and the Luhya. There are important cultural, historical, and agricultural differences between these groups and these differences will be taken into account during project implementation. It is expected that the degree of local participation and cooperation will vary between groups. More importantly, the entire project area is more or less involved in a similar process of rapid change. The effects of community-level adaptation to a range of different local micro-systems make environment and specific locational considerations far more relevant to the achievement of the project objectives than ethnic or cultural ones.

3. Demographic Patterns

The 1969 census shows a significant outflow (-8.8 percent) from Western Province and a very slight inflow (+0.3 percent) to Nyanza Province. Permanent migration into or out of the project area is relatively rare, although there are major short-term and medium-term flows due to better employment opportunities elsewhere. It is expected that this project will, on the average, contribute to reducing the rate of out-migration through the provision of employment opportunities on road construction and road maintenance as well as to help raise the agricultural production level in the project area.

B. Sociological Nature of Benefits

1. Selection of Roads

The selection of the roads to be built and improved is a key feature of the RRSP. The Special Rural Development Project (SRDP) Evaluation recommended that the District Development Committee (DDC) be involved in the road selection process. It was argued that the balance of locally elected members of Parliament, County Council heads, other selected leaders and representatives of each ministry involved in rural development constitutes the most representative body now in operation. Experience in Migori, South Nyanza showed how the DDC and sub-location committee positively affected the selection of rural access roads. 1/ It is possible that a relatively remote community lacking full representation on the DDC could be overlooked in the road selection process. The project evaluation and regular monitoring activities will need to carefully focus on questions of

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1/ Institute for Development Studies. Overall Evaluation of the SRDP. University of Nairobi, 1975.

local participation in the road selection process. Local committees will be established to assist the DDC's in order to increase the degree of local participation and control in the road selection process.

2. Rural Employment

It is estimated that the RAR component will generate 6,200 worker years through road construction (employing perhaps 20,000 individual workers). The road maintenance program could employ approximately 400 project area resident's every year. The GBC component will result in some 1,000 worker years of employment on the GBC unit plus another 1,000 worker years for the labor intensive construction and placement of bridges and culverts.

It is planned that recruitment for the unskilled labor positions will favor the poorest of the area's residents. Devising a fair system for allocation of jobs is difficult and there are always new ways being devised to "beat the sytem". Under the SRDP various systems were tried in order to achieve an equitable system of labor recruitment and it is expected that with some adaptation to local situations, these systems will largely overcome the recruitment problems.

Road construction activities and employment recruitment will be timed to minimize conflict with the periods of heaviest labor demand by farms. In general, with a total population of over 4 million in the project area, it is not expected that the project will seriously strain the area's available supply of labor. In fact, it is expected that some decrease in out-migration could result from increased local employment opportunities due to the construction and maintenance labor requirements.

3. Increased Participation in the Market Economy

While improved access will increase the economic opportunities of the project areas residents, there are several potential problems which must be monitored as the project progresses. It is important to note that despite the relatively large volume of sociologically orientated literature on the project area, that little work has been done on the actual impact on the project area of an improved and slightly expanded road network. It is therefore possible only to identify potential problems and to suggest their order of magnitude.

Within a road's zone of influence, those residents with the greatest resources will be in a position to take maximum advantage of the expanded road network. However it is important to remember that the roads will serve almost exclusively smallholder farming areas and that relative to national income differentials, the intra-project area income differentials are minimal. Furthermore, the increased access will also give the poorest farmer an opportunity to take advantage of newly created or improved access.

Considerable study has been undertaken in Kakamega on the effects of a sugar factory on land prices and land holdings in that area. It was found that a new small scale entrepreneurial class was emerging and purchasing farmland for sugarcane production. While there has been an increase in land purchases in some locations within the project area, the attitude toward land and land sale varies considerably throughout the two provinces. Furthermore, it is still very much an open question among economists and sociologists whether selected land purchases have a positive or negative impact on the individuals and area directly affected.

There are, however, no prior grounds for determining that land purchases generated by improved access will be either on a significant scale or have significant consequences.

4. Role of Women

There is a growing literature on the role of women in the development of Kenya. Most reports mention the increasing workload placed on the wife as the family in increasingly involved in the cash economy. Of particular note is the study by Suan Abbott[2/] which identified five factors increasing the stress on women: 1) lower cash income than neighbors, 2) when a husband sleeps at homemmakes management decisions for the farm, but does not work at home, 3) no formal education, 4) not joining women's organizations, 5) to have five or more children.

On one hand, therefore, improved access and incremental agricultural production will increase the workload on the women while in the context of the overall development of the project area, the RRSP will accelerate rather than initiate this process. On the other hand, the project will help reduce the relative income problem through

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2/ S. Abbott. Full-time Farmers and Weekend Wives. PhD. Thesis, University of North Carolina, 1974.

the provision of cash employment in the construction and maintenance operations as well as providing new opportunities for increasing on-farm production margins. New employment and improved productivity will help reduce some of the area's outmigration, reducing stress related to the absent-husband. Improved access will also increase social interactions and contacts thereby reducing the dependence on local women's organizations. Improved access to health facilities and family planning clinics is expected to have an impact on reducing population growth, thereby addressing stress related to large families.

In sum, improved access will accelerate an on-going process, a process, which, on balance, will improve the role of women. Further research must be undertaken, and will be included in the evaluation component, to examine the sequence and magnitude of changes in the role of women, changes which are generated by the RRSP and other development efforts.

5. Nutritional Considerations

Nutritional studies in Kenya have shown great intra and inter-community variability in levels of nutrition, especially among young children. The prediction as to whether access roads may contribute indirectly to a raising of lowering of overall nutritional levels cannot be made, but the issue should be carefully monitored by the Project evaluators.

The process of increased cash crop production (a process which the RRSP will help accelerate) has, in some cases, lead to greater malnutrition among young children, especially in mono-crop cash cropping. The RRSP will only have a marginal impact on increasing mono-crop cultivation. It is expected that increased access to social services, especially health facilities, and increased field visits by health officials, will introduce elements of basic nutritional health to the project area's rural poor.

6. Family Life

The project area is currently undergoing a modernization process as cash cropping and family income increase and social and cultural barriers decrease due to both increased access, greater physical mobility, universal primary education, and the gradual evolution of small central places. The RRSP will facilitate these general and irreversable trends.

The break-up of families, decrease in mutual dependence of previously isolated nuclear and extended families, and the growth of more complex sets of social relations are already a major social phenomena in the project area. The quality of social life will be enhanced by greater opportunities for people to associate, to communicate, and to participate together in social events. Improved access will make it possible for divided families to be reunited more frequently.

7. Beneficiaries

The principal direct project beneficiaries are the road construction/maintenance employees and the small farmers living within the project area. Some road benefits will also accrue to merchants and traders. See Annex VI, pages 46-58 and Section III.D.

C. Summary

Whether all of the Project objectives have an equal chance of being realized is open to some question. In general, however, the Project is firmly based-from the social perspective--on knowledge gained from a number of localized studies as well as previous experimentation in the Project areas. It is being initiated in concert with other ongoing projects and activities operating in the area. This will increase the likelihood that the positive social consequences of the rural access roads for farm families and communities throughout western Kenya will be attained. On the basis of social considerations, there is ample reason to expect the Project to make an important positive contribution in the districts in which it will be implemented.

V. Evaluations

A. Formal Evaluation of the Impact of the Program on the Environment

Evaluating the impact of the proposed road construction program on the environment will be conducted in two ways. The first will be through the annual evaluations that are required under the program (See Section IV-C). The first evaluation is scheduled to begin twelve months after signing of the Project Agreement. These will continue annually until the project is completed. (See Section IV-B1, Schedule of Major Events). The evaluations will among other things, focus on the environmental consequences and impact of the program during the construction period and will address the following major areas:

A. Land Use
B. Water Quality
C. Atmospheric
D. Natural Resources
E. Socio-Economic
F. Cultural
G. Health
H. General

The evaluations will be conducted jointly by the USAID and the MOW and will follow criteria (checklist) specifically developed and agreed to by AID/Washington, the USAID and the MOW. The criteria will be spelled out to the MOW by implementation letter. Further, the MOW will periodically report to the USAID on the status of the program by means of Quarterly Progress Reports. These reports will comment on the environmental effects, both positive and negative, of the roads under construction and will serve as a monitoring device to identify at an early stage any adverse effects on the environment, and problems relating thereto, that may arise during the construction period.

Second, there are $400,000 in grant funds earmarked for undertaking a comprehensive evaluation of the program, including the impact on the environment. The evaluation will attempt to test the hypothesis that the rural roads proposed for financing under this program have a direct economic impact on the target group. It is expected that this evaluation, including the environmental impact, will be carried out through a host country contract with a U.S. consulting firm. The consultant will assist the GOK in designing

the evaluation scope of work including a sub-scope for the environmental evaluation. Arrangements will be made to provide full-time Kenyan field personnel to gather the necessary baseline data at the district level.

The IBRD has also earmarked funds for evaluating its rural access road and IADP loan programs. The MOW, therefore, is anxious to coordinate the evaluation for the RRSP with other evaluations that are being planned in order to avoid any duplication of effort. The MOW believes its Central Bureau of Statistics could play a lead role in conducting a coordinating approach to the AID and IBRD project evaluations and has asked the USAID to consult with them at an early stage to determine the feasibility of a coordinated, joint evaluation effort. The agreed-upon scope of work, including criteria and a checklist for conducting the final environmental evaluation will be spelled out to the MOW by implementation letter.

VI. Impact Identification and Evaluation Form

Impact Areas and Sub-Areas	Impact Identification and Evaluation 1/
A. Land Use	
1. Changing the character of the land through:	
a. Increasing the population	L
b. Extracting natural resources	N
c. Land clearing	L
d. Changing soil character	L
2. Altering natural defenses	L
3. Foreclosing important uses	N
4. Jeopardizing man or his works	L
5. Strip or squatter development along R/W	L
6. Borrow pit sitting	N
B. Water Quality	
1. Physical state of water	L
2. Chemical and biological states	M
3. Ecological balances	L

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

C. Atmospheric

1. Air additives	L
2. Air pollution	L
3. Noise pollution	N

D. Natural Resources

1. Diversion, altered use of water	L
2. Irreversible, inefficient commitments	L
3. Wildlife	N

E. Cultural

1. Altering physical symbols	N
2. Dilution of cultural traditions	M
3. Damage to primitive cultures	N

F. Socioeconomic

1. Changes in economic/employment patterns	M
2. Changes in population	L

3. Changes in cultural patterns	L
4. Dislocation of population by new or widened R/W	L

G. Health

1. Changing a natural environment	N
2. Eliminating an ecosystem element	N
3. New pathways for disease vectors	L

H. General

1. International impacts	N
2. Controversial impacts	L
3. Larger program impacts	L

Summary Recommendations:

The above discussions examine the project in general, from this point of view the project has beneficial effects on the population it will serve and will have no significant adverse impact. However, any discrete subproject or part of a project may have adverse impacts. The approval of a negative determination for the project as a whole does not automatically extend to each subproject. As each cluster of rural access roads is chosen, an environmental determination must be made on each subproject. If the specific determination confirms this general determination, it shall be so stated and the negative determination restated. If significant affects are possible for any subproject or part of the subproject, an environmental assessment is required.

To ensure no significant adverse environmental impact for the RAR component, it is recommended that the Mission and the GOK undertake an IEE on each cluster of roads identified for construction in the annual work/evaluation plan. AID will not support the construction of roads identified as having significant negative environmental impact. If, however, the benefits from constructing such roads far outweigh the negative environmental impact, the Mission and the GOK will prepare an EA, and, taking the results of the EA into consideration, the GOK will decide whether or not to construct the road(s).

Obligating funds for the entire project prior to IEE's for specific RAR roads does not pose FAA Sec. 611(a) problems because there are many alternative roads which can be upgraded/constructed, if, for environmental reasons, it is determined that AID should not support the construction of a road. It will be possible to substitute another road without delaying implementation of the project.

The foregoing plan satisfies Regulation 16, even though individual RAR's have not been selected. The IEE shows that from an engineering and sociological standpoint, there is not foreseeable significant impact on the environment. This conclusion is reinforced by AID's experience with similar rural roads projects. In addition, the plan to do an IEE for each road subproject during the road selection process ensures (1) that AID and the host government will be appraised of the benefits-costs of the roads selected and (2) that roads causing adverse environmental impacts will not be constructed, except in circumstances where there are overwhelming benefits. The IEE requirement, along with the Mission's right to approve roads to be constructed, will ensure the validity of the initial examination.

The Mission intends to make maximum use of its prior approval rights to ensure that there will be no significant adverse impact on the environment. The Mission Director will sign a formal Threshhold Decision prior to USAID's concurrence in proceeding with any road or package of roads subproject. Provision for this procedure will be included in the Project Agreement as a covenant.