

UNITED STATES GOVERNMENT

Memorandum

6150170-②

PD-AAA-814-81

TO : See Distribution

FROM : AFR/DR/ESAP, John Wooten

SUBJECT: Kenya Roads Gravelling Project Paper

DATE: SEP 01 1976

pp 3/5/76

Attached for your immediate attention are the original Project Paper for the Kenya Gravelling Program (submitted in March, 1976 as "Agriculture Sector Loan II - Part A") & an Addendum to this document. The title of the project has been changed to "Kenya Roads Gravelling". The Addendum was prepared by USAID/Kenya with assistance of Louis Berger, International, Inc.

An initial project committee meeting was held in April, 1976 in which several issues were identified (see State 99396 and 121110 attached). The Addendum to this Project Paper addresses these issues.

To expedite the review process and to assure authorization of this project for a TQ obligation, a Project Committee meeting is scheduled for Tuesday, September 7, 1976 in Room ~~6742~~⁸⁴¹⁴ at 2:00 p.m. Following is a tentative schedule for preparing the subject project for TQ authorization/obligation:

Project Committee Mtg.	September 7, 1976
ECPR	July 14, 1977
DLSC	July 22, 1977

Your attention to this matter is appreciated.

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43
ORIGIN AID-31

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E.O. 11652:N/A

TAGS:

SUBJECT:KENYA - GRAVELLING UNIT
REF: CYLKE/NELSON TELCON 4/22/76

1. SUMMARY OUR CONVERSATION FOLLOWS:

- A. THE GRAVELLING PROGRAM SHOULD BE MORE CLOSELY RELATED TO RARP. IF GRAVELLING PROGRAM WERE FOCUSSED FIRST ON THOSE SECTIONS OF ROADWAY WHICH DETERIORATE RAPIDLY DURING RAINY SEASONS AND WHICH SERVE TRAFFIC FROM RARP, THIS WOULD:
- I) RELATE PROGRAM MORE DIRECTLY TO ACCESS FOR SMALLHOLDERS
 - II) PROVIDE HIGHEST AGRICULTURAL AND ECONOMIC BENEFITS PER UNIT COST
 - III) JUSTIFY A MORE MECHANIZED OR CAPITAL-INTENSIVE ORGANIZATION THAN PRESENT GENERAL PROGRAM DUE TO GREATER MOBIL-

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ITY REQUIRED

IV) TIE THE PROGRAM MORE CLOSELY TO DISTRICT DEVELOPMENT COUNCILS' PRIORITIES AND COORDINATE WITH OTHER DEVELOPMENT OR SERVICE-PROVIDING ORGANIZATIONS.

B. THE STANDARD CROSSSECTION PROPOSED IN THE PP SHOULD ONLY REPRESENT A DESIRABLE MAXIMUM, WITH FLEXIBILITY TO GIVE NARROWER EXISTING SECTIONS THAT HAVE OTHERWISE GOOD ACCESS CHARACTERISTICS LOWEST PRIORITY.

C. COORDINATION WITHIN SPB SHOULD BE SPECIFIED BETWEEN GRAVELLING PROGRAM AND RARP. THIS SHOULD INCLUDE CLEAR DIVISION OF RESPONSIBILITY FOR MINOR ROADS BETWEEN RARP AND GRAVELLING PROGRAM.

D. STAGED CONSTRUCTION SHOULD BE EXPLICITLY CONSIDERED, PARTICULARLY WITH REGARD TO ROAD WIDENING WHICH SHOULD BE CONNECTED TO ECONOMIC BENEFITS AND ASSOCIATED TRAFFIC LEVELS.

E. LABOR-INTENSIVE METHODS SHOULD BE RE-EXAMINED USING UPDATED UNIT COSTS AND SHADOW COSTS OF LABOR IN A SENSITIVITY ANALYSIS, PARTICULARLY FOR QUARRYING TASKS. THE REQUIRED LEGAL ARRANGEMENTS AND ORGANIZATION SHOULD ALSO BE IDENTIFIED.

F. THE LENGTH OF ROAD FOR EACH AVERAGE SURFACE CONDITION OVER THE YEAR SHOULD BE ESTIMATED AND USED TO COMPUTE UNIT BENEFITS OF ROAD IMPROVEMENT. THE LENGTH OF SECTIONS PRESENTLY CUT DURING RAINY SEASON SHOULD ALSO BE SPECIFIED (USING 100 METER SECTIONS OR THE EQUIVALENT).

G. INDUCED BENEFITS SHOULD ALSO BE ESTIMATED. THIS ESTIMATE SHOULD TAKE INTO ACCOUNT AT A MINIMUM CHARACTERISTICS OF REGIONS WITH COMMON ECONOMIC RESPONSES BASED ON PAST PROJECT IMPACTS. THESE BENEFITS SHOULD BE CALCULATED IN PARTICULAR FOR IMPROVEMENT TO AN ALL-WEATHER STANDARD. THEN THIS IMPROVEMENT CAN BE RELATED TO SMALLHOLDER BENEFITS AND PROJECT PRIORITIES CAN BE MORE CLEARLY IDENTIFIED.

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H. A COMMITMENT OF ADEQUATE COUNTERPART AND MAINTENANCE EXPENDITURES SHOULD BE OBTAINED FROM GOK.

I. ALL ASSUMPTIONS AND THEIR BASES SHOULD BE STATED, PARTICULARLY FOR COST ESTIMATES, INFLATION RATES, UNIT BENEFITS, AND TRAFFIC GROWTH RATES.

2. ITEMS A THROUGH D CAN BE ACCOMPLISHED THROUGH A NEGOTIATED AGREEMENT WITH MOW. THIS WOULD TAKE 1-4 WEEKS IF MOW IS WILLING TO COOPERATE. THE CHANGES WOULD BE CONGRUENT WITH THEIR STATED PHILOSOPHY AND THEIR DESCRIPTION OF THE RARP.

3. ITEMS E, F AND I WILL REQUIRE ADDITIONAL ANALYSIS WHICH CAN PROBABLY BE CARRIED OUT WITH EXISTING DATA WHICH IS READILY AVAILABLE IN NAIROBI, OR CAN BE ESTIMATED FROM EXISTING DATA. THESE TASKS WILL TAKE TWO PERSONS (ONE ENGINEER AND ONE ECONOMIST) 3-5 WEEKS TO ACCOMPLISH. THE TASKS HAVE AN IMPACT ON PROJECT COSTS, EQUIPMENT SELECTION, AND PROJECT BENEFITS.

4. ITEM G REQUIRES SOME DATA COLLECTION AS WELL AS ANALYSIS AND COULD REQUIRE 8-10 MONTHS OR MORE.

5. ITEM H REQUIRES NEGOTIATION WITH MOW AND POSSIBLY THE MINISTRY OF FINANCE. HOWEVER THIS PROCESS HAS ALREADY STARTED AND IT APPEARS TO BE UNDER CONTROL.

6. IN SUMMARY, IT APPEARS THAT ITEMS A, B, C, D AND H COULD BE ACCOMPLISHED PRIOR TO THE END OF MAY 1976. ITEMS E, F AND I COULD ONLY BE ACCOMPLISHED WITH A CRASH PROGRAM IN THIS PERIOD. IT REMAINS TO BE DETERMINED IF THESE ITEMS ARE ESSENTIAL TO THE FY 1976 LOAN. FINALLY, ITEM G IS A LONGER-TERM TASK WHICH WOULD HAVE TO BE DEFERRED TO FY 1977 IN ANY CASE.

7. WILL CABLE DETAILED PROJECT COMMITTEE/BERGER COMMENTS SOONEST. REQUEST YOUR ASSESSMENT BEST APPROACH GIVEN PROPOSED GOK/IBRD NEGOTIATIONS AND REQUIREMENTS/TIMING SKETCHED ABOVE. SISCO

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ORIGIN AID-40

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UNCLAS STATE 121110)

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: KENYA GRAVELLING PROGRAM

REF: STATE 99396

NAIROBI FOR USAID AND REDSO

1. AID REPS MET WITH GOK/MOW DELEGATION (INCLUDING P.DENNIS,
J. WAIRAGU, N.P. RADIER, F.E.A. NDERITU AND S.J.MBUGNA) MAY
10. BELIEVE THERE GENERAL UNDERSTANDING AID CONCERNS SUM-
MARIZED PARAS 2-4 BELOW.

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2. GOK CRITERIA/PROCEDURES FOR RESOLVING FOLLOWING ISSUES NOT YET DETERMINED. IN ABSENCE IDENTIFICATION SPECIFIC ROAD SECTIONS, PP MUST SPECIFY CRITERIA/PROCEDURES FOR RESOLVING FOLLOWING QUESTIONS:

A. UNDER WHAT CIRCUMSTANCES IS ROAD IMPROVEMENT FOR PURPOSES OF ACCESS WARRANTED?

B. TO WHAT STANDARDS DO THOSE CIRCUMSTANCES WARRANT IMPROVEMENT?

C. ASSUMING 800 KM DOES NOT REPRESENT TOTALITY OF REQUIREMENT, HOW ARE ROAD SECTIONS PRIORITIZED?

3. EVEN AFTER DISCUSSIONS GOK/MOW DELEGATION, RELATIONSHIP RARP AND ITS PROCEDURES TO GRAVELLING PROGRAM NOT CLEAR. BELIEVE PART C ASL I, RARP, GRAVELLING PROGRAM AND IBRD PROPOSED IMPACT STUDY WARRANT INTEGRATED ANALYSIS (AND PROBABLY PROGRAMMING) IN AT LEAST WESTERN AND NYANZA PROVINCES.

4. PROJECT COMMITTEE REVIEW AND SUPPLEMENTARY COMMENTS OF CONSULTANTS (HANDCARRIED BY AA/AFR FOR USAID/REDSO) CONCLUDES ECONOMIC ANALYSIS INSUFFICIENT SUPPORT PP. ADDITIONAL WORK COULD ALSO LAY BASE FOR CRITERIA WORK CALLED FOR PARA ABOVE. FYI, GOK/MOW DELEGATION SUGGESTED AID CONSIDER TECHNICAL ASSISTANCE TO ASSIST DEVELOPMENT/EVALUATION/REFINEMENT OF RARP AND GRAVELLING PROGRAM'S CLASSIFICATION/DESIGN/SELECTION CRITERIA. INITIAL WORK COULD BE ASSOCIATED WITH CANADIAN UNIT AND WOULD MAKE OPERATIONAL DATA AVAILABLE TO MOW ON MORE TIMELY BASIS THAN PROPOSED IBRD STUDY.

5. BASED PARAS 2-4 ABOVE, PROPOSED USAID/REDSO MERGE OF RARP/GRAVELLING GRANT/LOAN PROJECTS FOR TQ/77. CONSULTANTS AVAILABLE JULY/AUGUST. TO INSURE EXPEDITIOUS PROCESSING, PLAN COMBINE ETHIOPIA AND KENYA DESIGN REQUIREMENTS AS SEPARATE COMPONENTS OF SAME PIO/T. SCOPE OF WORK FOR GRAVELLING PROGRAM TO BE BASED ON CONSULTANT ANALYSIS REF PARA 4 ABOVE. AFR BELIEVES GRAVELLING PROGRAM COULD GO FORWARD AS RURAL INFRASTRUCTURE I IN TRANSITIONAL QUARTER AND RARP AS RURAL INFRASTRUCTURE II IN FY 1977. SEPTEL FOLLOWS WITH NOMINATION CONSULTANTS/SCOPE FOR GRAVELLING

WORK AND ETA. KISSINGER

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AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT PAPER FACESHEET
 TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE
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Original Change
 Add Delete

PP

DOCUMENT
 CODE
 3

2. COUNTRY/ENTITY

Kenya

3. DOCUMENT REVISION NUMBER

4. PROJECT NUMBER

615-0170

5. BUREAU

a. Symbol

AFR

b. Code

1

6. ESTIMATED FY OF PROJECT COMPLETION

FY 8 | 2 |

7. PROJECT TITLE - SHORT (stay within brackets)

Agriculture Sector Loan II - Part A

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION

a. INITIAL mo. yr. 3 | 76

b. FINAL FY 8 | 80

9. ESTIMATED TOTAL COST (\$000 or equivalent, \$1 =)

a. FUNDING SOURCE	FIRST YEAR FY 1976			ALL YEARS		
	b. FX	c. L/C	d. Total	e. FX	f. L/C	g. Total
AID APPROPRIATED TOTAL	6,794	981	7,775	7,874	981	8,855
(Grant)	(120)	(-)	(120)	(1,200)	(-)	(1,200)
(Loan)	(6,674)	(981)	(7,655)	(6,674)	(981)	(7,655)
Other						
U.S.						
HOST GOVERNMENT				-	3,087	3,087
OTHER DONOR(S)						
TOTALS	6,794	981	7,775	7,874	4,068	11,942

10. ESTIMATED COSTS/AID APPROPRIATED FUNDS (\$000)

a. Approp. Allocation (Alpha Code)	b. Primary Purpose Code	c. Primary Tech. Code	FY 76		FY 77		FY 78		ALL YEARS	
			d. Grant	e. Loan	f. Grant	g. Loan	h. Grant	i. Loan	j. Grant	k. Loan
FN	150	060	120	7,655	282	-	96	-	1,200	7,655
TOTALS			120	7,655	282	-	96	-	1,200	7,655

11. ESTIMATED EXPENDITURES

- - 68 2,790 230 2,924

12. PROJECT PURPOSE(S) (stay within brackets)

Check if different from PID/PRP

To improve smallholder access to agriculture institutions, services, and infrastructure, including inputs, credit, knowledge/extension to apply inputs, markets and/or storage facilities, roads and water.

13. WERE CHANGES MADE IN BLOCKS 12, 13, 14, or 15 OF THE PID FACESHEET? IF YES, ATTACH CHANGED PID FACESHEET.

Yes No

14. ORIGINATING OFFICE CLEARANCE

Signature

Charles J. Nelson
 Charles J. Nelson

Title

Director, USAID/Kenya

Date received mo. day yr. 3 | 5 | 76

15. Date Received in AID/W, or For AID/W Documents, Date of Distribution

mo. day yr.

AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT IDENTIFICATION DOCUMENT FACESHEET
 TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE ("X" appropriate box)
 Original Change
 Add Delete

PID
 DOCUMENT CODE
 1

2. COUNTRY/ENTITY
 Kenya

3. DOCUMENT REVISION NUMBER
 1

4. PROJECT NUMBER
 615-0170

5. BUI/FAU
 a. Symbol AFR b. Code 1

6. PROPOSED NEXT DOCUMENT
 a. PRP PP b. DATE mo. yr. 03 76

7. PROJECT TITLE - SHORT (stay within brackets)
 [Agriculture Sector Loan II - Part A]

9. ESTIMATED COST (life of project)
 (\$000 or equivalent, S1 = 8.14)

FUNDING SOURCE	AMOUNT
a. AID APPROPRIATED	8,855
b. OTHER U.S.	-
c. HOST GOVERNMENT	3,087
d. OTHER DONOR(S)	11,942
TOTAL	

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION
 a. INITIAL FY 76 b. FINAL FY 80

10. ESTIMATED COSTS/AID APPROPRIATED FUNDS (\$000)

a. Appropriation (Alpha Code)	b. Primary Purpose Code	c. Primary Tech. Code	FIRST YEAR FY 76		ALL YEARS		11. OTHER U.S. (\$000)		
			d. Grant	e. Loan	f. Grant	g. Loan	a. FUNDING SOURCE	b. FIRST YEAR	c. ALL YEARS
FN	150	060	120	7,655	1,200	7,655	-	-	-
TOTAL			120	7,655	1,200	7,655	TOTAL	-	-

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

13. SPECIAL CONCERNS CODE (maximum six codes of four positions each)
 BR

14. SECONDARY PURPOSE CODE

15. PROJECT GOAL (stay within brackets)
 [To improve the welfare of smallholders]

16. PROJECT PURPOSE(S) (stay within brackets)
 [To improve smallholder access to agriculture institutions, services, and infrastructure, including inputs, credit, knowledge/extension to apply inputs, markets and/or storage facilities, roads and water.]

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)

18. ORIGINATING OFFICE CLEARANCE
 Signature: Charles J. Nelson
 Title: Director, USAID/Kenya
 Date Signed: mo. day yr. 3 5 76

19. Date received in AID/W, or For AID/W Documents, Date of Distribution
 mo. day yr.

5. Relationship to Other AID Activities

This project is closely related to, and supportive of, two on-going and proposed activities within the AID program in Kenya - Agriculture Sector Loan I and Rural Roads Systems. The first of these, ASL I, was authorized in June 1975 and will provide credit funds through the GOK agriculture budget to finance production of wheat, maize and certain cash crops in the 1975-76 planting seasons, and to initiate an experimental program designed to test new approaches for providing through cooperatives comprehensive production and marketing services during 1975-78 to 16,000 less-progressive small farmers. The latter element ("Part C") has goals very similar to the IADP, but the plans for the two programs differ in scope and the range of smallholders they are to service. Both programs will operate in the Western, Nyanza and Eastern Provinces; however, Part C as now being implemented is only active in three of the four districts in which IADP will operate in Nyanza Province, two of the three IADP districts in the Western Province, two of three IADP districts in the Eastern Province, and none of the four Central Province IADP districts. IADP will have a significant impact upon the agriculture credit system, reaching about 56,700 families over a four-to-five year period. In addition, IADP will support improvement of farm input supply systems, marketing systems, and field staff mobility.

The similarity of the two efforts was recognized in the planning for Part C, and there has been, and will continue to be, close contact and coordination between the planners and implementers of both projects. The designers of IADP, in fact, view Part C as a trail-blazing effort which will be a source of much information having great utility for further planning and implementation of their program.

The principal area of implementation of ASL I Part C, the Roads Graveling Project and the proposed RARP will be Western and Nyanza Provinces. The FY 1977 Rural Roads Systems program will include loan financing for equipment and some local costs for the Rural Access Roads program, which is to construct farm-to-market feeder roads using labor-intensive methods.

6. Justification

Kenya has, for a developing African country, a comparatively well developed roads network composed of classified roads - international and national trunk, primary, secondary and minor roads - and unclassified roads and tracks. As defined by the GOK, a "minor road" (Class E) is any link to a minor center; "secondary roads" (Class D) connect locally important centers to each other and to higher class roads; "primary roads" (Class C) join provincially important centers to each other or to higher class roads; "national trunk roads" (Class B) link nationally important centers and "international trunk roads" (Class A) link centers of international importance and/or cross international boundaries or terminate at international ports. 1/

1/ Central Bureau of Statistics, Statistical Abstract 1975 (Nairobi: Government Printing Office) p. 177.

Using 1969 census data, class A roads would, for example, link Nairobi and Mombasa, which have populations of 509,000 and 247,000, respectively, while class B and C would feed urban centers of over 10,000 population, i.e. the "major" towns. Class D would connect market centers of between 5,000 - 10,000 population, and class E, any population concentration of 833 or fewer rural families, assuming an average family size of six per the 1969 census. As can be seen from the following table on proposed road lengths for gravelling in Western and Nyanza Provinces, the proportion of minor roads serving these small centers to secondary roads is better than 2:1.

This classification is administrative in nature and does not necessarily denote the relative standard of a road or the level of traffic it carries. Therefore, some E roads have higher traffic levels than some D roads, see section II.B.4. for traffic figures) and are constructed and maintained to a higher standard.

A great part of the roads now classified as D and E roads were added to the former MOW - maintained network by a national decision in 1971 to add the former County Council roads to the National classified road network. In doing this the MOW assumed responsibility for their improvement and maintenance.

TABLE 1

Summary of Road Lengths by District (km)

<u>Western Province</u>	<u>Secondary</u>	<u>Minor</u>	<u>Total</u>
Bungoma	330.1	400.8	730.9
Kakamega	297.0	662.5	959.5
Busia	148.8	178.0	326.8
	<hr/>	<hr/>	<hr/>
Sub-Total	775.9	1,241.3	2,017.2
<u>Nyanza Province</u>			
Siaya	235.5	579.8	815.3
Kisumu	144.6	898.1	1,042.7
Homa Bay (S. Nyanza)	450.0	964.6	1,414.6
Kisii	296.3	565.4	861.7
	<hr/>	<hr/>	<hr/>
Sub-Total	1,126.4	3,007.9	4,134.3
<u>Total</u>	<u>1,902.3</u>	<u>4,249.2</u>	<u>6,151.5</u>

An inventory of D and E roads taken on July 1976 (Nyanza and Western Provinces) shows that, in general, the D roads are at a higher standard than the E roads. Of D roads, 42% are gravelled to an average width of 4.4 meters, while only 10% of the E's have been so surfaced and on a narrower average width (3.9 meters). The D roads inventoried are also better drained, averaging 3 times the number of culverts per kilometer than the E's. There are bridges on the average of one for each 17 km. in the D roads while only two bridges exist on over 2000 kilometers of E roads surveyed. Within each classification significant differences are found between the number of culverts per kilometer for gravelled roads compared with the earth surfaced majority. Gravelled D roads have 50% more culverts than earth D's while the 10% of E roads that is gravelled has 6.5 times the number of culverts on the earth-surfaced (90% of the E road network).

TABLE 2

SUMMARY OF INVENTORY OF D ROADS IN WESTERN AND NYANZA PROVINCES. (INCLUDES D 201 to D 312, EXCEPT D 226 to 236, 238, 286-9, 294-7, D 304 & 305 WHICH ARE IN RIFT VALLEY)

Road Surface	Km. Done	Per Cent	Average Road Width	Culverts per km.	Bridges per km.
Bitumen	6	Negl.	5.3	3.6	0
Gravel	866	42%	4.4	1.73	0.06
Earth	1205	58%	3.9	1.15	0.05
Total	2077	100%	4.1	1.4	0.06

TABLE 3

(SUMMARY OF INVENTORY OF E 101 to E 240 LESS ROADS IN RIFT VALLEY PROVINCE AND NON-INVENTORIED E ROADS IN WESTERN AND NYANZA WHICH EXTEND TO E-328)

	%	Km. Done	Road Surface	Road Width	Culverts	Bridges
Total	0	0	Bitumen		0	0
	10%	182	Gravel		396	0
	90%	1627	Earth		532	2
Average per km.			Gravel	3.9	2.18	0
			Earth	3.5*	0.33	(0.001)
Total km.		1809+	Total	3.54	0.51	negligible

* Varies widely from 2.4 to 5.0

+ Estimated length. Total of E roads in Western & Nyanza = 2,700 km.

Notes: The statistics on which these numerical averages are based have the following limitations:

- a) they are based on an inventory made by MOW in the period 1971-1975 and are not complete. That is to say that some few D roads were not inventoried and only two-thirds of the E roads in Western and Nyanza provinces were included.
- b) the data collected was length, average width, type of surface, topography, number of junctions, culverts and bridges. The MOW data for the D roads had been tabulated and averaged, that of the E roads had not. Many of both classification were in Rift Valley Province and we removed these for our analysis.
- c) The inferences drawn from this statistical analysis are of varying degrees of reliability. For example, only about two-thirds of the E roads were inventoried; the average width of earth surface roadways (E) is 3.5 approximately but measured widths ranged from 2.4 to 5.0 meters so the standard deviation is quite large. Few width measurements were made during the inventory so the new data itself is only approximate.

In 1973 the roads system consisted of approximately 43,000 km. (25,800 mi.) of classified roads and an estimated 85,000 - 100,000 km. (51,000 - 60,000 mi.) of unclassified roads and tracks. The basic skeleton of the trunk and primary roads portion of the classified system, totalling about 13,000 km. (7,800 mi.), is close to completion with all but about 4,000 km. (2,400 mi.) having all-weather surfaces (bitumen or gravel). The secondary and minor network constitutes the remaining two-thirds of the system (30,000 km. or 18,000 mi.), but, by contrast, only about 4,500 km. (2,700 mi.), 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 roads network to connect farms effectively to local, provincial and national production, marketing, distribution and storage centers throughout the year. To construct all-weather rural access roads without the companion GBC program would not eliminate the gap.

Filling in the existing gap in Kenya's national roads network in the target IADP areas has considerable significance for that program and Part C of ASL I as well as for agriculture sector development in general. It will, first, aid in diversification of agriculture in ways which will yield more cash income to small farmers by making possible assured, year-round access to markets and, thus, supporting incentives to produce cash crops while enabling farmers now isolated during the rainy seasons to reach markets offering higher prices than in their own home areas. Similarly, it will facilitate transport of food from areas of surplus to areas of shortage. While Western and Nyanza Provinces are large geographic and market areas in themselves, as Uma Lele has pointed out, "... services for food crop development ... have to be provided over a wide geographical area ... The geographical spread of agricultural services needs to be accompanied by the development of an infrastructure to link markets among regions so as to keep pace with the gradual increase in effective demand for food from within the rural areas and from surrounding regions." ^{1/} Third, it will contribute to growth of activities in which a given area or locality may enjoy a comparative advantage but which due to the absence of reliable roads may remain unexploited. (Six of the seven districts in the two provinces to be supported by AID are IBRD "Class B" districts, i.e. those with unexploited potential.) Fourth, it will support provision and use of social services, such as educational and health facilities; government services, particularly extension, credit, and stock theft control, and commercial, cooperatives and/or government distribution of seeds, fertilizer, pesticides and other inputs.

1/ Lele, Uma. The Design of Rural Development: Lessons from Africa (Baltimore: The Johns Hopkins University Press, 1975)p.p. 32-33.

The two target provinces in which AID-financed gravelling units will operate are characterized by the World Bank as having dense populations at totally unsatisfactory income levels, often at base subsistence. The inhabitants of the seven districts make their living overwhelmingly from agriculture with only five percent engaged in wage employment. Because of population growth and density these districts also are among those having the heaviest out-migration in the country, resulting in significant proportions of women acting as heads of rural households and, thus, day-to-day farm managers. Adjudication and registration of land is far advanced (see the table on the following page). Holdings are almost universally small - between 1-6 hectares and, according to the IBRD, occupied by an average 1.25 families.

Annual per capita income levels, according to the World Bank, typically range from KShs 760 - 1,200 (\$94-\$150). (The lower end of the range is judged typical of farmers in Kisumu, Siaya, South Nyanza and Busia who may occupy about 3.4 ha. while the upper end of the range is more typical of holdings averaging 2.5 ha. in Kisii, Kakamega and Bungoma.) The Bank further estimates the poverty level in Kenya to approximate \$122 per capita and that a minimum acceptable income level might be about \$196 per capita annually. The economic analysis prepared by REDSO/EA, which concludes that the principal beneficiaries of the gravelling program will be the "working poor", into which category the bulk of the population of Western and Nyanza Provinces falls, as well as the above data support the contention that the majority of the beneficiaries of the GBC program in these areas will be poor smallholders. Annex VIII prepared by the Ministry of Works gives additional, supportive and detailed data for a typical district in the ASL II target area.

The economic analysis does suggest that the area's more progressive smallholders will benefit most initially, being those in the best position to make use of the roads. However, it concludes that the population make-up of the two provinces is such that a sizable and growing proportion of small farmers would benefit. The implementation and, presumably, success of IADP and ASL I should be supportive and mutually reinforcing of this spread effect.

Because of the above socio-economic characteristics the target areas were rated by the MOW as having high priority for rural access roads construction under the RAR program. Indices used for this rating were the following: Population density; population increase variations projected for 1968-80 and 1980-96; percent of total area in high and medium potential agriculture land; value of agriculture output per inhabitant (a low value giving a high rating); distribution of settlement schemes; major crop distribution; kilometers of all roads per square kilometer of area; kilometers of all roads per inhabitant, and kilometers of all-weather roads per hectare of high and medium potential land. RAR activities have already begun in South Nyanza and are to be initiated in FY 1977 in Kisii and, tentatively, Kakamega Districts.

AID support for gravelling of secondary and minor roads will directly benefit the rural poor, including the small farmers of Western and Nyanza Provinces. It is recognized, however, that for this target group and the type of rural roads being upgraded, the socio-economic benefits of the GBC program will depend on large increases in future economic activity and the wide distribution of the resulting benefits. These increases may be attributed to reduction in transport costs, or to ongoing or planned agriculture development projects, or to the joint effect of both. However, existing mechanisms for evaluating derived benefits, which are limited solely to quantifying road user savings, neglect the developmental aspects of road investment. Means for substantiating the creation of socio-economic benefits are now only in the formative stage, in part through a series of IBRD-support research efforts in various countries aimed at clarifying the impact of rural roads on development. The conduct of such a study in Kenya is now in the design stage.

C. Detailed Description: The Graveling, Bridging and Culverting Program.

1. Project Area

The approximately 1300 km. of specific roads or sections of roads to be gravelled under this loan will be selected as part of the program implementation from 1,902 km. of existing secondary roads and 4,294 km. of existing minor roads in Western and Nyanza Provinces. With such a broad choice available it is impossible to provide detailed descriptions of the country side through which the project roads will pass or to identify specifically the people whose lives and livelihood will be touched by them. However, graveling operations are expected to take place in each of the three districts of Western Province (Busia, Bungoma, and Kakamega) and the four districts of Nyanza Province (Kisii, Kisumu, Siaya and South Nyanza) which are highly diverse. For this reason a brief description of each district will be given following a general description of characteristics common to the whole project area.

Kenya has a land area of about 570,000 square kilometers and a population of about 13 million (1975 estimated) growing at about 3.5 percent a year. This high growth rate is largely attributable to one of the highest female fertility rates in the world (1969 average of 7.6 children per woman reaching age 50), a high crude birth rate of 50 per 1,000 population, and a low and falling crude death rate of 17 per 1,000 as of the 1969 census. More recent data suggests the crude death rate may now be closer to 10 per 1,000.

According to the 1969 census, some 3,450,000 people then lived in the project area (Western and Nyanza provinces), or about 32% of the total population of the country at that time. The project area occupies only 3.6% of the nation's land area, resulting in uniformly high population densities when compared to the national norm (see Table 4). More recent estimates of population density range from 146 in Busia District and 147 in Bungoma and South Nyanza Districts to 278 in Kakamega District and 379 in Kisii District. The latter has the highest density in the country with the exception of the urban centers of Nairobi and Mombasa.

As of 1969, only three population centers contained more than 5,000 people: Kisumu, the nation's fourth largest city, with a population of over 32,000; Kakamega and Kisii with slightly over 6,000 each. Kisumu, formerly the capital city for both areas, is now the capital of Nyanza Province, while Kakamega is the capital of Western Province. The total population of these major towns then constituted less than 2% of the regional population. Since 1969 other centers may have entered this category (Bungoma, Mumias, and Homa Bay are possible candidates), but the population of the project area is still overwhelmingly rural in nature.

Figure 1 shows the project area, the road network, major administrative divisions, and the project area in relation to the nation and its neighbors. Figure 2 shows designated urban and rural centers as well as population density in the project area.^{1/}

^{1/} Figures follow annexes.

TABLE 4

DEMOGRAPHIC FEATURES OF THE PROJECT AREA

District	Land Area (1) (km ²)	Population(1) (x10 ³)	Pop Density(1) (per km ²)	Population per km ² of Agricul tural Land(1)*	1962-1969 Pop Growth (2) (av. annual rate)	Estimated (3) Growth Rate 1969-1976
Bungoma	3,074	345	112	138	6.4	5.0
Busia	1,629	200	123	128	2.4	2.5
Kakamega	3,520	783	222	232	3.8	3.9
Kisii	2,196	675	307	326	4.8	3.8
Kisumu	2,093	401	193	190 **	4.0	3.7
Siaya	2,523	383	151	170	2.4	2.5
S. Nyanza	5,714	663	116	118	4.6	4.5
Project Area	20,749	3450	166	175	3.8	3.8
Nationwide	570,000	10,830	19	70	3.5	3.5

* Includes cultivated land and grazing land, 1969/70

** Estimates of agricultural land exceed total land area.

(1) Source: Central Bureau of Statistics,
Statistical Abstract, 1975.

(2) Source: Provincial Physical Development Plans, 1970

(3) Consultant's estimates and District Development Plans.

Description of the Project Area (cont..)

Despite its current high population density, the project area presents an opportunity for growth through more intensive exploitation of its agricultural potential. In part because of its high annual rainfall and the nature of the soils, land in much of Western Province and most of Nyanza Province is classified as having a high potential for agricultural production with remaining areas classed as medium potential. Two crops a year are harvested in the high density areas.

Altitude is the principal determinant of 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-May i.e. the "long rains", and, secondarily, in November-December, the "short rains". January and July are the driest months.

In Western Province Kakamega and Bungoma Districts are predominantly high zones, receiving a large amount of rain, while Busia District is lower, Kisii District is the high area for Nyanza Province, with Kisumu, Siaya and South Nyanza classified as low. 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. Kisii District is currently one of the most highly developed districts in the country. Farmers there have benefited more from improved technology, have upgraded their cattle to a much greater extent, and have more advanced farm institutions, such as coffee cooperatives. In part, this is a reflection of the characteristic willingness of the Gusii people, the majority group of the district, to accept and practice a broad range of innovations as quickly as they become available.

Taking each province separately:

- a) in Western Province, approximately 90 percent of the land area is available for agriculture (7,388 sq. km) of which 5,244 sq. km. had been registered by smallholders by the end of 1974 (see table 5) There are a total of about 240,000 holdings averaging about 3 hectares in size, although in the most densely settled areas

(1) Source: Central Bureau of Statistics, Statistical Abstract 1975, Table 5

LAND TENURE AND LAND USE
AS OF 12/31/74 (1)
(km²)

DISTRICT	AGRICULTURAL LAND			OTHER LAND USES						TOTAL LAND AREA
	Reserved for small holders		OTHER	Forest reserves	Other reserves	Forest strips	Alienated land	Parks and game reserves	TOTAL	
	REGISTERED	UNREGISTERED								
Bungoma	1,749 (56.9%)	373 (12.1%)	342 (11.1%)	549	6	31	32	2	610 (19.8%)	3074
Busia	1,324 (81.3%)	303 (18.6%)	-	-	2	-	-	-	2 (0.1%)	1629
Kakamega	2,171 (61.7%)	482 (13.7%)	453 (12.9%)	327	2	50	35	-	414 (11.8%)	3520
Kisii	1,684 (76.7%)	234 (10.7%)	179 (8.2%)	1	-	29	69	-	99 (4.5%)	2196
Kisumu	233 (11.1%)	1,145 (54.7%)	63 (3.0%)	-	28	425	199	-	652 (31.2%)	2093
Siaya	970 (38.4%)	1,508 (59.8%)	-	-	-	4	41	-	45 (1.8%)	2523
S. Nyanza	1,637 (28.6%)	3,822 (66.9%)	11 (0.2%)	8	4	6	121	119	244 (4.3%)	5714
Project Area	8895 (42.9%)	7867 (37.9%)	2021 (9.7%)	885	38	545	487	121	20 (9.5%)	20,749

Description of the Project Area (cont..)

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 farm size 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 than in more prosperous areas of the country.

The bulk of the Province's population falls into the "working poor" category (as defined by a 1972 ILO/UNDP study) with income of less than K. Sterling 60 per year (at 1972 exchange rate of 1 K£ = \$ 2.80, this is about \$ 168). The IBRD has more recently estimated the poverty level at \$ 122 but has also concluded that to produce a "minimum acceptable income" (about \$ 196 per year) with current practices, the province could accommodate only about 234,000 holdings averaging 3.3 ha. Holdings not only exceed that total but are significantly below that size in many areas.

- b) 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. had been registered, and 3,704 sq. km. were being registered. There are about 400,000 smallholdings averaging 3 ha. in size although holding size varies from an average of 2 ha. in Kisii to 5 ha. in South Nyanza. In most instances the larger holdings are on land of lower agricultural potential, particularly in the savannah areas around Lake Victoria's Kavirondo Gulf where soil drainage is impeded.

Intensity of land use varies greatly. Of the area cultivated by Kisii District smallholders, about 23 percent is devoted to such cash crops as tea, coffee and pyrethrum. Maize production is well developed, as is dairying, using 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 make up one-third of the cereal acreage because of the soils problem mentioned above. The IBRD reports that this province, too, has far more holdings than the estimated 260,000 which could provide a decent living under current cropping practices.

Other significant land uses in the project 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 on Lake Victoria. Fishing 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.

Figure 3 shows areas designated for development under Phase I of the Integrated Agricultural Development Program, as well as current and planned development projects. The problem of access is a major constraint in many of the AID project areas which are among the districts having the highest average rainfall in Kenya, i.e. between 1,320 - 2,084 millimeters, or about 52 - 82 in. During peak rainfall periods roads without all-weather surfaces become extremely slippery and dangerous, seriously limiting transport during about six-eight months annually. In these areas average rainfall exceeds 75 mm. per month, generally being 100 - 200 mm., throughout the year with relatively low evapotranspiration 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.

Rainfall intensity and soil stability also vary considerable within the two provinces. The high rainfall intensity on the slopes of Mt. Elgon in Bungoma district creates greater barriers to access there, and in the highlands of Kakamega and Kisii there are similar but lesser problems. The greatest soil problem occurs in black cotton soils of the plain near Lake Victoria and in related valley bottoms. Earth roads in this soil are impassable when wet. Other soils are good for gravel road construction but the distance required to haul suitable gravel to a site varies from 0 to 20 km. within the project area.

Indicators of road service by district are shown in Table 6. Kisumu is the best served district by all criteria, largely owing to traffic generated by its major urban center. Densely populated Kakamega and Kisii have relatively less road kilometers per population, while sparsely populated Bungoma, Busia and South Nyanza have relatively fewer road kilometers.

Approximately 64% of the total road length (6155 km.) in the project area is composed of D and E roads. The A, B and C class roads which connect the principal centers have a generally uniform coverage in each district (see Figure 1). Approximately 5000 km. of the D and E roads are earth roads and about 40% of these are not all-weather roads. This road network is least dense and least passable in South Nyanza, Busia, Siaya and Bungoma districts, and these districts would benefit most from the program, although all districts in the two provinces would be involved.

The number of kilometers of non-all-weather roads by district shown in Table 7 shows the types of roads which are the target of the GBC program. This table shows that Bungoma and South Nyanza have between them almost one half of the kilometers of non-all-weather road in the two provinces. However there is still a significant proportion of population on non-all-weather roads in Kisii and Kakamega due to their high population densities.

TABLE 6
INDICATORS OF ROAD SERVICE
 (Classified Road Network)

	<u>Km/1,000 pop. (1)</u>	<u>Km/Km² area (1)</u>	<u>% of Road Network D & E roads(2)</u>	<u>%D and E roads Nor: all weather(3)</u>
Bungoma	3.01	0.34	69.9	65%
Busia	2.20	0.27	68.5	20%
Kakamega	1.62	0.36	75.7	35%
Kisii	1.64	0.50	78.8	35%
Kisumu	3.35	0.65	60.8	15%
Siaya	2.87	0.43	53.4	25%
South Nyanza	2.76	0.32	57.7	35%

(1) District Development Plans

(2) M.O.W. Inventory Data

(3) Estimated by Provincial Engineer

TABLE 7

<u>District</u>	<u>Km. of D and E roads non-all-weather 1/</u>		<u>Number of people (1969 pop) on non-all-weather D and E roads 2/</u>	
Bungoma	475	21.3%	71,000	17.7%
Busia	65	2.9%	15,000	3.7%
Kakamega	335	15.1%	85,000	21.2%
Kisii	300	13.5%	81,000	20.2%
Kisumu	210	9.4%	16,000	4.0%
Siaya	205	9.2%	37,000	9.2%
So. Nyanza	635	28.6%	96,000	24.0%
Total	2225 Km.	100.0%	401,000	100.0%

(36% of D and E Network)

(11.6% of 1969 population)

Source: Tables 1 and 3

1/ Kms of D and E roads in each District (p. 15 of PP) times percent of km. all weather D and E roads in each District in Table 3.

2/ Percent of persons (1969 population) near D and E roads (column 2 of Table 22, P. 69 this ad endum) times population per district (Table 1, Column 2) times percent non-all weather road each district in Table 3.

Bungoma District

Bungoma District has 4 divisions comprising 10 locations. The Town of Bungoma, now about 6,000 in population, is the district headquarters. Other urban centers include Webuye (site of a large pulp and paper mill) and Kimilili. There are five designated "rural centers" (Sirisia, Kapsakwany, Chele, Tongareni and Mulakisi), and 16 additional market centers. The Integrated Agricultural Development Project is planned to cover three locations in Bungoma District including Mulakisi, West Bukusu, and East Bukusu.

Current cash crops include coffee, cotton, sisal, and sunflower, with pyrethrum, wheat and sugar cane slated for future expansion. Food crops are also of major importance, and a portion of these are commercialized. Livestock and dairying activities are growing rapidly. Because of its high rainfall, good soils, and relatively lower population density, Bungoma District is now experiencing rapid growth both in population and in agricultural production.

The upper slopes of Mt. Elgon are held by the government as forest reserves. This area is also seen as having some touristic potential, with the proposed Mt. Elgon National Park bordering the District. However agricultural activity is already moving up the slopes threatening deforestation and severe erosion in the future. In planning future agricultural expansion, care must be taken to avoid directing development into these ecologically fragile areas.

Busia District

Busia District has three divisions comprising 6 locations. The town of Busia is the only urban center in the district. Six settlements qualify as rural centers : Nangina, Nambale, Butula, Amogoro, Hakati, and Port Victoria. There are 10 additional market centers. The Integrated Agricultural Development Program will cover four of the six locations. North and South Teso, Bukkayo, and Marachi. These locations contain an estimated 42% of the district's smallholder population.

Principal Cash crops include cotton sugar cane, oilseeds, fruits and vegetable. Food crops, livestock and dairying are also important agricultural activities. An estimated 92% of the district's population depends on agricultural earning, and some 60% of the land is currently under cultivation. This amount could be expanded with small scale immigration in the dryer lowland areas.

Busia touches a small part of the Lake Victoria coastline, and fishing is another major source of income. There is a fishing co-operative society as well as one for dairying and one for handicrafts. Cotton is the principal cash crop and there are 10 active cotton co-ops formed into three co-operative unions. Some of these groups have received credit through USAID's ASL I loan program.

Kakamega District

More than half of the population of Western Province is concentrated in Kakamega District. The town of Kakamega is both the provincial and district capital. There are 7 divisions including 20 locations. In addition to Kakamega the towns of Mumias, Butere Khayega and Kaimosi and the areas of Luanda-Maseno and Majengo-Vihiga are designated urban centers. There are ten more rural centers and 18 market centers in the District. Eleven locations will be included in the first phase of the Integrated Agricultural Development Program, including approximately 55% of the smallholder population of the district.

The entire district is very densely populated, with an even greater concentration in the southern part of the district. Two divisions-Vihiga and Hamisi - have benefited from substantial development inputs during the Special Rural Development Program (SRDP) which preceded the IADP. Response has been excellent and these areas, despite stony soils and broken terrain, have become able to support extremely high population levels.

Principal cash crops are coffee, tea, oilseeds, sugar cane and cotton. Interest in cotton is declining while sugar cane is undergoing expansion especially in the western part of the district. A large sugar mill is located at Mumias and there are numerous local sugar syrup (jaggery) factories.

Food crops, horticulture, livestock, and poultry raising are also practiced by small holders.

There is a small amount of land in forest reserves (258 km²) on the east side of the district and a substantial reforestation scheme (173 km²) located at Turbo. This scheme is intended to supply soft wood to the pulp and paper mill in Bungoma District.

Kisii District

Kisii District contains four divisions and 15 locations. Kisii is the district capital and three other towns (Keroka, Ogembo, and Manga) are classified as urban centers. In addition there are 7 designated rural centers and 24 market centers. Kisii District is inhabited by a culturally and ethnically homogeneous group which is quite distinct from its neighbors. It is extremely densely populated and has shown high recepti-

vity to agricultural innovations designed to increase the carrying capacity of the land.

Tea and pyrethrum are major cash crops and maize is the most important food crop. 90% of the labor force receives its income from agriculture, with the exception of the tea estates and co-operatively run tea plantations, these are all small-holders and landless laborers. Bananas, soy beans, tobacco, and dairying are being promoted in the lower less developed parts of the District. A rural Industries Development Project is proposed for Kisii. The Integrated Agricultural Development Project will cover only three locations on the western edge of the District.

Kisumu District

Kisumu is the only district in the project area which contains a major city, Kisumu Town (population now nearly 50,000). The municipal boundaries were expanded in 1972 to include the even more rapidly growing urban fringe; population of this "Greater Kisumu" area is now estimated at 158,000, growing at a rate of 6% per year. At this rate the population of the urban area is expected to exceed 500,000 by the year 2000.

Kisumu District is basically an alluvial plain through which several rivers flow into Lake Victoria. This plain is subject to almost annual flooding, causing severe agricultural and health problems. In addition, it contains "black cotton" soils which provide a poor surface for road construction.

About 87% of the District's land is used for agriculture, and 88% of this is in small holdings. Practically all of the large holdings are sugar cane estates, and many small holdings also produce sugar cane as a cash crop. Other cash crops of much less significance include cotton, oilseeds, and ground nuts. Most of the agricultural land, however, is devoted to food crops and pasture. The Integrated Agricultural Development Program will reach five of the twelve locations in the district and approximately 38% of its small holders.

Siaya District

Siaya contains four divisions and 16 locations. It was administratively separated from Kisumu District in 1966. Three towns - Siaya, Ukwala, and Yala - are designated urban centers and five more - Bondo, Asembo, Rangala, Nyangweso and Ngiya - are designated rural centers. In addition there are 12 market centers.

The population of Siaya District has been subject to considerable fluctuations due to the effects of trypanosomiasis and malaria. It is a low lying, often swampy area bordering on the lake with a consequently low population density. Swamp reclamation and drainage schemes offer some prospects for future development. Currently agriculture is at a subsistence level with 20% of the land under cultivation and 95% of the population dependent on agriculture for subsistence.

Efforts to promote cotton cultivation and livestock in Siaya District have so far been largely unsuccessful. The district is poorly provided with the agricultural infrastructure needed to increase productivity and commercialization of crops. Three locations have been selected to receive assistance under the Integrated Agricultural Development Program. A Rural Industries Development Centre is planned for Homa Bay.

Fishing is another subsistence activity which could be made more productive with outside assistance. The District plans to develop two fishing beaches in the current plan period. Although past experience with fishing co-ops does not augur well for this approach in the future, new efforts will be made to promote commercial activity among individual fishermen.

South Nyanza District

South Nyanza is by far the largest district in the project area. Although it also has a large population, the resulting density is low, and the area is capable of sustaining further population growth. Much of the land is not used as intensively as its soil and rainfall characteristics would permit.

There are six divisions and 32 locations in the district. The capital, Homa Bay, and the towns of Migori and Kendu Bay are classified as urban centers. There are nine rural centers and 27 market centers. Three divisions - Migori, Macalder, and Kihancha have participated in the Special Rural Development Program, forming a belt along the Tanzania border from the lake to Narok District in Rift Valley Province.

Agricultural activity focuses on food crops, livestock and dairying at a near-subsistence level. More than 95% of the population is dependent on agriculture, but only 18% of the total land area is cultivated at the present time. Cash crops include small amounts of cotton coffee, ground nuts, tobacco, rice, and sisal. Coffee and dairy co-ops are active while miscellaneous farmer co-ops, though numerous are usually defunct.

Four locations including the game reserve of Lambwe Valley, and the island of Rusinga, are destined to receive support through the Integrated Agricultural Development Program.

Mining was once an important economic activity in the southern part of the district. Mineral resources are known and future production depends on changes in world market prices. A planned government takeover of the hydroelectric project supplying power to the mine will facilitate development only insofar as it is linked to rural electrification schemes, as there is little likelihood of finding industrial users.

Fishing has been a major subsistence activity, to such an extent that offshore waters have been overfished and need to be restocked. Local demand exceeds supply at the present time. If the fishing industry were to be developed on a large scale, processing, storage and transport facilities would be required in order to supply fish to inland markets on a regular basis.

There is some potential for touristic development in the area, particularly if the Lambwe Game Reserve becomes a national park. There is also a bird sanctuary in the vicinity of Oyugis. This area hopes to be tied in with a tourist circuit originating in the Masai Mara park. The rugged, unspoiled western coastline and offshore islands in Lake Victoria also offer a potential tourist attraction if services can be provided to these areas.

D. Social Soundness Analysis

1. Social Characteristics of the Project Area

In comparison with the rest of Kenya as well as other parts of the world, the whole project area is quite densely populated and almost entirely rural in nature. With the exception of a few sugar estates in Kakamega, Kisumu (and a projected new one in South Nyanza), and cooperatively run tea estates in Kisii, most of the agricultural land is owned by small holders. However, the population pressure is so great that many farms are too small to support the number of people dependent on them. Thus there is emerging a class of landless laborers who are seasonally unemployed in the agricultural sector.

a. 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. (See table 4) High growth in Kisumu District is largely attributable to the growth of Kisumu Town at 5.7% 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 net outflow (-8.8%) from Western Province and a very slight net inflow (+ 0.3%) 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.

b. 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 (20.6% of the African population). The Luo and the Abaluhya are the next largest groups (14.3% and 13.6% 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% 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.

c. 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 & 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.

d. Social Services

Social services such as schools and hospitals are highly valued in the project area. Education is seen as the way to a better life, not only for the educated individual, but for the entire family. When the Government of Kenya eliminated school fees for the first four grades of primary school in 1974, total primary enrollment in Western Province jumped from 246,000 to 400,000. In Nyanza Province enrollment nearly doubled from 291,000 to 573,000. Although "building fees" are now being established at many schools and fees are charged for higher grades, smallholders consider education a top priority use for any money the family may earn. Research in several districts has shown that fees are often paid before agricultural loans even though default on the loans might mean loss of land and/or inability to obtain credit in subsequent years.

Available school and health facilities include 1,457 primary schools, 247 secondary schools, and 1,680 hospital beds and cots in Nyanza Province in 1975, and 1,091 primary schools, 191 secondary schools, and 1,657 hospital beds and cots in Western Province. Most of these facilities are well-utilized and probably insufficient to meet existing demand. With population growing rapidly, there will be an increasing demand for these and many other services. (See Figure 3)

1.) Education

According to the 1969 census, nearly 80% of the adult population (over 20) in Nyanza Province and 70% of that in Western Province could be classified as functionally illiterate (less than four years of primary education). Current enrollment in primary schools as a percent of the relevant age grade (ages-7-13) was estimated in 1970 to be slightly over the national average in Western Province and substantially under it in Nyanza Province (see Table 25). Patterns of access to education are similar in both provinces, although significantly fewer opportunities are provided for girls to receive secondary education in Nyanza Province than in Western Province.

Primary schools are generally well distributed throughout the project area, with most people living within a 5-mile radius of a school. Construction of school facilities, particularly under local initiative and self help programs, may have outstripped the capability of the nation's secondary and higher education system to supply qualified teachers and necessary teaching materials to rural schools. However, the current and continuing excess of secondary school graduates is creating pressures that may soon remedy this problem. As of 1970 there was some room to accommodate increased demand for primary education by increasing class sizes to the national target figure of 40, particularly in Busia, Kisii and South Nyanza Districts. This slack in the system has now been taken up by increased enrollment following the abolition of school fees for the early primary grades.

Secondary schools are less evenly distributed and tend to cluster around major population centers. (See Figure 3) This pattern responds to the prevailing practice of sending secondary students to board or live with a relative in town while attending school. Transportation is thus a major constraint affecting access, to secondary education (as is cash income).

A majority of secondary schools are private or locally operated (Charambee) schools, which often fail to meet the standards of government-operated secondary schools. Table 25 shows the rapid growth in the number of secondary schools between 1970 and 1975, particularly in Kakamega and Kisii Districts. Relatively few schools offer the full program of secondary education (through Form VI) required for access to higher education. There is an inequality between opportunities offered to boys and girls at the secondary level, as shown by the following statistics from 1970:

	<u>Secondary Schools</u>			<u>Schools Offering Forms V-VI</u>		
	<u>Boys</u>	<u>Girls</u>	<u>Mixed</u>	<u>Boys</u>	<u>Girls</u>	<u>Mixed</u>
Western	32	10	51	3	1	0
Nyanza	81	18	6	5	0	0

TABLE 25
EDUCATIONAL STATUS INDICATORS (1970)

District	PRIMARY		SECONDARY				NUMBER OF SCHOOLS				Library
	Enrollment ratio	Average class size	FORM I-IV		FORM V-VI		SECONDARY		HIGHER		
			Enrollment ratio	Class size	Enrollment ratio	Class size	Aided (2)	Non Aided (2)	Voc. Techn.	Teacher Training Colleges	
Bungoma	84.4	35	10.7	34	1.0	25	10 (29)	14 (14)			1
Busia	52.6	25	10.4	34	None		7 (11)	4 (8)			
Kakamega	62.9	35	10.8	34	0.3	25	21 (27)	37 (102)	2	2	
Kisii	54.5	27	7.7	36	0.3	21	9 (19)	27 (70)		2	1
Kisumu	51.0	35	9.4	34	1.1	21	8 (14)	10 (28)	1	1	1
Siaya	63.3	33	7.4	28	0.6	21	7 (14)	12 (26)			
S. Nyanza	37.2	22	7.2	34	0.4	21	9 (19)	23 (57)		1	

National
Average

61.6

40
(1)

11.1

35
(1)

0.7

25
(1)

(1) Target figures from the 1970-1974 plans

(2) Values in parentheses are for 1975 and are taken from the draft District Development Plans.

This discrepancy is particularly marked in Nyanza Province, where the culture has traditionally offered greater resistance to giving women access to opportunities in the modern sector.

Technical schools are to be found in Kakamega and Kisumu Districts, and teacher training colleges in Kakamega, Kisumu and Kisii Districts. Public libraries are available in Bungoma, Kisii and Kisumu.

Recently, the "village polytechnic" movement has encouraged the development of post-primary schools oriented specifically to the needs of rural life, including courses in agriculture, domestic science, and local crafts and industries. At present such schools are organized and operated by the Ministry of Housing and Social Services. According to the draft District Development Plans, there were over 40 functioning Village Polytechnics in 1975 distributed as follows:

Bungoma	2
Busia	7
Kakamega	7
Kisii	N/A
Kisumu	14
Siaya	8
S. Nyanza	5

The District Development Plans emphasize the need to direct more resources into this type of educational facility and to relate it even more closely to rural employment opportunities.

2) Health

The location of health services in the project area was assessed by regional planners in 1970 as unrelated either to population density or to local service centers. This pattern was established by the region's initial dependence on missions and private enterprises to provide health services. Local self-help efforts in this area and increasing government control over the health service delivery system should result in a more rational distribution of services in the future.

Some vital statistics from compulsory registration areas in 1971 give an indication of current health status in the project area (see Table 26). The extraordinarily high birth and death rates for Kisumu District reflect the concentration of health facilities in this area, as well as, probably, a much more comprehensive system for recording vital statistics. The low rates for South Nyanza District undoubtedly reflect serious under enumeration. These data are not available for Kisii District, which was relatively underserved with health facilities at the time. Indicators of health service provision by district are shown in Table 27.

Of the seven districts, only Kisumu exceeds the 1970 national average in provision of hospital facilities. Kisii District appears to be least well supplied with hospital and health service facilities. Average distance to such a facility is 6 miles in densely populated areas (3 miles around Kisumu Town) and 10 to 20 miles in the more sparsely populated areas.

TABLE 26
VITAL STATISTICS 1971 (1)

District	Recorded Birth Rate (per 1,000 pop.) (2)	Recorded Death Rate (per 1,000 pop.) (2)	Infant Mortality (per 1,000 pop.) (2)	per 100 births
Bungoma	36.4	5.7	1.7	4.8
Busia	20.9	4.4	1.0	4.8
Kakamega	27.7	5.0	1.2	4.2
Kisii	N/A	N/A	N/A	N/A
Kisumu Urban(3)	89.3	29.7	5.2	6.2
Kisumu Rural(3)	45.7	28.5	7.1	15.5
Siaya	27.9	9.2	1.8	6.5
South Nyanza	6.9	1.6	0.3	4.4
Project Area Average				

- (1) Vital Statistics from Central Bureau of Statistics, Statistical Abstract 1975, Table 24
- (2) Population in 1971 estimated from 1969 census figures grown at Consultant's estimated growth rates (Table 4)
- (3) Urban and rural growth rates based on data in Kisumu District Development Plan. (Kisumu Town 5.7%; rural 3.1%)

TABLE 27
HEALTH SERVICE INDICATORS (1)

District	Hospitals			Health Centers			Dispensaries		
	Number		Beds per 1,000 pop (2)	Number		Pop. per Health Ce	Number		Pop. per dispen.(3)
	GOK	Private		GOK	Private		GOK	Private	
Bungoma	1	4	0.47	9		1/51,300	1		1/30,800
Busia (5)	1	3	1.09	5		1/16,400	4		1/17,800
Kakamega	1	6	0.91	28		1/35,200	13		1/20,600
Kisii (6)	1	3	0.31	N/A		N/A	N/A		1/24,900 (4)
Kisumu	4	7	1.96	3	3	1/80,200	15	1	1/14,600
Siaya	1	4	0.70	4	2	1/74,000	15	2	1/15,900
South Nyanza	1	4	0.68	13	4	1/50,800	15	10	1/18,400
National Average (1970)			1.37			1/65,000			

(1) Based on information contained in the 1975 draft District Development Plans.
(Information Bungoma District from MOW study, Annex VI).

(2) Population projected to 1975 using Consultant's growth rates.
Includes both hospital and health center beds.

(3) Assumes dispensary service also available at hospitals and health centers.

(4) Based on 1970 data since District Development Plan does not give data.

(5) Excluding national leprosanarium located in Alupe, Busia District.

(6) District Development Plan gives no numerical data on existing facilities.

The nutritional quality of the family diet is usually very low. It is too high in carbohydrates, mainly corn but sometimes potatoes or sorghum or millet, and deficient in protein, vitamins and fats. There is no evidence to indicate whether increased incomes would result in a better nutritional balance in the diet. It is safe to say, however, that for the marginal farmer with an insufficient amount of land, increasing food crop production through higher yields would benefit the farm family, at least from a caloric consumption point of view. Preliminary evaluation data indicate that farmers in the project area prefer to increase family food consumption and to assure a reasonable surplus, before commercializing any of their food crop production.

3) Housing and Social Services

In addition to the Village Polytechnics, the Ministry of Housing and Social Services administers a variety of programs designed to improve rural welfare and quality of life. Most of these programs are operated out of the administrative centers in each district and do not require separate facilities.

Housing activities are concentrated in urban areas - 95% of national housing funds have been allocated to 38 urban centers, including Kisumu. The remaining 5% is available for loans to individuals or co-operative societies in rural areas. Thus there is no organized government activity in the area of rural housing construction or improvement. However, upgrading of housing and construction of permanent structures is a fairly high spending priority for rural households.

The successful conversion of many farm families to cash cropping is visible to the observer in the high percentage of homes with tin roofs or cement block construction sprinkled throughout the project area.

Lack of proper sanitation is currently the most important problem in housing, particularly in the lowland areas around the Lake which are periodically flooded and where cholera has become a serious health problem, in recent years. Provision and installation of pit latrines and sanitary water supply facilities are of the greatest importance for future development in this area. Such facilities are also needed and desired in the highland areas, although water supply is not quite such a serious problem there.

The division of Community Development concerns itself with local self-help (harambee) movements attempting to guide them into projects consistent with national as well as local development priorities. It also works with private service-providing institutions and voluntary groups to coordinate their activities with those of government. The division attempts to ensure the success of harambee projects by providing information about national standards for construction and financial requirements to local self-help committees.

The division of Social Services also organizes and operates day care centers, women's groups, and functional literacy programs. There is a plan to construct one Family Life Training Center in each district of Western Province during the 1976/77 fiscal year. A Vocational Rehabilitation Center is functioning in Kakamega and another, for women only, is planned for Itando in the same district. Another Rehabilitation Center is found in Kisii.

e. Motivation

In Kenya and in the project area, social systems which might be considered both traditional and modern operate simultaneously. Under traditional social systems, kinship, ethnicity and tribalism are important components. Kinship relations determine to a large extent informal learning, the initial placement of individuals in society, social behaviour and obligations. Ethnic systems are cultural groups which center around real or imaginary generic origins and act as social collectives. In comparison, tribalism is a cross-ethnic phenomenon which becomes salient in competition or confrontation with similar large-scale units. Tribal systems are built on commonality, real or imagined, between ethnic groups.

Within modern social systems, groups are mainly categorized on the basis of education, religious affiliation, occupation, and income. Since individuals are simultaneously members of both modern and traditional systems, in any given situation they have the alternative of selecting between the behaviour patterns associated with each. Although persons may function primarily within traditional social systems, guided by traditional values, and beliefs, this does not mean that they will not accept innovations the transmission of which may be facilitated by improved access. Rather, innovations are judged according to their compatibility with the traditional system.

Further, the relationship between motivation and behaviour may be constrained by social structural factors. For example, a male household head may decide to initiate production of a cash crop, expecting that the labor will be performed largely by his wife and children. But, if the income will go to the male household head and if the crop competes for labor with food crops which are under female control, evidence indicates that the cash crop might be neglected until work on food crops is complete. Economic considerations motivate both parties, but the needs of the situation are differently perceived by each.

For the purpose of this project the key questions are whether people in the project area will perceive road improvements as a desirable change, and whether they will be motivated to take advantage of the opportunities offered by improved roads to increase their social welfare through (1) increasing production of food crops for domestic consumption, (2) commercializing a greater proportion of their total production, (3) investing land, labor and capital in the production and marketing of new cash crops, and (4) utilizing newly available services. A further question is assuming that people utilize the advantages of improved road access to raise their cash incomes, whether or not this marginal income will be spent in a way that will enhance rural social welfare.

In answer to the first question, there is no doubt that people in the project area want the roads to be improved. District Development Committees have repeatedly raised the issue with the local representatives of the MOW. Presently programmed rural works expenditures, made at the discretion of the DDC's, contain a major component for road improvements.

It should be noted, however, that road improvements have traditionally been perceived as a responsibility of central government. Therefore people expect to be paid for their labor in road construction and maintenance, and they are unlikely to take the initiative in clearing a road or drainage structure of debris following an accident or a flood. The road is perceived

as serving the purposes of central government, therefore as part of the national development effort. To the extent that people in the project area associate themselves with this effort, they will be desirous of further road improvements.

The actual savings effected by road improvements accrue primarily to vehicle owners: Government Ministries, traders, transporters, urban salaried employees and wealthy farmers. For the purpose of this paper is assumed that negligibly few individual farmers in the project area own vehicles (although vehicles may be owned or operated by farm co-operatives, in which case the savings accrue to the group as a whole). This means that the response of smallholders to new road opportunities is critically dependent on the extent to which such savings are passed along in the form of reduced prices for inputs, reduced transport and travel cost, and reduced physical distance between the smallholder and the service delivery point.

Assuming that such savings are in fact passed on, if not through an actual reduction in costs then through a relatively slower rise in costs then would otherwise be the case, this may provide an economic motivation for farmers to alter their behavior in the direction of spending more (proportionately) for inputs, input and crop transport, and travel. Whether or not they do so then depends on the value attached to such activities compared to alternative possible uses of scarce funds.

In the value system of the project area it is highly desirable for each smallholder to produce enough food to meet the needs of the family, including enough surplus to generate cash income needed for high priority expenditures such as school fees, clothing, and housing improvements. After this locally defined minimum standard of living is met, the value of additional production drops off sharply in relation to the amount of additional labor required.

Insofar as this marginal production is dependent on female labor, it is virtually impossible, under existing patterns, to increase the cultivated area or to change cropping patterns to include cash crops requiring a higher per hectare labor input (irrigation is particularly crucial here, as in most of the project area it depends on female transport of water). To the extent that men assume responsibility for labor required to produce additional cash crops, production is crucially dependent on the extent to which such men have adopted a "modern" (work ethic) value system. The capacity to mobilize additional labor by males is clearly present in the local economy, but the willingness to do so is equally clearly dependent on the level of acculturation.

Extension activities may possibly encourage such a change in salient values by associating "modern" farm practices with education and a more forward-looking way of life. The availability of credit, not to say peer group support, through farmer co-operatives may also act as an incentive to more modern farm management. The strengthening of both services (agricultural extension and co-operatives) through the IADP may be considered as a possible factor marginally increasing the probability of a full response by farmers to new opportunities provided by improved road access.

The utilization of services made accessible by road improvements depends on a number of external constraints (capacity and location of facilities, regular flow of needed supplies, perceived competence of staff, local political support for service etc. It also depends on the smallholders' perception of his need for such services and the sacrifices he is willing to make in order to secure them. This clearly differs by type of service as well as between cultural groups or sets of value systems in the project area. Further research in this area is needed in order to make accurate predictions about smallholder response to access-to-service benefits.

f. Role of Women

Women constitute an estimated two-thirds of Kenya's rural population, and an estimated one-third of all rural household heads. This group provides an estimated 80% of the labor necessary for food production and a significant portion of that for cash crop production. This is in addition to women's traditional responsibilities in the home and for the well-being of the family. These responsibilities in fact, have been growing greater and her tasks more difficult over the past few decades. A woman's labor increases when male family members migrate in search of employment. It also increases when she is deprived of the help of her children because free education is provided and when, recognizing the importance of education, major sacrifices are made to pay school fees and to keep children in school as long as possible.

Traditionally, women depend on their husbands to make many of the decisions regarding land and crops; therefore, if male family members are absent, the woman may be less likely to make by themselves decisions on new technology, agricultural innovations and so which may be offered to them. However, there is some research evidence from small-holder areas in the Eastern Province which indicates that receptivity to adoption of innovations is not sex-related. Similarly, in Kakamega District research has shown that women farm managers, i.e., those who are widowed, separated, or who have a husband employed outside of the area, are no more or no less likely than men to adopt such innovations as hybrid maize, chemical fertilizer, and horticulture. It has been found, however, that women from poorer households are less willing than men to accept the risk of using land titles for security against agricultural loans.

Land registration is a major social, cultural, and economic change in Kenya and may have significant effects on women. Under the land adjudication and registration program, the tendency has been to regard the power of allocation (which under the patrilineal system is normally the right of the male head of household and male heirs) as tantamount to ownership; therefore, titles have overwhelmingly been conferred on men although there are some reported instances of widows obtaining registered titles. However, as a market in land has come into being, more and more women are finding it possible to acquire holdings of their own through purchase with cash earnings from wage labor or female crop commercialization. Such land will be a woman's property and may be passed on to her daughters.

The Government of Kenya has, in some cases, created and supported programs aimed at improving women's place in the economy. The Ministry of Agriculture Extension Service trains women for home demonstration work and accepts women in variety of field training courses, for instance at farmer training centers. However, in the case of extension agent train-

ing, there has been difficulty in filling all the places available to Kenyan women because many women do not yet perceive these job opportunities as being either open to them or as appropriate areas for their employment. While graduates of Egerton College have been assigned to Government extension positions, there has been no followup of their activities, further training requirements or further needs for informational materials. In training activities conducted to date under ASL I, Part C, women have formed a large percentage, ranging from 20 percent to over 40 percent, of the attendees at the classes conducted at farmer training centers.

In 1975 the Government of Kenya legally abolished wage differentials based on sex for the same work performed. No information is currently available on how widely this legal requirement is now being applied.

In addition to these Government actions, it appears that women may be increasingly helping themselves. There is some evidence to suggest that more women are becoming members of cooperatives and/or are forming their own cooperatives and that more rural women are insisting on having a say in what happens to money earned from crops for which they are responsible. For example, several of the milk producer cooperatives in Western Kenya have a high percentage of female members who take the milk to the cooperative for marketing, and insist on receiving directly the cash payments for sales. Also, women's groups at the local level increasingly arrange for extension agents to visit them to discuss a variety of topics important to rural agriculture production and family welfare.

For further information see Annex VII.

2. Social Impact Assessment

A comprehensive framework for assessing the social impact of a program such as the GBC has yet to be developed. Such a framework should include consideration of both direct and indirect effects of an alteration in the infrastructure of a developing area on the patterns of social behavior to be found in that area. It also requires making a value judgment as to whether such changes are good or bad from a development point of view. A more sophisticated methodology would provide a way of determining the values and priorities of such social changes from the point of view of the people participating in them. Lacking such sophistication in the present instance, it will be necessary only to describe the expected social consequences and allow the reader to form a judgement as to whether they are good or bad for the people concerned.

a. Direct Effects

There are three possible ways in which a program such as the GBC might directly affect the social structure of the project area: through employment, through purchase of goods and services, and through land acquisition.

1) Employment. The GBC as presently planned, will contribute little or nothing to local employment. The unskilled labor required to support the proposed machines and their skilled operators is well within the capacity of the provincial MOW camps to supply from currently under used manpower reserves. Similarly, there will be no direct income effect, as these people are already on the MOW permanent payroll and are spending their money in the local economy.

The use of labor-intensive methods does not appear to be appropriate for most of the tasks involved in the road improvement program. Brush cutting, ditching and culverting are normally done by hand labor. Where needed, the MOW has in the past preferred to hire casual day labor for such tasks rather than add to the permanent pay-roll. Any money spent in this way will circulate in the local economy, representing a benefit to underemployed casual laborers and the system which serves them. The magnitude of this benefit, however, is likely to be quite small.

Use of locally manufactured materials such as bridge beams and culverts will certainly benefit the local economy by generating additional employment in such enterprises and by encouraging the use of local resources (hand crushed stone, for instance). Such projects should also have a demonstration value for communities needing all-weather access on roads which would not be eligible for improvements under the GBC program. Culverting done with local materials and unskilled labor would be well within the capabilities of such communities to undertake, for example, within a rural works program.

To the extent that gravelling and/or bridge construction is done by local contractors using local labor, there will also be a benefit to the local economy. This employment impact will probably affect primarily the more skilled sectors of the local labor market providing back-up services to the contractor, such as machine repair shops, fuel suppliers, tools and materials stockists, and so on. Nevertheless, such a stimulus to the local economy is preferable, from a social standpoint, to the effects of bringing in outside contractors with self-contained support units.

2) Purchase of goods and services. It is expected that the major part of the loan funds would be spent on the purchase of machines and POL through an independent procurement center (i.e. not through normal MOW procurement channels). Within the capability of local suppliers to meet the demands for efficient operation of the gravelling unit, off-shelf procurement of tools and materials would be desirable. A smaller amount of grant funds is earmarked for expatriate technical assistance, a portion of which might find its way back into the local economy. The magnitude of this effect depends partly on the expatriates' choice of a home base and on their consumption patterns.

3) Land acquisition. Widening of roadways and changes in alignment might pose a problem by taking land away from smallholders and out of agricultural production. The GBC program does not propose widening existing roads to MOW standards unless this can be justified by traffic levels, in which case the travelled way may already have encroached on neighbouring smallholdings. Any proposed widening of an existing road should be studied to determine its land acquisition implications. The MOW has provided assurances that any changes in alignment under the GBC program will not go beyond existing rights-of-way.

b. Indirect Effects

Improving secondary and minor roads to (1) all-weather standard and (2) a level when the MOW will assure future maintenance will have an indirect impact on the social structure of the project area as well. The mechanism through which this impact takes place can be summed up under the general heading of a change in accessibility experienced by the people who live near and/or travel on the secondary and minor roads. The magnitude of this change depends on many factors: the previous level of access provided by the road, previous travel patterns and desired changes in travel patterns constrained by lack of access, timely provision of goods and services to which access is desired and so on. In general, however, it is safe to say that improved access will be perceived as a benefit by smallholders in the project area as well as by the people who actually travel on the improved roads.

The implications of improved access for rural social welfare can be discussed under several headings: impacts on education, health, family life, community life, population growth, and migration. Such a discussion would of course, be highly theoretical. Little research, and none in the project area, has ever been directed at evaluating the social impacts of a change in accessibility on an empirical basis. For this reason, it is

recommended that a certain amount of baseline data be collected concerning travel and transport on secondary and minor roads before and after the gravelling program takes place. (See section VIII entitled "Evaluation Program") From these data it should be possible to determine with much greater precision the social consequences of a change in accessibility and the share of the small holder in project benefits.

1) Education: Primary schools are already well distributed over the project area, even in regions not well served by the road network. Since most students walk to school, road access is not a constraint unless there is a major impediment (such as a river without a bridge crossing). However, poor and/or unreliable road service may discourage teachers and education officials from coming to such schools; they will have greater difficulty getting needed books and supplies as well. Improvement of roads leading to schools is a high priority in some communities.

For secondary schools and village polytechnics, distance is probably a more serious constraint limiting access to educational opportunities. However, it is improbable that road improvements alone would solve this problem, as few students could afford to pay for vehicle transport on a daily basis. Some students may commute on bicycles; for these, road improvements would provide a tangible benefit. Such students are likely to come from the more privileged of smallholder families, however, including those with at least one non-farm wage earner.

Other educational efforts such as functional literacy classes, domestic science and agricultural training programs, family planning clinics and so on appear to be constrained more by lack of funds, staff, and vehicles than by the condition of the roads. (It should be noted, however, that the poor condition of many government vehicles can be partly attributed to the wear and tear now occasioned by taking these vehicles over bad roads). However, road conditions are one factor taken into account by administrators in deciding where to provide scarce services. For this reason it can be hypothesized that road improvements will induce a better distribution of such services in the project area. At this point such a statement is no more than an assumption, and one which should be tested by empirical data in the course of the gravelling program.

2) 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 harabee health centers which have not yet reached Ministry of Health standards. It is conceivable that better roads would encourage more activity of this nature.

Family planning education is conducted by rural nurses in conjunction with the maternal and child health clinics 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.

Insofar as the graveling program contributes to increased yields of food crops, it will enhance the caloric consumption of some farm families which are currently unable to meet their own food requirements. Insofar as it encourages increased production of cash crops, income will become available for spending on foods that would improve the nutritional quality of the diet. Little is yet known about consumer spending patterns, but current evidence seems to suggest that conversion to a cash economy may actually result in a decline in the nutritional quality of the diet. Certainly it cannot be assumed that increased agricultural production necessarily improves nutrition in the home. This question is another major topic for future empirical research.

3) 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 stand-point 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 small-holders. 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. Since the roads to be gravelled under the GBC program are already part of the classified network and pass through fairly densely populated areas, there is little likelihood that improvements under this program . . . will induce much movement of household heads in search of new agricultural opportunities.

The burden of labor placed on women whose husbands are away earning money and whose children are in school is unlikely to be lightened by road improvements. Many women now find cash employment by transporting agricultural produce to a market or pick-up point. This important source of income for women may be eliminated if roads are improved to a point where it becomes economic either for a transporter to bring vehicles to the farmer or for a farmer (or farm co-operative) to operate a vehicle. In this case the savings would be transferred from rural women to farm owners, independent transport operations, or government crop commercialization agencies. Where women are themselves farm managers and/or provide unpaid labor to transport goods, the effect would be to free them from a time-consuming task. In some cases this labor could be used to increase agriculture production.

4) Community Life. By definition, in Kenya the secondary and minor roads serve the least important population centers in terms of size and services available. Growth in these centers is definitely constrained by lack of all-weather access. To the extent that such centers are located on presently impassable or very poor condition D and E roads, they will benefit from increased contact and communication once the roads have been improved. Evaluation data from road improvements constructed under the SRDP in Vihiga and Hamisi Divisions of Kakamega District will provide some indicators of the magnitude of this response in terms of number of new establishments and items stocked in local shops and markets.

Provision of improved road access may also enhance community social life by increasing the probability that new social groups such as farmer's clubs, women's groups, sports clubs and youth groups will form under the impact of an external stimulus. Such social groups may either cross-cut or reinforce traditional intra- and inter-community cleavages. Data to assess either the magnitude or the direction of this effect, in terms of its contribution to national development, are lacking at this time.

5) Population Growth. The entire project area is under very high population pressure at the present time. It is right in the middle of the demographic transition where death rates and particularly infant mortality rates have declined while the birth rate continues to maintain a high level. Family planning programs have so far had no measurable impact on the birth rate. It is likely that official statistics do not present a reliable picture of population growth in the project area.

Improved road access is not likely to materially affect such growth, although in individual cases improved access to health care may prolong the life of an expectant mother or a sick child. Death rates from certain key diseases such as malaria and cholera in the lower lying regions may decline drastically as a result of national health campaigns and the timely provision of medical services in case of need. On the other hand, with increasing numbers of vehicles on rural roads, traffic accidents may become a more significant cause of death or disability. In addition, improved roads may facilitate the expansion of family planning services.

The net effect of road improvements on population growth will therefore be small but positive. (i.e., will probably contribute more to population growth than it will detract from it).

6) Migration. The effect of road improvements on population distribution is somewhat more tangible. The whole project area is densely populated and 85% of this population lives within 5 km. of major (A,B or C) roads. Therefore, if there is any land left to be exploited, it will be found in the areas served by D and E roads. The possibility of making such land more productive by bringing in inputs and taking crops to markets, using vehicle transport, should act as an incentive for the excess population to move into these areas, thus bringing about a more even population distribution. This is particularly likely to be the case where much of the land remains unadjudicated, i.e. in Kisumu, Siaya, and South Nyanza Districts.

Migration outside of the project area is not likely to be materially affected by the GBC program. Improved passenger transport service in response to cost savings on D and E roads will facilitate short-term migration by surplus labor, thus enhancing the flexibility of the rural labor market. Probably more trips will be made to urban centers by residents of previously isolated areas. On the other hand, improvements in rural roads along with the other services to be provided in rural areas under the Integrated Agricultural Development Program are designed to make rural life more attractive to young people and therefore to reduce the flow of migrants to the cities. The net effect will probably be a slight increase in short-term migration and a slight decline in long-term migration.

3. Incidence of Benefits and Participation in Planning

The incidence of economic benefits to be derived from the GEC program is discussed in Section III-B. The present discussion concerns the incidence of social benefits as described in the preceding section. The "sociocultural feasibility" of the project and the role of local participation in planning and implementation are then evaluated. In conclusion, the project appears to be feasible from a socio-cultural point of view and the majority of social benefits will accrue to the more isolated, hence less privileged, smallholders in the project area.

1. Incidence of Social Benefits

The GEC program is intended to improve access for those people in the project area who are not now served by all-weather roads. It is assumed that roads above the "secondary and minor" (D and E) category are now all-weather or will become so under the regular MOW construction and maintenance program.

The proportion of the population served by D and E roads can be calculated in two ways. One is to assume that people living within a certain radius of a major road are served by that road, and everyone else is served by the secondary and minor roads. The second way is to assume that each population group is served by the closest road. The results of both calculations (based on 1969 population distribution) are shown in Table 28.

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. Less than 15% of the population now lives more than 5 km. from a major road. However, many secondary and minor roads serve population within this perimeter as well as outside it. Over 30% of the project area population lives closer to a secondary or minor road than to a major road.

The proportion of secondary and minor roads which do not now provide all-weather access has been estimated by the Provincial Engineer as follows:

Bungoma	65%
Busia	20%
Kakamega	35%
Kisi	35%
Kisumu	20%
Siaya	25%
S. Nyanza	35%

Using the more generous criterion in Table 28, and assuming that all people served by a road benefit from its improvement (probably more true for a link-type improvement than for a spot-type improvement) the maximum number of people whose access will be improved by the proposed GBC Unit constitutes no more than 500,000 or 11% of the total project area population.

Who are these people? They are small holders and landless laborers living on those secondary and minor roads which do not now have all-weather access. By definition, then, they have not received the same steady flow of goods and services as centers which do have all-weather access. While we cannot show, on the basis of existing data, that this 10% is the poorest 10% of the rural population, it is probable that this target group contains a high proportion of those producers who are less integrated into the cash economy and who have been relatively deprived of access to inputs, credits, market facilities, and administrative services.

The benefits of road improvements to this group are of two types: (1) access benefits which automatically follow road improvements, and (2) benefits which depend on an increase in farm family income and on patterns of consumer expenditure. The former are of an "opportunity" nature and include such items as: more goods in the local market, more public transport and travel facilities, outreach by government service providers, and so on. The latter accrue to those individuals who (1) have enough disposable income to take advantage of newly accessible opportunities, and (2) make a conscious choice to do so.

In principle, the benefits of improved road access accrue to all the people living along the road which has been improved. In practice, however, the extent to which these benefits can be enjoyed depends upon the way in which the road is used before and after the improvement. This implies a change in travel and transport patterns which can be conceptualized as a behavioral response to new access opportunities, in much the same way as the planting of new crops is interpreted as a behavioral response to new agricultural opportunities.

The type of improvements proposed under the GBC Program are intended to make secondary and minor roads passable to light vehicles throughout the year. This means that access benefits will be realized principally by those who travel in such vehicles, i.e. government officials, traders and suppliers, farmers who can afford to use vehicles for transport (this includes cooperatives), truck, bus and taxi operators, and vehicle passengers. Benefits will also accrue to bicycle owners or users in the form of reduced wear and tear on their vehicles. **Animal-powered transport is relatively rare**

in the project area; if an intermediate form of transport technology using human or animal power combined with wheels (e.g. ox carts or wheel barrows) were to be introduced, however, there would be additional benefits for road improvements.

It is clear that such access benefits will be materialized only to the extent that people can afford to pay for vehicle transport and are willing to spend money for it. With respect to government services, the realization of benefits depends on available vehicles and fuel allocations. Traders and transporters are constrained chiefly by vehicle costs; experience with the SRDP, sugar and tea roads suggests that goods and passenger transport services move rapidly into an area where transport costs have been lowered by road improvements. The supply of such services is closely calibrated with demand, indicating that farmers are in fact willing to use vehicles for crop transport and that people in the project area value travel as a consumer good as well.

To the extent that rural development programs make it possible to increase farmers' cash income, then, it is likely that the benefits of road access will in fact be fully realized. To the extent that such programs have a redistributive effect in the rural economy, these benefits will also be redistributed. In addition, there is a distributional benefit deriving from the fact that goods and services will be made available in areas that were previously inaccessible at least part of the time. People in these areas will have more equal opportunities to benefit than they had before, even if the realization of these benefits is still constrained by cash income.

In short, a road improvement program limited to secondary and minor roads will provide fewer benefits to the very rich and the very poor than to the middle groups of smallholders who are in a position to take advantage of new opportunities. Access benefits per se are class-blind; they accrue to the community as a whole. Income-dependent benefits, that is, benefits that require some initial expenditure to be realized, will accrue to individuals in proportion to their disposable income and the value they place on travel or transport.

Presently, there are very few data on which to base a prediction about the behavioral response of smallholders in the project area to new transport opportunities. For this reason it would be highly desirable to implement an evaluation program in parallel with GBC improvements that would provide more solid information on which to base future decisions concerning such improvements. Details of a proposed evaluation plan are given in Section IV-C of this paper.

2. Participation in Planning

Improvement of secondary and minor roads (as well as bitumenization of major roads) is a high priority throughout the project area as expressed in the District Development Plans. This priority has been verbally reinforced by provincial administrators and planning authorities in conversations with the Consultant. Specific links requiring improvement have been identified by the District Development Committees, reflecting the concerns of local communities as well as those of the various Ministries providing services in each district. These lists are then prioritized within the Provincial Development Committees, and the prioritized list is submitted

to the Ministry of Works. In principle, each year the list is updated to reflect current improvements made under the MOW's regular maintenance program and other special programs (sugar roads, tea roads, etc.). In practice, however, there has been relatively little feedback from the MOW of the District Development Committees to show how these local priorities are taken into account in planning the regular construction and maintenance program.

A selection process for links to be constructed under the Rural Access Roads program has already been initiated by the MOW. In this process, District Development Committees are asked to provide some specific information about each link they recommend for construction. These data are then incorporated into the MOW's internal evaluation process, which also includes a technical feasibility and cost study component.

The MOW will then prepare a proposed program of rural access road construction for each district which will go back to the District Development Committee for discussion, amendment and final approval. This process has the advantage of allowing the Committees to see how the data which they provide are used in analyzing the feasibility and cost/benefit ratio of specific links, thus contributing to the development of a real planning capability at the district level.

This planning exercise is expected to have some spinoffs for the GBC program. In the latter case, the Ministry of Works will prepare a proposed program for each district based on a number of objective criteria, as outlined in Section III-A-1.d. of this paper. (These criteria include, but are not limited to, those which are now used by DDC's in arriving at their recommendations for upgrading of existing roads - i.e. agricultural access, traffic counts, and new development projects). This proposed program will be presented and discussed with the District Committees, and the final selection of links and sites for improvement will be decided in consultation with these committees. It is unlikely that local people will feel a strong sense of participation in the road selection process and consequent commitment to road maintenance. This is so not because of any defects in the GBC program but because road construction and maintenance are traditionally perceived as Government responsibilities. Consequently, voluntary selfhelp efforts have gone into other activities such as schools, health centers, water supplies and cattle dips. This does not mean that people fail to perceive a need for roads, but rather that they perceive the Ministry of Works as one of the more effective government agencies on the ground and they rely on the political process to make this agency responsive to their needs.

Therefore, voluntary maintenance of newly improved roads is neither expected nor appropriate. The standard of the improved roads should be such that the MOW can in fact assume responsibility for their effective maintenance, whether through traditional techniques or by a program of employing local labor. Failure of the government to maintain such roads will not go unnoticed by the District Development Committees, and it is incumbent upon these groups, as the coordinating unit of the national development planning process on the ground, to ensure that road construction and maintenance is carried out in harmony with other planned development activities.

No groups or individuals have been identified as opponents of all-weather roads for Western and Nyanza Provinces. The roads already exist and the changes in alignment will be so minor as not to generate opposition by farm lands being taken for roads. Similarly, the highly competitive nature of the local transport system indicates that opposition should not be forthcoming from commercial vehicle owners and operators, who stand to benefit both from savings in vehicle costs and from access to new business opportunities. Traders who in the past have controlled marketing of farm production from remote rural areas by acting as the middle man between the farmer and marketing board purchasing offices may suffer a loss of earnings if farmers choose to use the improved road network to market their produce themselves. However, it is doubtful that this concern would be translated into action against proposed road improvements.

The most serious question is whether or not the socioeconomic benefits to which the roads are to contribute will, in fact, be realized. Failure of this to happen may result from one of two causes - either the roads are not selected so as to maximize their contribution in concert with other development activities in the area, or the other development activities do not achieve the results projected for them.

With regard to the first possibility, the proposed link selection criteria and evaluation plan should ensure that selection of roads for graveling will reflect socio-economic considerations and their relationship to other development activities, such as the Rural Access Roads program, the Integrated Agricultural Development Program and Part C of ASL 1. Also, the concentration by AID of its support for significant parts of ASL 1 and the IADP in the same areas in which AID financing for graveling and rural access roads programs will operate should provide a means for strengthening coordination of these various activities.

It is evident from previous sections of this paper that there are numerous factors which will affect whether or not improved extension services, farm inputs, increased credit, and so on are actually adopted and/or the increased income derived from the resulting increases in production will be spent in a manner which will improve the quality of life for the rural poor making up the majority of the population of Western and Nyanza Provinces. The socioeconomic studies proposed as part of the other segment of this loan as well as under the proposed FY 1977 rural roads project should shed light on this particular question.

TELEGRAM

Annex I
Part A
615-0168

0450

ASPPON: AID - PROG REDSO

UNCLASSIFIED

INFO: AMB DEN EPON ADM

Classification

80AN76 0122

DIR AID CONT TSS CH RF

ACTIONS TAKEN

R 072340Z JAN 76
FM SECSTATE WASHDC
TO AMEMBASSY NAIROBI 5583
BT
UNCLAS STATE 003987

DATE ANSWER DUE 1-12-76

INITIALS DATE

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: KENYA: RURAL ROADS PPP
REF: STATE 302420
FOR USAID AND REDSO

1. ECPR MET DECEMBER 23. WHILE IT DETERMINED INCLUDE PRO-
JECT IN 77 CP, ECPR DEFERRED PSP 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 REPTEL.

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. ECPP PARTICULARLY CONCERNED WITH ECONOMIC ISSUES IN-
CLUDING 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 INTI-
TIATION OF PROGRAM AT MORE MODES THAN PROPOSED IN-

TELEGRAM

CN: 0458

PAGE 2,000

UNCLASSIFIED

Classification

8 JAN 76 01:32

FY 76 ASL AND FY 77 RURAL ROADS PNP. FURTHER COMMENTS THIS REGARD WILL FOLLOW EOPR REVIEW OF MATERIAL REQUESTED PARA 1 ABOVE AS WELL AS REVIEW OF FY 76 ASL PP. KISSINGER

OFFICE WORKING COPY

ACTION: AID- ~~PROG~~ UNCLASSIFIED

INFO: AMB DCM ECON ADM

DIR ~~RED~~ REDSO CONT F&A CH RF ~~RED~~

2 APR 75 06:10

P 012322Z APR 75
FM SECSTATE WASHDC
TO AMEMBASSY NAIROBI 0211
BT
UNCLAS STATE 073794

ACTION TAKEN _____

DATE ANSWER DUE 4-7-75

INITIALS _____ DATE _____

AIDAC, REDSO FOR INFO

E.O. 11652: N/A

TAGS:

SUBJECT: KENYA: FY 1976 AGRICULTURE SECTOR LOAN (ASL)
REF: A. STATE 54988 B. NAIROBI 2172

SUMMARY: AFR REVIEW SUBJECT PRP CONCLUDED PRODUCTION ORIENTATION DOES NOT APPEAR APPROPRIATE PREMISE FOR FY '76 ASL. WHILE FY 75 ASL COULD GIVE RISE TO FY 77 ASL WITH EMPHASIS SMALLHOLDER PRODUCTION, AFR BELIEVES FY 76 ASL BETTER DIRECTED AGGREGATE OR SECTOR LEVEL CONCERNS. WITH MISSION CONCURRENCE, DAP TEAM COULD BE EXPECTED ASSIST MISSION IN PREPARATION REVISED PRP WHICH WOULD, IN EFFECT, BE FIRST DRAFT OF PP FOR SUBMISSION JULY 1975.

1. AFR REVIEW OF PROPOSED FY 1976 AGRICULTURE SECTOR LOAN PRP UNDERTAKEN COINCIDENT WITH RECENT DISCUSSION IBRD STAFF AND DE-BRIEFING FY 1975 ASL TEAM. FOLLOWING COMMENTS, THEN, REPRESENT ENLARGING PERSPECTIVE WITH REGARD AID ROLE KENYA AGRICULTURE SECTOR DEVELOPMENT AND ARE INTENDED TO ELABORATE AID/W VIEWS AS BASIS CONTINUING EXCHANGE WITH USAID AND REDSO. BELIEVE EFFORT OUTLINED REF A CAN BE UTILIZED TO EXPAND AID/W-USAID UNDERSTANDING AND DIALOGUE WITH GOVERNMENT OF KENYA AS WELL AS GIVE SHAPE TO FY 1976 ASL.

2. BANK BELIEVES AGRICULTURAL SECTOR PERFORMANCE SATISFACTORY IN KENYA OVER LAST DECADE. MARKETED PRODUCTION HAS DOUBLED IN DECADE SINCE INDEPENDENCE AND, IN REAL TERMS, THIS HAS MEANT A SIX PERCENT AVERAGE RATE OF GROWTH IN MONETARY AGRICULTURAL SECTOR. WITHIN THE SECTOR, WHILE DEVELOPMENT HAS NOT REACHED ALL THE RURAL POPULATION, PROGRESS MADE BY SMALLHOLDER HAS BEEN SIGNIFICANT. SINCE 1974 SOME 830,000 HECTARES OF LAND HAVE BEEN TRANSFERRED FROM LARGE TO SMALL FARMERS. OVER 630,000 HOLDINGS HAVE

BYR/REAZETERAS//

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BEEN REGISTERED, AND SEVERAL HUNDRED THOUSAND SMALLHOLDERS HAVE BEEN INTRODUCED TO NEW CASH CROPS SUCH AS TEA, COFFEE, SUGAR, PYRETHRUM OR HIGH-GRADE CATTLE. AS A RESULT, VALUE OF SMALLHOLDER MARKETED PRODUCTS HAS TRIPLED IN LAST DECADE.

3. MISSION DAP AND ASL TEAM QUITE CORRECTLY POINT OUT, HOWEVER, THAT GREATER ATTENTION TO SMALLHOLDER PRODUCTION IS NECESSARY AND THAT APPROPRIATE MECHANISMS AND EXPANDED DELIVERY CAPACITIES FOR REACHING SMALLHOLDERS NEED BE DEVELOPED. PROPOSED FY 1975 AID ASL AND PROPOSED FY 1976 IBRD INTEGRATED CROP PRODUCTION LOAN COULD BE IMPORTANT VEHICLES FOR ASSISTING SMALLHOLDER PRODUCTION IN KENYA.

4. FY 1975 ASL TEAM SUGGESTS TESTING (E.G. MECHANISMS, DELIVERY CAPACITY, GOK COMMITMENT) ABSOLUTELY NECESSARY TO FURTHER SMALLHOLDER PRODUCTION DEVELOPMENT. THE IMPLEMENTATION SCHEDULE FOR THE FY 1975 ASL PROPOSES INITIATION SMALLHOLDER PRODUCTION EFFORTS MARCH-APRIL 1976, WITH FLOWS FROM OTHER COMPONENTS OF ASL ALSO AVAILABLE FOR PROGRAMMING. DISCUSSIONS WITH IBRD INDICATE THAT DISBURSEMENT ITS LOAN WILL NOT COMMENCE UNTIL MAY-JUNE 1976. FURTHER, IT OUR UNDERSTANDING POSSIBILITY AID ARID LANDS PILOT EFFORTS WILL NOT BEGIN TO SHOW RESULTS UNTIL MID TO LATE 1976. ON THIS BASIS, AFR BELIEVES IT INAPPROPRIATE PLAN FY 1976 LOAN DIRECTED TO SMALLHOLDER PRODUCTION. RATHER SUGGESTS FIELD CONSIDER LOAN WITH PRODUCTION FOCUS FOR FY 1977 PREMISED ON EXPERIENCE AID FY 1975 ASL, OBSERVATION IBRD FY 1976 INTEGRATED PRODUCTION LOAN AND OUTPUT ARID LANDS STUDY.

5. THESE PROPOSALS NOT INTENDED TO DEFLECT AID ATTENTION FROM AGRICULTURE SECTOR OR EQUITY CONCERNS - SINCE BELIEVE SECTOR WARRANTS BALANCED ATTENTION TO AGGREGATE OR SECTOR LEVEL CONCERNS AS WELL AS FARM LEVEL PRODUCTION. GOK SESSIONAL PAPER, FOR EXAMPLE, RECOGNIZES THAT DESPITE PROGRESS MADE IN PAST, IT IS APPARENT THAT KENYA'S SUCCESS IN ADJUSTING TO DIFFICULT YEARS AHEAD (INCLUDING CRITICAL BALANCE OF PAYMENTS SITUATION) WILL TO A LARGE EXTENT DEPEND ON HER ABILITY TO RAISE PAST GOOD PERFORMANCE OF AGRICULTURAL SECTOR TO AN EVEN HIGHER LEVEL IN IMMEDIATE FUTURE. IN PARTICULAR, UNLESS MACROECONOMIC SCENE IS NOT TO WORSEN MORE THAN NOW FORESEEN, IT WILL BE NECESSARY FOR AGRICULTURAL SECTOR TO (A) MAINTAIN DOMESTIC FOOD PRODUCTION (B) MAKE A MAJOR CONTRIBUTION TO IMPORT SUBSTITUTION AND (C) OPEN UP NEW EXPORT OPPORTUNITIES - AND (D) PLAY AN EVEN

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MORE IMPORTANT ROLE IN ABSORBING LABOR AND MAINTAINING INCOMES AND CONSUMPTION WHEN EMPLOYMENT OPPORTUNITIES IN URBAN SECTOR MAY BE FAR FEWER.

6. IN THIS CONTEXT, AFR SUGGESTS FY 1976 ASL BEST DIRECTED TO AGGREGATE OR SECTOR LEVEL CONSTRAINTS/CONCERNS. FOR REASONS OUTLINED PARA 4 ABOVE DO NOT FEEL LOAN SHOULD TAKE PRODUCTION FOCUS. ASL TEAM NOTES MOVEMENT AHEAD OF SCHEDULE OUTLINED PARA 4 ABOVE COULD STRETCH GOK UNTESTED CAPACITIES. IN ADDITION, ISSUE OF GOK DELIVERY CAPACITY TO SMALLHOLDERS ARISING WITH REGARD CREDIT ALLOCATION IN PROPOSED FY 1975 PRODUCTION LOAN WOULD CERTAINLY BE EQUALLY AS RELEVANT WITH REGARD FERTILIZER ALLOCATION IN AN FY 1976 PRODUCTION LOAN.

7. DAP SECTOR ANALYSIS AND STRATEGY ELABORATION CONTEMPLATED REFS A AND B COULD GIVE RISE TO APPROPRIATE AGGREGATE OR SECTOR FRAMEWORK AS BASIS FY 1976 AGRICULTURE SECTOR LOAN. GOK SESSIONAL PAPER AND PENDING WHITE PAPER RECOGNIZE CRUCIAL ROLE TO BE PLAYED BY AGRICULTURAL SECTOR OVER NEXT FEW YEARS AND PROPOSE THREE KINDS OF MEASURES TO HELP SECTOR RISE TO CHALLENGE. FIRST, A LARGE INVESTMENT OF RESOURCES WILL BE CHANNLED INTO AGRICULTURE THROUGH THE DEVELOPMENT BUDGET. MINAG DEVELOPMENT EXPENDITURE WILL BE ALLOWED TO INCREASE FOURFOLD BETWEEN FY 1974 AND FY 1978. A SECTOR LOAN COULD ASSIST IN MEETING THIS STAGGERING RESOURCE REQUIREMENT. SECOND, GOK RECOGNIZES THAT THESE RESOURCES WILL BE DIFFICULT TO ABSORB EFFECTIVELY WITHOUT A SUBSTANTIAL INCREASE IN PLANNING CAPACITY, AND THE FY 1976 AID TA PROGRAM ALREADY PROPOSES ASSISTANCE IN THIS AREA. THIRD, THE SESSIONAL PAPER RECOGNIZES THAT IF PRODUCTION IS TO INCREASE, FARMERS MUST BE PROVIDED WITH APPROPRIATE PRICE INCENTIVES. POLICY ISSUES SUCH AS THIS, THOSE ARISING FROM DAP STRATEGY (REFS A AND B) AND EXPERIENCE WITH SMALLHOLDER PRODUCTION GAINED FROM FY 1975 ASL COU SUGGEST APPROPRIATE FRAMEWORK FOR AN AGGREGATE/OR SECTOR LEVEL LOAN IN FY 1976. WHILE CONCUR LOCAL CURRENCY APPLICATION SHOULD GIVE PRIORITY TO STRENGTHENING INSTITUTIONAL CAPACITIES TO MAXIMUM EXTENT POSSIBLE WITH REGARD SMALLHOLDER PRODUCTION IN RELEVANT SECTORS GOK FY 1976 AND 1977 DEVELOPMENT BUDGETS, BELIEVE ITEMS ENUMERATED PRP SECTION D 2-8 WOULD BE APPROPRIATE FOR LOCAL CURRENCY SUPPORT. WITH MISSION CONCURRENCE, DAP TEAM COULD BE EXPECTED ASSIST

MISSION IN PREPARATION REVISED PRP WHICH WOULD, IN EFFECT, BE FIRST DRAFT OF PP FOR SUBMISSION NOT LATER THAN JULY

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8. KEY TO AFR PROPOSITION IS ELABORATION MULTI-YEAR STRATEGY, WITH EQUITY POLICY BIAS, WHICH POSSIBLY WOULD ENABLE AID TO OPERATE AT FARM/PRODUCTION AND AGGREGATE/SECTOR LEVELS IN ALTERNATE YEARS WITHOUT CONFUSING AID PROGRAM REQUIREMENTS OF ONE FOR THE OTHER. MISSION RESPONSE WELCOMED.

9. IN THIS SCHEMA, FERTILIZER DOES NOT BECOME A PURPOSE OF AN FY 1976 ASL. TO THE EXTENT FOREIGN EXCHANGE RESOURCES BECOME AVAILABLE TO THE GOK THROUGH THE LOAN, FERTILIZER (OR ANY OTHER INPUTS OR COMMODITY) OF COURSE COULD BE FINANCED, AND TO THE EXTENT DELIVERY CAPACITIES ARE EXPANDED AT THE FARM/PRODUCTION LEVEL THROUGH THE FY 1975 LOAN, FERTILIZER COULD FLOW TO THE SMALLHOLDER. WHILE THE FY 1976 LOAN MIGHT ALSO FACILITATE FERTILIZER FLOW TO THE SMALLHOLDER THROUGH ITS ATTENTION TO CRITICAL POLICY BOTTLENECKS AND WITH BUDGETARY SUPPORT TO EXPANDING INSTITUTIONAL CAPACITY, THE PURPOSE OF THE LOAN WOULD NOT BE FERTILIZER IMPORT AND AID PROGRAM REQUIREMENTS ARISING IN A STRICTLY PRODUCTION CONTEXT (AS WITH THE FY 1975 ASL PARA 6 ABOVE) WOULD NOT BE ABSOLUTELY RELEVANT.

10. IN DISCUSSIONS WITH GOK MISSION SHOULD NOT LEAD GOK TO EXPECT USE FY 1976 ASL F/X FOR FERTILIZER PROCUREMENT IN CALENDAR YEAR 1975 SINCE IT IS UNLIKELY LOAN WILL BE AUTHORIZED EARLY ENOUGH FOR PROCUREMENT ARRANGEMENTS TO BE MADE FOR LATE CY 1975 DELIVERY. FOREIGN EXCHANGE MADE AVAILABLE IN FY 1975, OF COURSE, CAN BE UTILIZED TO MEET FERTILIZER (OR ANY OTHER INPUT OR COMMODITY) REQUIREMENTS IN CALENDAR YEAR 1975. WILL ATTEMPT AUTHORIZE FY 1976 ASL BY END CY 1975 BUT DESIRE STRATEGY AND DESIGN ISSUES TO BE FULLY ARTICULATED AND DO NOT WANT TO BE UNDER UNREASONABLE TIME PRESSURES.

11. GIVEN CURRENT AGENCY STUDY LOCAL CURRENCY FINANCING POLICY, DIRECT PURCHASE MAY NOT BE POSSIBLE FY 1976 AND MISSION MAY HAVE TO CONSIDER CIP, SLC, OR UNRESTRICTED SLC (FORMERLY KNOWN AS QUOTE DE MINIMUS UNQUOTE SLC). IN PREPARING PP, MISSION NEEDS GIVE ATTENTION THESE ALTERNATIVES WITH STRONG JUSTIFICATION REQUIRED IF DIRECT PURCHASE RECOMMENDED. AID/W WILL ADVISE AS LOCAL CURRENCY FINANCING POLICY EVOLVES AT AGENCY LEVEL. KISSINGER

HF

UNCLASSIFIED

Classification

GOK POLICIES AND THEIR IMPLEMENTATION

1. GOK Policy

Attainment of the fundamental goal of the Government of Kenya (GOK) 1974-78 Development Plan - a more equitable distribution of national income through increased development of rural areas and faster growth of employment opportunities - is viewed by the GOK as being dependent in very large measure on achieving the goals set for the agriculture sector since it is upon this sector that over 80 percent of Kenya's population relies for its livelihood. The principal agriculture sector goals having particular relevance for this loan were stated as being achievement of a 6.7 percent target growth for marketed production through intensified land use (and a 5.2 percent overall sectoral growth rate); improvement in the distribution of rural incomes by obtaining a significant increase in the proportion of farmers obtaining cash incomes from their land; an increase in opportunities for employment in the agriculture sector; devising methods of developing less favored areas and promoting more even development among different areas of Kenya, and a more than doubling of development expenditures on agriculture over the levels for the previous plan period (1970-74).

The strategy for achieving these targets was seen as increasing the rate of public expenditure on programs aimed at helping large numbers of farmers to intensify production, including such efforts as agriculture extension, training and research, credit and input supply programs, cooperative development and marketing, disease control, and land adjudication and registration. According to the Plan (page 197), "this implies giving highest priority to programs aimed at developing the small-holder farming areas", and "a proposed integrated crop production project will be of considerable significance in implementing improved crop production methods" (page 198).

The Plan, the Government has repeatedly stated, is a comprehensive strategy for the development of the rural areas involving interlocking and mutually supportive efforts in agriculture, health, roads, public works, education, and water aimed 1) at improving the overall standard of life at least as fast as the rise in average income throughout the whole country and 2) at raising the standard of services toward those levels already existing in urban areas.

Infrastructure development to support the projected growth in the various economic sectors was stated as being the primary responsibility of Government with the thrust of efforts under the Plan to be on providing efficient connections to smaller centers. Special attention was to be devoted to providing all-weather access between farming and marketing centers, thus enabling rural populations to travel more easily and to market their produce more cheaply. Accordingly, major emphasis was to be shifted to the improvement and maintenance of the secondary and minor roads networks and high priority to be given to new access roads in agricultural areas where communication is not possible in the rainy season or where the cost of road transport is excessively high. Two separate activities cited by the Plan to address these objectives are the graveling, bridging and culverting (GBC) and the rural access roads (RAR) programs.

Kenya's current serious economic difficulties - rising domestic inflation, balance of payments deficits, severely reduced foreign exchange availabilities, and lower rates of growth in gross domestic product and per capita income - arising principally out of world-wide inflation and the energy crisis (Kenya is an MSA), but also from adverse weather conditions in much of the period since publication of the 1974-78 Development Plan, have not altered the substance of the policies or strategies set forth therein. If anything, they have accelerated several of the changes in emphases enunciated in the Plan which were then, and are still, viewed as being essential to achieving its equity and employment objectives. This has occurred despite the reduced growth targets which have had to be adopted as a result of the current economic facts of life.

Sessional Paper No. 1 of (March) 1974 stated that higher priority would have to be given to projects aimed at achieving higher agriculture production. In effect, while maintaining its commitment to development of the smallholder sub-sector, the Government placed more stress on increasing production by all classes of farmers in order to meet domestic food needs, to reduce imports, and, if possible, increase exportable surpluses.

Sessional Paper No. 4 of 1975, "On Economic Prospects and Policies", issued in May 1975, reaffirmed this dual strategy while revising downward both the target rate of growth in GDP during 1974-1978 and the projected rate of growth in real income per capita. (In fact, in 1974 GDP only grew at 3.6 percent, less than the revised 5 percent target, while real per capita income decreased (by 5.4 percent) for the first time since independence.) That paper also cut back the rate of growth

in GOK expenditures on development to 7.8 percent and on the recurrent budget to 6.3 percent compared to the original Plan projections of 12.3 percent and 11.3 percent, respectively. Despite the decrease in total development expenditure the pattern of spending was to be shifted so that expenditures on agriculture, water, and rural development would grow even faster than proposed in the Plan (up 66.8 percent from the Plan figure of £59.0 million to £98.4 million, or 21.6 percent of the total development budget), and expenditures on rural roads would shift toward access and feeder roads in rural areas within a Ministry of Works (MOW) budget that was to be held to its present level. Between 1975-78 £22.4 million, or 44.3 percent of the GOK budget for roads construction and over twice the 21.6 percent attributed to these roads in 1973-74, is to be devoted to secondary and minor roads.

The purpose of these changes was to increase agricultural production more rapidly, largely through the small-scale farmer, to reduce food imports, and to increase agriculture exports. The change in MOW spending was justified on the grounds of freeing more resources for agriculture and water development, conserving foreign exchange, assuring the small farm sector of access to markets, and creating more employment opportunities.

These alterations are significant elements in a revised economic strategy whose purposes are to keep domestic price increases to no more than half of increases in import prices, to hold increases in the wage and non-import costs of production to less than domestic price increases, to restrain imports, to promote exports, and, most importantly, to choose policies for this crisis period which insofar as possible reinforce the GOK's longer term objectives of promoting growth, employment and an improved distribution of income. (See also State A-59 of May 16, 1975.)

2. Relationship of GOK Policy to IBRD and ILO/UNDP Recommendations

During 1971-73 Kenya was the subject of three intensive surveys carried out by the ILO/UNDP and the International Bank for Reconstruction and Development (IBRD). The first, by the ILO/UNDP, was requested by the GOK, and the report, Employment, Incomes and Equality, was issued in 1972. The study focused on employment and poverty as key development problems for Kenya growing out of various imbalances in the economy, such as between urban and rural areas, which had originated in Kenya's colonial past and which had been exacerbated by the pattern of development achieved since independence. The ILO/UNDP team concluded that a major revision of development priorities was necessary during the 1970's and recommended adoption by the GOK of a strategy of redistribution of

income in association with continued growth and expanded production in every sector. The team concluded that to implement this strategy successfully in the agriculture sector would require a 6 percent annual increase in output, including a 5 percent increase per year in food production, no matter whether one approached the task from the angle of raising rural incomes and providing increased employment opportunities or of meeting increased demand.

Three main components were proposed for an agriculture development strategy of which the most significant for this loan was the following:

"The intensification of land use for both crop and livestock production through the improvement of farming techniques and practices on all farms to raise over-all incomes and employment in agriculture. This intensification of land use must be associated with a concerted effort to raise the standard of living of the poorer families in relation to the community as a whole". ^{1/}

The ILO/UNDP report went on to conclude that given the relevant technology coupled with training, credit, access to the necessary inputs, appropriate pricing policies for purchased inputs and agricultural commodities, and assured access to markets, there were a wide variety of farming systems by which one hectare or less could provide a family with sufficient food and cash income to enable the purchase of at least the necessities of life. Agriculture and economic research would also need to be intensified, particularly on farm management problems facing the small farmer. Specific recommendations included:

- Altering extension methods to place more emphasis on group and mass extension techniques.
- Putting farmer training centers on a sounder footing.
- Improving the quality of extension services.
- Increasing credit available to small farmers.
- Reducing the costs while increasing the availability of farm inputs.

^{1/} ILO/UNDP, Employment, Incomes and Equality, (Geneva: International Labor Office, 1972). p. 152.

- Raising producer prices of agricultural commodities, but more preferably improvements in marketing and reduced transport costs through construction of feeder roads and linking remote areas to main marketing centers.
- Increased production by small farmers of food crops, especially hybrid maize, and introducing cash crops, including pyrethrum, tea and horticultural crops, and livestock.

As is clear from the above, the ILO/UNDP report views development of the secondary and minor roads systems as a necessary factor in agriculture sector development. Within the broader context of constructing rural works this is also seen, however, as one means for extending social and public services to rural areas whether for agriculture, health, education, or for facilitating coordination between central and local government administrations; as a means of increasing rural incomes, particularly when based on labor-intensive construction and phased with the supply and demand of agricultural labor, and as a focus for local participation and involvement in development.

The IBRD Basic Economic Report ^{2/} similarly concluded that a major change of development policy would be required during the 1970's, emphasizing the necessity of Kenya's making more efficient use of resources and finding better ways of sharing development benefits so as to attain the GOK's dual goals of rapid growth and equitable income distribution. Increasing investment and, thus, the rate of growth in agriculture and the other productive sectors were identified as being the most efficient use of resources, and in combination with factor price changes (devaluation and raising the price of capital relative to labor) were recommended as the means to restructure the pattern of growth. Simultaneously, the process of growth was to be reformed, principally through providing improved price signals to the private sector, although the public sector could contribute indirectly through improved project design and appraisal.

To the IBRD planners the general strategy proposed for restructuring growth entailed achievement of an average agriculture sector growth rate of about 7.5 percent per year with annual investment in agriculture growing at about 6.5 percent in real terms. In reaching this conclusion the report drew upon the findings and recommendations of the World Bank's

2/ IBRD, The Second Decade: A Basic Economic Report on Kenya, Report No. 201-KE, Washington, D.C., 1/15/74 (in five volumes).

Agriculture Sector Survey - Kenya published in December 1973. This study stressed the necessity - in light of existing population pressures on the limited land area in Kenya suitable for agriculture - of providing means to increase employment and incomes in situ by intensifying land use in heavily populated localities, mainly through integrated, area-based programs. This survey stressed the need for an integrated approach to smallholders which would combine research, effective farmer training, and integrated delivery of credit and farm inputs. Particular emphasis was given to expanding maize production while modest investments in technical research and design of farming systems along with improved promotion programs, it was felt, would make possible rapid expansion in production of oilseeds, pulses, small grains, and horticultural crops. The potential for expanding livestock was also noted. The major constraints to implementing such an approach were identified as being research, organization of public support services (such as extension), design of delivery systems for smallholders, and the capacity of the operating ministries to develop a sector strategy and to identify and implement development activities.

In discussing area-based programs the sector survey stressed their role in lessening disparities in land distribution and intensity of land use, improving the lot of the rural poor, and raising outputs when focused on areas of high population density. The IBRD sector survey divided Kenya's districts into three categories having the following characteristics:

Category A: High and medium potential agriculture lands; population density generally less than 90 per square kilometer; few cash crops produced, and generally low economic activity.

Category B: High and medium potential agriculture lands; population density about 250 per sq. km.; few cash crops produced, and low economic activity.

Category C: High and medium potential agriculture lands; population density over 300 per sq. km.; significant production of cash crops, such as tea, pyrethrum, and coffee, and high level of economic activity.

The survey concluded that if the GOK's concern was with the rate of return to rural programs in terms of income distribution, it should center its area-based programs in Category B districts which had both dense populations at unsatisfactory income levels, often at bare subsistence, and considerable unexploited agriculture potential. The only solution seen by the Bank was in situ development to intensify land use since no major impact could be

achieved by land redistribution. These areas also are mainly composed of smallholders and were located in two main blocks - Western and Nyanza Provinces in Western Kenya and much of the Eastern and Central Provinces.

The GOK's priority task for these areas was seen as conducting improved technical research, particularly on oilseeds, pulses and drought-resisting grains, although the availability of research results, it was emphasized, should not delay initiation of integrated, area-based programs. The first phase of such programs was considered to be a vehicle for testing new ways to reach smallholders with credit, advice, inputs and marketing channels. It was recommended that these programs focus on a combination of cash crops and expanded hybrid maize production. It was also recommended that rural roads programs be carefully integrated with agricultural development projects.

As can be seen from the above relatively brief resume, there are numerous and striking similarities between the conclusions of the ILO/UNDP and IBRD studies. It is also clear that the GOK has accepted much of the substance of these reports and woven them into the fabric of the 1974-78 Development Plan and subsequent policy statements.

3. Progress in Implementing Development Plan and IBRD-ILO/UNDP Recommendations

Probably the Plan goal on which the GOK has made the most striking progress is that of increasing investment in the agriculture sector. As indicated by the table on the next page increases in development spending on the agriculture sector have been significant, both in terms of proposed amounts in the Plan and its subsequent revision and in terms of actual budget estimates. While budgetted expenditures for the sector in 1975/76 did fall short of proposed amounts, the increase over 1974/75 was still a significant one. The shortfall from Plan proposals for agriculture represents financial stringencies, an attempt to be realistic in the budget about the MOA's ability to absorb increased resources, and delays in obtaining donor support and implementing proposed programs for agriculture development. On the roads side budget estimates have exceeded planned levels for secondary, minor and unclassified roads. The decrease in the estimates between 1974/75 and 1975/76 reflects delayed initiation of RAR and CBC as well as financial stringencies. The increase in actual budget allocations for primary and trunk roads over planned levels is attributable to rising costs due to inflation of completing on-going programs.

BUDGET ANALYSIS

(K£000)

	Original				Sessional Paper No. 4, May 1975				
	Actual 1973/74	Development Plan, March 1974			1975-76			1976-78		1975/76
	1974/75	1975/76	1976-78	1974/75	1975/76	1976-78	1974/75	1975/76	1976-78
<u>Min. Ag.</u>	<u>16,816</u> ^{1/}	<u>26,210</u>	<u>30,490</u>	<u>71,350</u>	<u>24,319</u>	<u>39,262</u>	<u>86,037</u>	<u>25,865</u>	<u>29,382</u>
1. Recurrent	8,811	11,220	12,000	26,690	10,257	13,376	27,549	10,113	7,989
2. Development	8,005	14,990	18,490	44,660	14,062	25,886	58,488	15,752	21,393
<u>Min. Water Dev.</u>	<u>3,175</u> ^{1/}	<u>NA</u> ^{4/}	<u>NA</u> ^{4/}	<u>NA</u> ^{4/}	<u>10,453</u>	<u>19,844</u>	<u>42,602</u>	<u>6,005</u>	<u>15,663</u>
1. Recurrent	436				2,667	2,933	6,777	546	799
2. Development	2,739				7,786	16,911	35,825	5,685	14,864
<u>Min. Works</u> ^{6/}	<u>29,818</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>35,931</u>	<u>38,743</u>	<u>81,673</u>	<u>33,265</u>	<u>35,465</u>
1. Roads	<u>21,313</u>	<u>19,200</u>	<u>18,000</u>	<u>32,000</u>	<u>NA</u>	<u>16,899</u>	<u>33,688</u>	<u>23,035</u>	<u>22,564</u>
a. Primary & Trunk	<u>13,065</u>	<u>13,790</u>	<u>10,900</u>	<u>13,450</u>		<u>10,290</u>	<u>17,891</u>	<u>12,459</u>	<u>14,157</u>
1) Development	(10,380)							(9,674)	(10,085)
2) Recurrent	(NA)							(NA)	(NA)
3) Maintenance	(2,685) ^{2/}							(2,785)	(4,072)
b. Secondary, Minor & Unclassified	<u>8,248</u>	<u>5,410</u>	<u>7,100</u>	<u>18,550</u>		<u>6,609</u> ^{5/}	<u>15,797</u> ^{5/}	<u>10,576</u>	<u>8,407</u>
1) Development	(5,008)							(6,813)	(4,369)
2) Recurrent	(NA)							(NA)	(NA)
3) Maintenance	(3,240) ^{2/}							(3,763)	(4,038)
2. Buildings & Works	<u>1,630</u>							<u>1,796</u>	<u>1,856</u>
3. Other Services	<u>197</u>							<u>305</u>	<u>522</u>

^{1/} Until Ministry of Water Development created in 1974/75, Water Department was part of MOA. Budget figures here have been broken out from MOA budget.

^{2/} Includes \$1,658,000 from development budget attributed to all classes of roads.

^{3/} Includes secondary and minor roads only for 1974/75 and all subsequent years.

^{4/} Plan does not break out figures by year but does give total Plan period expenditures during 1974-78 of K£84.8 million, including K£63.0 million for development and K£21.8 million, recurrent.

^{5/} Excludes unclassified roads expenditures.

The Ministry of Agriculture's limited planning capabilities, i.e. to develop a sectoral strategy and to design and implement projects, was a principal sectoral constraint identified by the IBRD and others. To address this problem the Ministries of Finance and Planning and of Agriculture carried out in early 1975 a review of the MOA's planning organization and needs and subsequently developed a proposal for strengthening its planning and project management capabilities. The GOK is now in the process of working out contractual arrangements with the Harvard Institute for International Development for recruitment of 13 expatriate planning experts and training for Kenyans. It has sought support from various donors, including AID, SIDA, CIDA, FRG, Netherlands, and UNDP, and current expectations are that the requested assistance will be forthcoming. AID support will be provided as part of the proposed Rural Planning Project, the PP for which is to be submitted for AID/W approval this fiscal year.

With considerable planning expertise provided through AID, the Ministries of Agriculture and Cooperatives Development and the Mission developed during 1974-1975 the first AID agriculture sector loan for Kenya, including a program aimed specifically at "non-progressive" smallholders having gross per capita real farm incomes of no more than KShs. 800 per year yet having the potential to earn more. In fact, the MOA proposed to AID a more restrictive earnings ceiling - total family income from both farm and off-farm sources of KShs. 1,000 - as the income criteria for participating in the Part C program. This activity, which is now being implemented, is the first program in Kenya specifically directed toward this target group.

Also, in accordance with IBRD and ILO/UNDP recommendations, last May the Ministry submitted to the IBRD a revised proposal for an Integrated Agriculture Development Program (IADP). (The initial draft was completed in October 1974.) Negotiations began March 8, 1976 for a Bank loan to be made probably NLT June 1976. The IADP, for which AID support is to be proposed in Part B of this PP, is a long-term scheme which the GOK has proposed as the national strategy for small farm development and for assisting subsistence farmers to enter the monetary economy. It is an integrated approach - providing extension advice, training, research, input supply and delivery, credit, and marketing services - to improve smallholder productivity and incomes principally through intensification of land use for cash and food crops and for dairying in selected, mainly Category B, districts in medium and high potential agriculture areas. Phase I of the IADP, covering activities during 1977-80 in 14 districts of Western, Nyanza, Eastern and Central Provinces, is scheduled to begin in time for the 1977 long rains' planting season (February-April). Phase II covering additional districts is now in the design stage.

In addition to the above project the GOK has through the Ministry of Works developed two related project proposals for rural roads development, i.e. construction of rural access roads and gravelling, bridging and culverting for secondary and minor roads. Both have been submitted to various donors for financing - GBC to AID and to CIDA, which in 1974 made a combined loan-grant of \$13.5 million covering a 7.5-year implementation period, and RAR to the World Bank, UK, AID, SIDA, and FRG. The latter will be a joint multi-donor project with the IBRD appraisal report now being refined and its loan approval tentatively scheduled for next June. While some rural access roads construction has been in progress for several years as part of the GOK's Special Rural Development Program in the Kakamega and Nyeri Districts with AID and UK support, respectively, the GBC program will only begin implementation in August 1976 with arrival of the first of three Canadian-financed gravelling units.

The DAP Supplement (pages 24-30) details a series of macro-economic policy measures adopted by the GOK between publication of the Plan and June 1975. These include significant changes in policies re taxation, interest rates and credit availability, import duties, export subsidies, wage and employment guidelines of direct benefit to women and the lowest paid workers in rural and urban areas. The reader is referred to the specified pages in the DAP Supplement for details.

Subsequent to that document the Budget Speech for 1975/76 delivered last June 12 by the Minister of Finance and Planning announced the following steps to implement Sessional Paper No. 4 policy measures:

1. Restraining growth of recurrent expenditure to 13 percent over the 1974/75 level; however, almost half of the change covered a pay increase for civil servants. New recruitment into the Civil Service and purchase of new vehicles was to be restricted.
2. Increasing total development expenditure by over 50 percent above the 1974/75 level.
3. Further tax reforms, following from those of the previous year, including introduction of two new income tax withholding measures affecting non-resident entertainers and insurance commissions paid to residents; limiting the investment allowance applicable to new buildings and machinery to investment in rural areas only, i.e. areas outside Nairobi and Mombasa, and, introduction of a capital gains tax applicable to sales of property or shares by individuals.

4. Further reforms of customs tariffs, including application of a 10 percent duty to raw materials and capital equipment not then being so taxed and raising ad valorem duties on several items falling into the luxury goods category - clothing, wines and spirits, and larger cars - and increased duties on oil.
5. An increase to 20 percent in the sales tax on luxury items such as film, leather goods, phonographs, refrigerators, washing machines, perfumes, etc.

Subsequent to announcement of the above measures, all of which have been gazetted and are being implemented, the GOK and its partners in the East African Community in late October announced a 14.3 percent devaluation of the shilling against the dollar and most other hard currencies. The three currencies remained at par against themselves. They are also now pegged against the SDR, instead of the dollar as previously.

Another important measure instituted since Plan publication has been a series of increases - in August and October 1974, January 1975, and January 1976 - in producer prices of agriculture commodities. The last two increases were specifically aimed at increasing the return to the farmer so as to stimulate greater production. The January 1975 price increase was the most dramatic - for example, the price of maize was increased by 30 percent over the October 1974 level, that of what by 11 percent, and that of beef was decontrolled. The January 1976 changes, which were relatively small, covered only producer prices of rice and sugar, but, as in the case of the price increases of the year before, these were passed on to the consumers. While farm-gate prices still are slightly below world market levels, maize is a case in point, the GOK's actions in this regard are expected to have a significant impact on achieving production objectives. While one cannot say with certainty the degree to which increased prices alone will result in increased production (other factors, including weather, also play a role), it appears that the January 1975 increases, announced prior to the 1975 long rains' planting season, may have contributed to the major increase in maize production during 1975. Commercially marketed maize in 1975 is estimated to total 495,000 tons, a national high, compared to 453,000 T. and 355,000 T. in 1974 and 1973, respectively. (Marketed maize is estimated to approximate one-third of total production.)

Finally and most recently, during the period December 1975 - February 1976, the Treasury completed its first annual review of spending during the current budget year. Purpose of the review is to monitor GOK spending, particularly under the recurrent budget, in order to keep such spending within the budgetted amounts. Subsequently, a

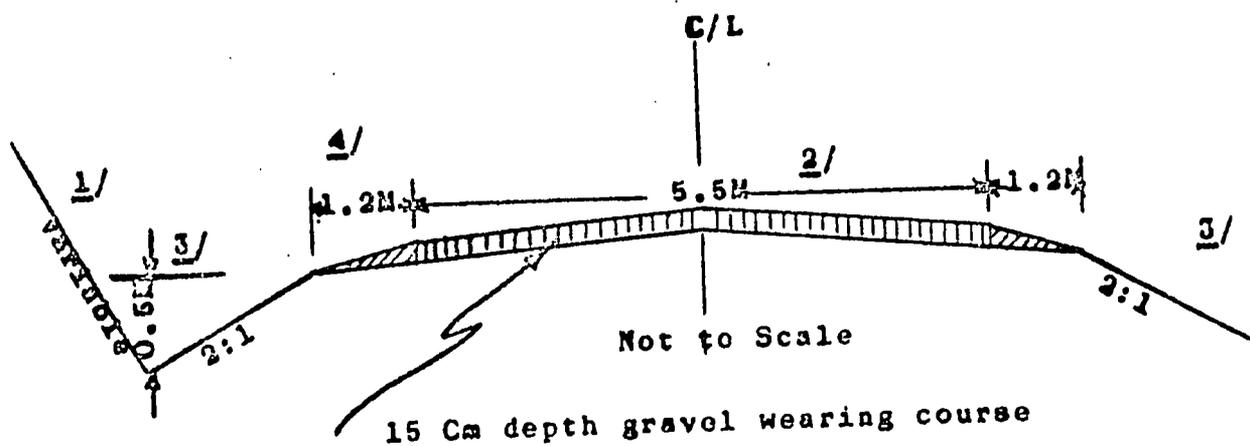
circular was sent to all ministries by the Directorate of Personnel Management in the Office of the President announcing a freeze on both new hiring and temporary appointments to fill authorized civil service positions vacant as of February 25 and instituting a critical review of all recruitment for pre-service training for GOK employment. Other steps taken include suspension of low priority projects and of purchases of new vehicles, minimizing transfers of personnel, and cut-backs in GOK travel.

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: 30 Percent
- 3/ Ditch Section Minimum: 0.50-meter depth
- 4/ Shoulder Material to be drainable with minimum depth of 15-cm edge of roadway, tapered run-out.

ANNEX IV

Traffic Threshold Analysis Calculations

The following tables give the details of traffic threshold calculations for three alternative levels of improvement proposed for the GBC program. The basis for the calculation is that the economic rate of return must equal 10%. The discount benefits of an average kilometer of road improvement are set equal to the discounted costs in order to determine the traffic threshold in the opening year that will provide a 10% ERR. In mathematical terms:

$$\sum_{i=1}^{20} \frac{B_i}{(1+r)^i} = \sum_{i=1}^{20} \frac{C_i}{(1+r)^i}$$

In practice, the benefits considered are user cost savings and the costs are the construction costs, annual maintenance increment and regraveling costs. Therefore:

$$\sum_{i=1}^{20} \frac{365 T_i S}{(1+r)^i} = C + \sum_{i=1}^{20} \frac{\Delta M_i}{(1+r)^i} + \sum_{i=1}^{20} \frac{R_i}{(1+r)^i}$$

where T_i is the daily traffic in year i

S is the weighted average user cost savings per vehicle per Km.

r is the discount rate

C is the construction cost per Km

M_i is the incremental maintenance costs in year i

R_i is the regraveling cost in year i

In application of these thresholds, allowance can be made for additional benefits due to induced agriculture production, etc., by reducing the computed traffic threshold in proportion to the additional benefits.

Traffic Threshold Analysis - D & E Roads

a) MOW gravel standard, from good earth road (5.5 m. surface, 7.9 m. platform)

1. Construction Cost per km.	(\$7,700)	65,000 shs.
2. Maintenance Cost	before:	2,000 shs.
a) annual cost	after:	<u>4,000 shs</u>
	difference:	2,000 shs/km
b) regravelling (year 6, 11, 16)		30,000 shs/km

3. User Cost Savings (G1 to G3)

Vehicle Type	Operating Costs per Km G1	Operating Costs per Km G3	Savings	Percent Traffic ^{1/}	Weighted Savings
Car	0.61	0.48	0.13	.31	.0403
Lt. Veh.	0.64	0.52	0.12	.43	.0516
Med. Veh.	1.35	1.07	0.28	.20	.0560
Heavy Veh.	2.44	1.98	0.46	.01	.0046
Bus	1.47	1.19	0.28	.05	.0140

weighted average savings

.1665 or
.167 sh
x 1.5
.250 sh/km

1976 price update ^{3/}

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth/yr

$$\sum_{i=1}^{20} \frac{365 T S (1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{\Delta M i}{(1.1)^i} + R \left[\frac{1}{(1.1)^6} + \frac{1}{(1.1)^{11}} + \frac{1}{(1.1)^{16}} \right]$$

$$365 TS (16.8) = C + \Delta M (8.51) + R (1.13)$$

$$T = \frac{C + \Delta M (8.51) + R (1.13)}{365 S (16.8)}$$

$$= \frac{65,000 + 2000(8.51) + 30,000(1.13)}{365 (.250) (15.8)} = \frac{115,920}{1533}$$

$$\underline{\underline{T = 76 ADT}}$$

1/ from the average of D and E roads page 35 of PP

2/ from Annex V page 2 of PP

3/ same as that used implicitly in Table 3 page 36 of PP

Traffic Threshold Analysis - D & E Roads

b) Spot improvements (20% of length)

1. Construction Cost per Km.	(\$3,900)	32,500 shs.
2. Maintenance Cost	before	2,000
a) annual cost	after	<u>4,000</u>
	difference	2,000 shs./Km.

3. User Cost Savings (G1 to G2-G3)

vehicle type	operating cost per km. ^{1/} G1	G2-G3	savings	percent traffic ^{2/}	weighted savings
Car	0.61	0.51	0.10	.31	.0310
lt. veh.	0.64	0.55	0.09	.43	.0387
med. veh.	1.35	1.14	0.21	.20	.0420
hvy. veh.	2.44	2.09	0.35	.01	.0035
Bus	1.47	1.26	0.21	.05	.0105

weighted average savings

$$1976 \text{ price update } \frac{3/}{.1257 \text{ or } 126 \text{ sh/km}} \times 1.5 = .189 \text{ sh/km}$$

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth

$$\sum_{i=1}^{20} \frac{365TS(1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{\Delta Mi}{(1.1)^i}$$

$$365TS (16.8) = C + \Delta M (8.51)$$

$$T = \frac{C + \Delta M (8.51)}{365 S (16.8)}$$

$$= \frac{32,500 + 2000 (8.51)}{365 (.089)(16.8)} = \frac{49,520}{1159}$$

$$\underline{\underline{T = 43 \text{ ADT}}}$$

1/ from Annex V page 2 of PP, average of G2 and G3

2/ from average of D and E roads page 35 of PP

3/ same as that used implicitly in Table 3 page 36 of PP

Traffic Threshold Analysis - D & E Roads

c) gravel with sealed grades (20%)

1. Construction Costs per km.	(\$10,200)	86,000 shs.
2. Maintenance Cost	before	2,000
a) annual	after	4,000
	difference	2,000 shs/km
b) regravelling and resealing (45%) (years 6, 11 and 16)		43,000 shs/km

3. User cost savings (G1 to G3 + Bit.)

vehicle	operating costs per km		savings	percent ^{2/} traffic	weighted savings
	G1	G3+Bit (20%)			
car	0.73	0.54	0.19	.31	.589
lt. veh.	0.77	0.59	0.18	.43	.774
med. veh.	1.89	1.41	0.48	.20	.0960
hvy. veh.	3.90	3.01	0.89	.01	.0089
Bus	2.35	1.80	0.55	.05	.0275

Weighted average savings

1976 price update ^{3/}

$$\begin{aligned} & .2697 \text{ or} \\ & .270 \text{ sh/km} \\ & \times 1.5 \\ & \hline & .405 \text{ shs/km} \end{aligned}$$

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth/yr.

$$\sum_{i=1}^{20} \frac{365TS(1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{\Delta Mi}{(1.1)^i} + R \left[\frac{1}{(1.1)^6} + \frac{1}{(1.1)^{11}} + \frac{1}{(1.1)^{16}} \right]$$

$$365TS (16.8) = C + \Delta M(8.51) = R(1.13)$$

$$T = \frac{C + M(8.51) + R(1.13)}{365 S (16.8)}$$

$$= \frac{86,000 + 2000 (8.51) + 43,000 (1.13)}{365(.4)5 (16.8)} = \frac{151,610}{2483}$$

T=61 ADT

1/ from annex V page 2 of P.P cost increased 60% for heavy vehicles, 40% med. veh. and 20% light vehicles due to grades.

2/ from average of D and E roads, page 35 of P.P.

3/ same as that use implicitly in table 3, page 36 of P.P.

Traffic Threshold Analysis - D & E Roads

d) MOW standard on poor soils

1. Construction costs per Km.	(\$15,400)	129,000 shs.
2. Maintenance Cost	before	2,000
a) annual	after	<u>4,000</u>
	difference	2,000 shs./km.
b) regravelling (45%)		58,000 shs./km.
(years 6, 11 and 16)		

3. User cost savings (G0 to G3)

vehicle type	operating costs per km. ^{1/}		savings	percent traffic ^{2/}	weighted savings
	G0	G3			
car	0.67	0.48	0.15	.31	.0465
lt. veh.	0.70	0.52	0.18	.43	.0774
med. veh.	1.49	1.07	0.42	.20	.0840
hvy. veh.	2.67	1.98	0.69	.01	.0069
bus	1.61	1.19	0.42	.05	.0210

weighted average savings

1976 p. le update ^{3/} .2358 or .236
x 1.5
.354 shs/km

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth per year

$$\sum_{i=1}^{20} \frac{365TS(1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{Mi}{(1.1)^i} + R \frac{1}{(1.1)^0} + \frac{1}{(1.1)^{11}} + \frac{1}{(1.1)^{16}}$$

$$365TS(16.8) = C + M(8.51) + R(1.13)$$

$$T = \frac{C + M(8.51) + R(1.13)}{365S(16.8)}$$

$$= \frac{129,000 + 2000(8.51) + 58,000(1.13)}{365(.354)(16.8)} = \frac{211,560}{2171}$$

$$\underline{\underline{T = 97 ADT}}$$

1/ from Annex V page 2 of PP

2/ from average of D and E roads on page 35 of PP

3/ as implied in Table 3 page 36 of PP

ANNEX V

**Analysis of Preliminary Evaluation
Results of Vihiga SRDP Roads**

This annex gives the preliminary results of agricultural and traffic survey data collected by the Vihiga SRDP. The general conclusions can be stated as follows:

1. Short Term Agricultural Impact (Tables 1-3)
 - a. Acreage under production increased substantially: 13% and 71% for Vihiga and Mbale respectively
 - b. Most of the increase in maize and beans was consumed but a higher percentage of bean production was marketed in one area (17%)
 - c. A shift in production to more sorghum and millet was observed although total production of these 2 crops is small by comparison with maize in both areas. Only occasional marketing of these crops observed.
 - d. Milk marketing increased significantly (to 30-50%) and milk production in one area increased significantly.

Note: The effect of the road itself on the increase is not clear because the resulting production increase was not marketed, except in the case of milk. Access to other inputs may have been facilitated by the road.

2. Short Term Traffic Impact (Table 4)
 - a) The amount of vehicular traffic increased significantly in each case but the amount of increase varied widely between roads and over time.
 - b) If the lorries collecting sand are excluded as a special case, the average number of vehicles generated by the roads is approximately 10 per day.
 - c) The number of bicycles using the road increased dramatically.

TABLE 1

SUMMARY TABLE FOR TWO SAMPLE AREAS

Road Segment	No. of Farmers	Farm Produce	AVERAGE YIELD ^{1/} (OUTPUT/ACRE)				AVERAGE ACREAGE		AVERAGE PRODUCTION **				AVERAGE AMOUNT MARKETED							
			1972	1973	1974	1975	1972-73	1974-75	1972	1973	1974	1975	1972		1973		1974		1975	
													Amt	%	Amt	%	Amt	%	Amt	%
VEIGA - MBIEI	7	Maize*	3.9	4.6	3.5	2.2	1.5	1.7	5.9	6.9	6.0	3.7	0.4	6.8	0.6	8.7	0.7	11.7	0	0
		Beans	1.6	1.9	1.4	1.4			2.4	2.9	2.4	2.4	0.2	8.3	0.0	0	0.4	16.7	0.4	16.7
		Millet	0.2	-	0.1	0.1			0.3	-	0.2	0.2	0.0	0	-	-	0	0	0.1	50
		Sorghum	-	-	0.8	0.4			-	-	1.4	0.7	-	-	-	-	0.1	7.1	0	0
		Potatoes	-	-	0.3	-			-	-	0.5	-	-	-	-	-	0	0	-	-
		Milk **	-	-	-	-			-	-	27.9	-	8.6	25.7	8.6	30.8	-	-	4.3	50	8.6	33.5
MALE - MBIEI	9	Maize*	4.4	4.3	5.3	4.9	1.4	2.4	6.2	6.0	12.7	11.8	1.3	20.9	1.1	18.3	1.5	11.5	0.1	0.7
		Beans	0.9	1.2	1.7	1.4			1.3	1.7	4.1	3.4	0.16	7.7	0.1	5.9	0.5	12.2	0.1	2.9
		Millet	0	0	0	0			0.1	0	0.2	0	0	0	0	0	0	0	0	0
		Sorghum	0.2	0.2	0.8	0.5			0.3	0.3	2	1.2	0	0	0	0	0	0	0	0
		Coffee	5	7.4	-	-			6	10.4	-	-	6.7	100	9.8	98	0	0	0	0
		Milk	-	-	-	-			26.7	13.3	30	28.3	10	37	3.3	23	6.7	22	13.3	4.8

* Maize, Beans, Millet, Sorghum, Potatoes, Coffee : all production in bags

** Milk : all production in bottles per month

^{1/} Average yield is calculated on total acreage since the actual acreage for each crop is not known. The numbers may be most accurate for maize. Other numbers only indicate trends.

Source: Averages of Tables 2 and 3

Comments on Table 1

Vihiga - Mbihi and Mbale - Mbihi sample Areas

1. Amount of maize marketed (1972-1975): This is generally on the increase despite a drop in 1975. The amount marketed however is not substantial (between 1 bag per farmer). The amount marketed is small, largely because most of the maize is consumed as the staple crop. The cash obtained from the sale of maize is used for paying school fees for children and for buying essential, consumer items e.g. salt.
The percentage of the amount of maize marketed appears to be increasing although none was marketed in 1975 due to the 40% drop in production.
2. Beans marketed (1972-1975): The amount of beans marketed is increasing slightly despite the fact that an almost constant amount is being produced. Furthermore beans are locally consumed hence the amount marketed is only 17% or less.
3. Millet - amount marketed in 1972 - 1975 : Millet is said to be not valued locally this may be the reason as to why not much millet is produced. This may also explain why not much millet is marketed. It has also been observed that the millet produced is locally consumed leaving little if any, for sale.
Initially no millet was marketed, but in 1975 half of the production was marketed.
4. Sorghum - amount marketed (1972-1975): Sorghum is not as valued as maize. Sorghum is, however, also preferred to millet. The little sorghum produced is locally consumed which leaves an insignificant amount to be sold once in a while when money is greatly required (as in 1974 when 7% of production in one area was sold).
5. (Sweet) Potatoes - amount marketed in (1972-1975): Potatoes are grown for basically consumption and not for sale.
The percentage of the potatoes sold is subsequently zero.
6. Milk - amount marketed in the period (1972-1975) : about a third of the milk produces is locally sold in small quantities. The percentage of the milk sold is increasing. Part of this increase may be due to better access and less spoilage.
7. The acreage of the land being farmed has increased approximately 13% on the average from 1972-73 to 1974-75.

4
TABLE 2

VIHIGA MBIHI SAMPLE AREA

Farmers	Acreage Farmed	Crop	C R O P S P R O D U C E D A N D S O L D									
			1 9 7 2		1 9 7 3		Acres	1 9 7 4		1 9 7 5		
			Yield	Amount sold	Yield	Amount sold		Yield	Amount sold	Yield	Amount sold	
1st	1½	Maize Beans Sorghum	5 bags 1 bag -	0 ½ bag -	2 bags 1 bag -	0 0 -	1½	10 bags 6 bags 6 bags	0 1/3 bag 0	10 bags 6 bags 3 1/4 bags	0 0 0	
2nd	1	Maize Beans L/cattle	6 bags 1 bag 60 botls. per	0 0 30 botls. per month	5 bgs. 1½ bgs. -	0 1/6 bg. -	1	8 bgs 3 bgs 60 botls. pm (six months)	1/3 bag 1/3 bag 30 botls. per month	7 1/4 bgs 5 bgs -	0 1 bag -	
3rd	31/4	Maize Beans F/Millet L/cat. Sorghum	6 bags 4 ½/bgs 2 bags 60 btls. pm -	3 bags 1 bag 1/6 bag 30 btls. per month -	14 bgs. 6 bgs. - - -	4 0 - - -	3	12 bgs. 3½ bgs 1 bg. - 3 bgs.	4 bgs. 2 bgs 0 - 1 bag	8 bgs. 3½ bgs. 1½ bgs. 120 btls. per mon. 1½ bags	0 2 bags 1 bg. 60 btls. per mon. 0	
4th	1	Maize Beans L/cat.	2 bags 1/3 bag 15 bot. per mon.	0 0 0	2 bags 1/3 bag -	0 0 -	1	1 bag 2/3 bag -	0 0 -	1 bag 1/3 bag -	0 0 -	
5th	2	Maize Beans	3½ bags 2 bags	0 0	3 bags 1 bag	0 0	2	3 bags -	0 -	2 bgs. 1 bag	0 0	
6th	1½	Maize Beans L/cat.	10 bags 5 bgs. 60 btls. per m.	0 0 0	13 bgs. 5 bgs. -	0 0 -	1½	3 bags. - -	0 - -	3½ bgs. - 60 btls. per m.	0 - 0	
7th	1½	Maize Beans	10 bgs 3 bgs	0 0	11 bgs 6 bgs	0 0	2	5 bgs 3½ bags	1/6 bag 1/3 bag	4 bgs 1 1/6 bags	0 0	

MSALE-MBIET CROPS PRODUCED AND SOLD

No.	Acre age	Crop	1972	sold	1973	sold	Acre age	1974	sold	1975	sold
1(a)	2	maize	10 bgs	2	8 bgs	2	2	8 bgs	3	15 bgs	0
		beans	1½ bgs	0	2 bgs	2/3		2 bgs	1	1½ bgs	1
		cattle	-	-	-	-		-	-	35/pm	35/pm
2(a)	1½	maize	7 bgs	0	8 bgs	0	14	10bgs	0	11 bgs	0
		beans	1½ bgs	0	3 bgs	0		5 bgs	0	3½ bgs	0
		cattle	60 pm	0	60 pm.	0		(3/4y1)	-	-	-
3(a)	2	maize	12 bgs	3	8½ bgs	2	2	22 bgs	10	11 bgs	0
		beans	1½ bgs	2/3	1 bg	0		3 bgs	1 2/3	1½ bgs	0
		sorghum	-	-	-	-		-	-	3 bgs	0
		millet	-	-	-	-		-	-	½ bg	0
		cattle	-	-	-	-		-	-	60 pm	30 pm
4(a)	1½	maize	4 bgs	0	4 bgs	0	3	11 bgs	0	11 bgs	0
		sorghum	2 bgs	0	2 bgs	0		½ bgs	0	1½ bgs	0
		beans	1½ bg	0	1½ bg	0		½ bg	0	1½ bgs	0
		millet	½ bg	0	½ bg	0		½ bg	0	1½ bgs	0
		cattle	60 pm	30pm	-	-		60 pm	0	-	-
5(a)	½	maize	9 bgs	5	9 bgs	4	1½	9 bgs	0	10 bgs	0
		beans	½ bgs	0	1 bg	0		6 bgs	0	-	-
		coffee	60 bgs	60	89 bgs	89		-	-	-	-
		cattle	-	-	-	-		-	-	15 pm	0
6(a)	1½	maize	6 bgs	2	5 bgs	2	2	12 bgs	0	9 bgs	0
		beans	1½ bgs	1/3	1½ bgs	1/3		3½ bgs	2	4	0
		cattle	60 pm	30pm	60 pm	35pm		30 pm	30pm	30 pm	30pm
		sorghum	-	-	-	-		1½ bgs	0	-	-
7(a)	1½	maize	5 bgs	0	7 bgs	0	3	14 bgs	0	16 bgs	0
		beans	½ bg	0	3 ½ bgs	0		6 bgs	0	7 bgs	0
		sorghum	-	-	-	-		6 bgs	0	5 bgs	0
		cattle	-	-	-	-		60 pm	0	60 pm	0
8(a)	3/4	maize	3 bgs	0	went to		3½	13 bgs	0	8 bgs	1
		beans	1½ bg	0	husband			3 bgs	0	2 bgs	1/6
		cattle	60 pm	30pm	in town			60 pm	30pm	60 pm	30pm
		sorghum	-	-	-	-		7 bgs	0	-	-
		millet	-	-	-	-		3 bgs	0	-	-
9(a)	1	maize	2 bgs	0	2 bgs	0	2	13 bgs	0	11 bgs	0
		beans	1 bg	0	½ bg	0		6 bgs	0	9 bgs	0
		cattle	-	-	-	-		-	-	-	-

Table 4

Selected Traffic Counts on Vihiga SRDP Roads

Location Completed	Mbale - Magada Sept - Dec 1975				Vihiga - Mbihi Sept - Dec 1975				Tigoi - Wangoya July 1974			
	Prior Status	passable dry season no bridge in middle			impassable track no bridge			passable dry season no bridge at end only				
	Bic.	L.V.	H.V.	T.V.	Bic.	L.V.	H.V.	TV.	Bic.	L.V.	L.V.	T.V.
<u>1974</u>												
mkt. day 1	NA	NA	NA	NA	0	0	0	0	0	3	2	5
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
non mkt 1	NA	NA	NA	NA	0	0	0	0	1	4	1	5
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<hr/>												
Average					0	0	0	0	1.5	3.5	1.5	5
<u>1975</u>												
mkt. day 1	4	16	4	20	28	2	0	2	22	15	10	25
2	27	21	6	27	1	0	0	0	21	13	8	21
non mkt 1	29	8	0	8	10	0	0	0	18	12	9	21
2	20	5	1	6	4	0	0	0	21	13	11	24
<hr/>												
Average	20	12	3	15	11	1/2	0	1/2	20	13	10	23
<u>1976</u>												
mkt. day 1	79	12	0	12	11	7	0	7	(14)	(4)	(26)	(30)
2	(104)	(8)	0	(8)	11	0	0	0	28	7	15	22
non mkt 1	37	4	0	4	(14)	0	0	0	23	8	28	34
2	20	7	0	7	37	0	0	0	19	9	17	26
<hr/>												
Average	60	8	0	8	18	2	0	2	21	7	21	29
Comments	1. Road but no bridge in 1975. 2. many personal cars going home after duty and to visit Kakamega and Kisumu. 3. lorries to sell charcoal and deliver sand and pickup beans for Nairobi. 4. Some EAPL cars in 1975 5. Pedestrian traffic much greater on market day.				1. road but no bridge in 1975. 2. 1975 car-sick to take person to hospital 3. Some bicycle carry goods 4. Also students going to school on bicycles				1. Most lorries collect sand in area and bring goods + beer to shop away. 2. bread van every day 3. shift in position of count in 1976 reduced light traffic because schools traffic excluded.			

Table 4

Selected Traffic Counts on Vihiga SRDP Roads

Location Completed		Mbale - Magada Sept - Dec 1975				Vihiga - Mbihi Sept - Dec 1975				Tigoi - Wangoya July 1974			
Prior Status		passable dry season no bridge in middle				impassable track no bridge				passable dry season no bridge at end only			
		Bic.	L.V.	H.V.	T.V.	Bic.	L.V.	H.V.	TV.	Bic.	L.V.	L.V.	T.V.
<u>1974</u>													
mkt. day	1	NA	NA	NA	NA	0	0	0	0	0	3	2	5
	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
non mkt	1	NA	NA	NA	NA	0	0	0	0	1	4	1	5
	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average						0	0	0	0	1.5	3.5	1.5	5
<u>1975</u>													
mkt. day	1	4	16	4	20	28	2	0	2	22	15	10	25
	2	27	21	6	27	1	0	0	0	21	13	8	21
non mkt	1	29	8	0	8	10	0	0	0	18	12	9	21
	2	20	5	1	6	4	0	0	0	21	13	11	24
Average		20	12	3	15	11	$\frac{1}{2}$	0	$\frac{1}{2}$	20	13	10	23
<u>1976</u>													
mkt. day	1	79	12	0	12	11	7	0	7	(14)	(4)	(26)	(30)
	2	(104)	(8)	0	(8)	11	0	0	0	28	7	15	22
non mkt	1	37	4	0	4	(14)	0	0	0	23	8	28	34
	2	20	7	0	7	37	0	0	0	19	9	17	26
Average		60	8	0	8	18	2	0	2	21	7	21	29
Comments		1. Road but no bridge in 1975. 2. many personal cars going home after duty and to visit Kakamega and Kisumu. 3. lorries to sell charcoal and deliver sand and pickup beans for Nairobi. 4. Some EAPL cars in 1975 5. Pedestrian traffic much greater on market day.				1. road but no bridge in 1975. 2. 1975 car-sick to take person to hospital 3. Some bicycle carry goods 4. Also students going to school on bicycles				1. Most lorries collect sand in area and bring goods + beer to shop away. 2. bread van every day 3. shift in position of count in 1976 reduce light traffic because schools traffic excluded.			

THE ROLE OF WOMEN IN KENYA'S DEVELOPMENT 1/

It has been estimated that between 80-90 percent of women in Kenya live in the rural areas where they spend most of their time in agriculture, animal husbandry, gathering fuel, fetching water, cooking, as well as caring for the children. These rural areas are generally depressed areas of low productivity where economic activities, income and employment are limited.

Considering that more than 50 percent of Kenya's rural population are women, it must be stressed that achievement of the Government's priority objectives of raising the level of living of the majority of the people, who live in the rural areas, demands special attention be given to the tasks and responsibilities of women.

Women in Agriculture

Although the majority of the rural women today are engaged in agriculture and many take charge of all cultivation, preparation and storage of food crops, their role has increasingly changed in the past few decades from that of the traditional African societies. Before the coming of the Europeans to Kenya the traditional African societies had clearly defined roles for men and women. The men were assigned the duties of hunting, herding and the protection of the village from the warring neighbors. The women, on the other hand, did such duties as housekeeping, child care and gardening. With the arrival of the Europeans tribal wars came to an end and thus, a major men's duty was eliminated. At the same time, cash crops were introduced, and because gardening was the traditional role of women, cash crops became one of their tasks. But by this time agriculture had become the means of existence for most of Kenya's tribes so that while in the past women had only to cultivate small "shambas" (gardens), now their workload increased tremendously, to the extent that women took charge of cultivation, preparation and storage of all food crops.

With the introduction of cash, economy and wage-earning opportunities, the men have migrated to the towns or to the big European plantations

1/ The text of practically all of this Annex is taken from TOAID A-68 of June 7, 1974. This is still the most comprehensive statement of women's role known to the Mission.

to earn money for school fees, clothes and a few luxury items. Many of these men are able to return home on weekends, but others are so far from their homes that they may return only several times during the year. Inevitably, women are left in many instances to manage their family resources for the provision and maintenance of an acceptable and satisfying environment for the family. This situation has not been improved by recent increases in the cost of living and the social problems emerging in towns. Some of these are caused by the fact that the husband and wife have to live two separate lives with completely different surroundings. The man is usually much better off than his wife because he has learned to improve his conditions of living. The wife remains at the same, if not lower, standard of living.

In addition to the domestic chores of cooking, carrying water and firewood, keeping house, bearing and bringing up children, women are also responsible for the routine chores of weeding, planting, harvesting, marketing and so on which are necessary for the production of the family's food.

As can be seen, this disruption of the pre-colonial division of labor between men and women has meant that more and more women assume men's work, but the reverse is uncommon. It also implies that women are making increasingly more decisions in agricultural production and marketing. The loss of their traditional role by males without fully defining a new one which all of Kenya's men can reasonably aspire to fulfill given the current development of the modern sector is believed by many to be chiefly responsible for the very significant increase in alcoholism, which to date is almost totally a male problem.

The main concern is that these women, who are looking after the majority of the Kenya population, should be assisted so that they, too, can benefit from the new ideas and modern ways of farming and, also, be able to utilize the available land fully. At present, the rural women feel that they are denied access to the knowledge and the resources to go forward; as a result they are a drawback to the ongoing rural development program.

This argument is supported by recent agricultural research in Kenya which shows that the colonial agricultural program in Kenya was in all its constructive ways favorably oriented toward the "success of commercial agriculture," which was to be the domain of the white settlers. The colonial administrators and planners, by preferring men to women for commercial agriculture, promoted the productivity

of male labor at the expense of women. Wherever the colonizers went they disregarded female farming systems, at least up to the point where it was felt that the land women were farming could not be more productively used. Men were encouraged to grow such cash crops as cotton, coffee, and tea, but women were left to do the routine farming related to food crops production.

The situation was further aggravated by the traditionally accepted belief that improvements in farming practices or the acceptance of improvements in agricultural techniques form the basis of good farming and that the farmers concerned in making such changes were men. As a result of this the farming improvements favor the male-dominated sector of production while the female sector continues to deteriorate. But in Kenya today more women than men are engaged in farming, and their agricultural production must be given more consideration in the planning of agricultural change. Women who lack training, education and experience and still face negative attitudes towards involvement cannot make a positive contribution to rural development.

Extension work has been shown to be one of the most successful ways not only of getting new ideas across but of getting them put into practice. In view of this fact, it is recommended that the teaching of new methods must be merged with agricultural extension and that more women be trained who can communicate with female farmers. The number of trained female extension workers in Kenya today is exceedingly low, and whenever women farmers go to the Farmer Training Centers (which are not adequate) for instruction, they are taught invariably such useless courses as baking, embroidery, etc. This approach is a remnant of the colonial attitude that "farmer" meant a "man," and women's work was to be a housewife.

These attitudes of the extension service have resulted in a widening of the gap between the labor productivity of men and women. Men are taught to apply modern methods in the cultivation of a given crop while women continue to use the traditional methods in the cultivation of the same crop, thus getting much less out of their efforts than men.

It is feasible that policy recommendations must be committed both in theory and practice to narrowing the gap in labor productivity of men and women. This essentially means allocation of research personnel and resources to study the economic position of women in different societies and an attempt to provide marketing facilities, especially through cooperative societies, for food crops. Other related questions that might be posed are as follows: (i) To what extent do women in a

given area engage in trade or sale of goods - local or long distance. (ii) What types of cooperative societies exist in any one area; what is the involvement of women in these societies (a) in the structure of decision-making and (b) in sale of crops, and (c) what crops are grown or suitable to be grown. Evidence exists to show that most cooperative societies are based on cash crops, which is mainly a male domain, e.g., coffee, tea and pyrethrum cooperative societies. (iii) Are there any food crop cooperatives and could they provide an avenue for women to market their produce. The assumption here is that increased production of food crops will be required so that the surplus could be sold. They would also provide a market in which women could buy a variety of food crops they themselves do not produce. The effect of this would be to diversify foods available at reasonable prices for home consumption which is also badly needed in many areas of Kenya.

Nutrition, Health and Family Planning

Malnutrition is a problem throughout Kenya and in particular protein-caloric malnutrition. Every woman is responsible for her family's food and its health. The present serious problems of children's undernourishment and poor health arise mainly because of ignorance on the part of the mother. Women could play an important role in raising the nutritional status of the community, but they must have access to information about nutritional needs of individuals, children and adults, food preparation, serving, storing and preserving. Because of a woman's responsibility as a mother, the health of her family should receive her greatest attention and highest priority. In most parts of Kenya cereals are the basic staple food, and diets would be reasonably well balanced if there were enough food and if mothers understood the nutritional needs of young children.

In order to provide leadership in the maintenance of good health for the families, women must be mobilized in special health education programs where such subjects as germs and their relation to disease, personal and family hygiene, communicable diseases and their prevention and cure can be taught. Other causes of malnutrition which should be stressed in these programs, in addition to shortages of resources, are ignorance of nutritional needs, especially those of children, early stopping of breast feeding, diarrhea caused by dirty feeding bottles and dishes, failure to supplement breast milk early enough and sudden weaning before a child has learned to like new foods. Sending the weaned child away from the mother and giving too few meals a day to

children occurs because the mother is overworked. Often much of the protein-rich food is given to the farmer who in the past had plenty of meat as a hunter or warrior and who now works less hard than his wife. These programs should be on a short-term basis, perhaps only 2-3 weeks. Secondary school (girl) leavers and other women in the rural areas, such as teachers and nurses, would already know a little about these things. If such a program is introduced, it could absorb quite a large number of girls, and would acquaint them with certain real problems that tend to hinder social development and progress. Another aspect of this is that it would help the women in the rural areas to value their own local foods rather than spend a great deal of money on tinned foods.

The Ministry of Health and some private organizations have established clinics where mothers can learn to prepare for, and take care of, their own children. Because of limited facilities, staff, transportation, etc., the number of women who can take advantage of these programs is limited. It seems imperative that an all-out program should be encouraged so that more women could understand the necessity of spacing the births of their children to ensure better health for mothers and babies. Women must be educated to the fact that family planning simply provides for their responsible parenthood.

Women's Self-Help and Organizations

The areas of concern for rural women in Kenya differ in kind and degree from women in other parts of the world, but in nature they remain the same.

In their efforts to cope with their responsibilities as wives, mothers, food producers, traders, craftswomen, etc., women have organized themselves into voluntary or working groups which provide practical and leadership training programs in the rural areas. Such organizations include the Maendeleo ya Wanawake (Women's Progress); Young Women's Christian Association; Women's Mabati Group, and many others.

Limited numbers of these organizations provide opportunities for the development of persons involved as members of their societies. These women's groups congregate not only to learn the basic elements of education, vegetable production, pottery, sewing, knitting and home improvements, but enjoy social development through sharing their daily experiences with their colleagues.

The women's organizations in Kenya have great potential, but many lack resources and good leadership. At a recent national conference held at Nyeri from all Special Rural Development areas in the country, it was unanimously agreed that women's programs in the rural areas should be reorganized and generally intensified. It was felt that these programs should be initiated through local women's organizations.

Some of the national women's organizations have a very good national network and one which could be exploited more in the promotion of greater women's participation in national development programs, as well as in the creation of more employment opportunities for women. Groups like "Women Mabati," which means "women corrugated iron sheets" groups, should be encouraged since their concern is to modernize the traditional thatched houses by roofing them with corrugated iron sheets.

Housing is one of the major elements in living standards and general welfare. The number of women living in mud huts, block, concrete or brick houses in the rural Kenya areas is not available. It is understandable that the housing needs of the family are met traditionally by family labor and local materials. The types of homes in which the rural women live and care for their families are affected by climate, economics, materials and services available as well as by cultural heritage. Women in the rural areas by tradition set the standards for the safety, housekeeping practices, and sanitation for their homes. It is apparent that a clean house and yard, sanitation facilities, and use of clean water for domestic purposes are based on the understanding of the homemaker for these matters.

Women should have the knowledge of how to deal with these requirements. They should be able to discuss with the neighbors and with the officers of the municipality about preventing and eradicating such problems as poor spacing of houses and poor sanitary facilities. Women should understand that the practice of cleanliness in the home and its surroundings, and clean habits make for a strong and happy nation.

Consequently, women's organizations require a proper reorganization if they are to be used as tools for rural development. At present, these organizations lack substance in their programs, except in a very few cases, and they have no wide support among the masses of women.

With the exception of a few groups who provide services to rural women, most organizations are urban-oriented in that they draw their membership from the urban centers while contacts with the majority of Kenyan women are limited. Consequently, the impact of these groups is far from what it should be.

Without effective planning and programs which have immediate relevance to the members and the immediate community, it is almost impossible for these organizations to grow and become strong and powerful to the extent that they influence the policy decisions.

In view of the fact that there is a large contribution made to Kenya's development by the women, it is suggested that a machinery be established which will look into ways and means of reorganizing and establishing viable women's working groups in the country. The resources which are available through women's organizations must be tapped and fully utilized.

Women in Employment

At this point in the development of Kenya because of their lack of education, lack of vocational and technical training in addition to strong traditional values and attitudes, women are confronted with obstacles to employment in the modern sector. Although employment opportunities have opened up tremendously for Kenyan women in the last decade, this is not to say that the new opportunities for wage-earning have opened to all classes of women of all races in Kenya. The bulk of African women are still employed in agriculture, but there has been a distinct move into wage-earning jobs. Recent reports by the Ministry of Labor indicate that the number of women (of all races) in private industry and commerce has increased, but the majority of African women, in spite of this shift, are employed in unskilled jobs.

This state of affairs is the result of two processes. First, during the colonial period discrimination on the basis of race was the rule so that European employers gave priority to European women and Asian shopkeepers hired Asian women. Although the colonial period is past, the private sector of the economy is still controlled largely by non-Africans.

Secondly, preparation for skilled jobs is a matter of formal education and vocational training. Education does facilitate the development and realization of the potential of a person. In Kenya in past years, women have not been given similar opportunities as the men. As a result the education of women has always lagged behind that of men.

Often one reads newspapers in Kenya of leaders' statements urging women to participate and contribute fully to the task of nation building. Many women, however, have not been equipped through educational preparations, as the men have been, for this important task, so the women's participation and contribution have still to be very limited.

With the coming of Independence jobs for educated Africans first opened up, and women were first absorbed by the nursing and teaching professions which are traditionally women's professions. Now there are openings for these women in secretarial positions, social work, social services and as administrative officers. It should be noted, however, that the jobs available for women are still within the "traditional" female sphere. Many of the teachers are encouraged to be home economists, and the largest number of civil service positions filled by women are in the Ministry of Social Services, which looks after largely female-dominated social service organizations. Women with some kind of training can indeed find work, but there is a conspicuous absence of women in decision-making positions and professional life. With a negative participation by women in the higher cadres of public administration, it is obvious that women cannot influence policy decisions yet.

Efforts must be made to organize rural women. Rural women, though largely illiterate, possess remarkable organizational capabilities and energy which contributed much to the fight for independence and which today is the backbone of numerous "harambee" projects.

The need for women, especially rural women, to earn money to provide for themselves and their children cannot be understated. The special problem of school-leavers and dropouts needs greater attention. These two problems can be addressed through increasing the possibility of employment and through programs which can be designed to make self-employment easier in the rural areas. Some of the feasible projects include sale of agricultural produce, small animal husbandry and poultry keeping, crafts production, small-scale industries, and services. Some voluntary agencies have training programs to help girls and women in these activity areas.

Credit unions and cooperatives are some of the means that could be used for the mobilization of indigenous savings, easing the problems of marketing and lessening costs to the consumer. Encouragement of small-scale businesses and examples of entrepreneurship are important features in this field. Such skills as fabric dyeing and printing, which are income-producing activities and which are culturally acceptable for women in most countries, could be taught.

Such programs, if fully supported both financially and materially, could have a wide influence on employment opportunities for rural women in many parts of Kenya. Needless to say, this type of training requires qualified staff and funds to be able to succeed.

REPUBLIC OF KENYA



MINISTRY OF WORKS

ROADS DEPARTMENT

RELATIONSHIP BETWEEN
OTHER DEVELOPMENT EFFORTS
AND
THE GRAVELLING PROGRAMME
IN BUNGOMA DISTRICT

FEBRUARY 1976

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CHAPTER 7 — ECONOMIC IMPACT OF THE GRAVELLING PROGRAMME..... 7.1

ATTACHMENTS

BUNGOMA DISTRICT VICINITY MAP

M.O.W. SPECIAL PROJECTS BRANCH ORGANISATION DIAGRAM.

The purpose of this Report is simply to demonstrate that benefits arising from the Programme will actually accrue to the small scale farmers in the rural areas. At a meeting convened between Kenya Government officials and U.S.A.I.D. representatives in Kenya, it was agreed that the forementioned task be limited to a typical sample district. In view of the forementioned, BUNGOMA DISTRICT has been selected as a representative district for Western Kenya.

Arising from the forementioned, a field trip was made to Bungoma District between the 8th February and 10th February, 1976. The purpose of the trip was to inspect the existing and proposed road network in the district and also to obtain relevant data on various Rural Development Efforts through discussions with all officials concerned.

For ease of reference, the first six chapters of the report deal with:-

- Introduction;
- Summary and Conclusions;
- Objectives, strategy and Policy for the 1974-78 Plan;
- The Study Area - Background;
- Other Rural Development Efforts in the Study area.
- Road communications in the Study area.

The last chapter deals with economic impact of the Graveling Programme.

Many thanks are expressed to all who assisted in one form or another toward gathering of relevant informations which appear in this report.

K E N Y A

SECONDARY AND MINOR ROADS GRAVELLING PROGRAMME

CHAPTER 1—THE PROBLEM:

After a period of almost three years of negotiations culminating with a signed agreement between Kenya Government (KG) and Swedish International Development Agency (SIDA) for the financing of the GRAVELLING PROGRAMME, SIDA has now indicated that owing to overstressed financial position its participation in the above programme can no longer be expected, at least in the foreseeable future.

The programme has in the meantime, been given quite a lot of publicity both in the PARLIAMENT and in the RURAL AREAS where the bulk of Kenya's 13.5 population live. To the rural populace, the programme is a pre-requisite to boosting the agricultural output from their small farms which are at present under cultivated because of the prevailing road communication problems.

The Graveling Programme is supposed to be one of the Government's major contributions for the development of rural areas, running parallel with the RURAL ACCESS ROADS PROGRAMME.

Considering the existing road pattern in Kenya; (Ref. Appendix I of this report) it is abundantly clear that without the Graveling Programme, the impact of the Rural Access Roads will hardly be felt and the programme will end up in a fiasco. Moreover, other planned RURAL DEVELOPMENT EFFORTS equally depend on the same programme which forms the backbone of Highway network in the Rural areas.

The contributions initially agreed upon between the Kenya Government, the Swedish International Development Agency and the Canadian International Development Agency (CIDA) for the Graveling Programme, actually fell short of the anticipated national target. The U.S.A.I.D. had therefore been earlier on approached to assist in bridging the gap by financing some additional Units. Following SIDA'S latest move, further contact with U.S.A.I.D. has been made for possible increase in their level of participation in the Graveling Programme.

CHAPTER 2—SUMMARY AND CONCLUSION:

Following the request by the U.S.A.I.D. for a report which demonstrates that benefits arising from the Gravelling Programme will actually accrue to the Small Scale farmers in the rural areas, a field trip was made to Bungoma District which had been selected as a typical sample within the project area (Western Kenya). The findings of this exercise are contained in this report and summarised as follows:-

1. The Republic of Kenya which has an area of 583,000 sq.km. (225,000 sq. miles) and a population of nearly 13.5 million inhabitants, is basically an agricultural country with the greater bulk of her population (over 80 per cent) residing in the rural areas.
2. The Kenya Government believes strongly that the end result of its planned balanced development will be a better life for all the people living in Kenya. This move will have been realised when nobody goes hungry, nobody lacks a decent shelter, nobody who is ill remains untreated, nobody eager to learn is prevented from learning and when everybody is genuinely equal in the eyes of the law, to every other person in Kenya.
3. Kenya is committed to a "mixed economy" system. This means that the Government owns or controls certain sectors of the economy while allowing other sectors the level of freedom customarily allowed to individuals or groups of people under Democratic Systems.
4. The Kenya Government further believes that the justification exists to undertake the proposed Gravelling Programme because the roads included in the Programme form the back-bone of the much needed transportation infrastructure in the rural areas. The roads are a pre-requisite, a sine qua non, for the success of other planned development projects in the rural areas.
5. By virtue of the likely construction methods to be adopted i.e. less capital intensive methods, the programme will naturally assist in:-
 - (i) providing work for the unemployed and underemployed;

- (ii) partly substituting foreign imported techniques, thus allowing the country's import capacity to be put to better use.
 - (iii) curbing the influx of rural population to major towns such as Nairobi, Mombasa, Kisumu, Nakuru etc.
 - (iv) ensuring that money earned by the local population will mostly circulate within the study area.
6. The Kenya Government rightly believes that further justification exists to undertake the Gravelling Programme because in doing this the following sectors, within the Study area, would then succeed in implementing various expansion programmes included in the current development plan period 1974-78:-
- Ministry of Agriculture with special emphasis on the planned Intergrated Agricultural Programme, Settlement and Co-operatives.
 - Forests, Fisheries and Mineral Resources.
 - Water supplies.
 - Commerce and Manufacturing.
 - Tourism and Wildlife.
 - Education and Training.
 - Health.
 - Social Services etc.

7. The policy guiding the entire highway development programme will be based on staged construction. Standards will be directly correlated to present and anticipated traffic volumes. Systematic upgrading of the highway network will be equally correlated to the present and anticipated traffic volumes.

8. All Trunk roads in the District are either paved or under construction. Primary roads are gravel surfaced and are planned for paving as stated under paragraph 6 above. Apart from the Gravelling Programme, Rural Access Roads to the tune of about 650 km., which wholly stem from the Secondary and Minor Roads, will also be improved through labour intensive methods in Bungoma District.
9. Maintenance work will be assumed on all completed sections of the roads. A sum involving K.£100 per year per km. for normal maintenance and K.£1,400 per every 10 years cycle or so will be spent on regravelling. This issue however, is still being studied further.

CHAPTER 3—OBJECTIVES, STRATEGY AND POLICY FOR THE 1974-78 PLAN:

The objectives of the Kenya Government as enunciated in the sessional Paper No. 10 of 1965 on "African Socialism and its application to Planning in Kenya" emphasize the pursuit of individual freedom - freedom from want, disease, ignorance and exploitation; expansion of the economy with equitable sharing in its benefits; and integration of the national economy.

To achieve these objectives, the Government has clearly defined her strategy in the Development Plan 1974/78. The fulcrum of that strategy is the promotion and acceleration of rural development, and equitable distribution of income and the creation of additional employment opportunities. The goal here is economic and social betterment of each individual in the society; key to which is an expanding economy which provides the people with material means to overcome poverty and enjoy a higher standard of living.

Towards these goals, the Government has placed emphasis on road development as follows:-

1. Major emphasis to be on the improvement of Secondary and Minor roads in the rural areas.
2. High priority to be given to new access roads in the agriculturally potential areas where communication is not possible in the wet season, or where the cost of road transport is excessively high.
3. Staged construction to be a policy guiding the entire highway development programme. Standards will be directly correlated to the present and anticipated traffic volumes. Systematic upgrading of the highway network will be equally correlated to the present and anticipated traffic volumes.
4. New construction on the International Trunk Network is to be limited to works which will eliminate bottlenecks or other congestion points.
5. The above trends are further emphasized in sessional Paper No. 4 1975, which takes into account the effect of the current worldwide financial crisis.

CHAPTER 4— THE STUDY AREA - BACKGROUND:

4.1 GENERAL INFORMATION:

At this point in the report, and in order to provide a complete picture of the background situation within which the proposed Graveling Programme is to be conceived, it is indispensible to highlight the physical character of the study area, physical conditions, social pattern and the present and future road improvement plans in the Study area.

4.2 PHYSICAL CHARACTER OF THE STUDY AREA (BUNGOMA DISTRICT)

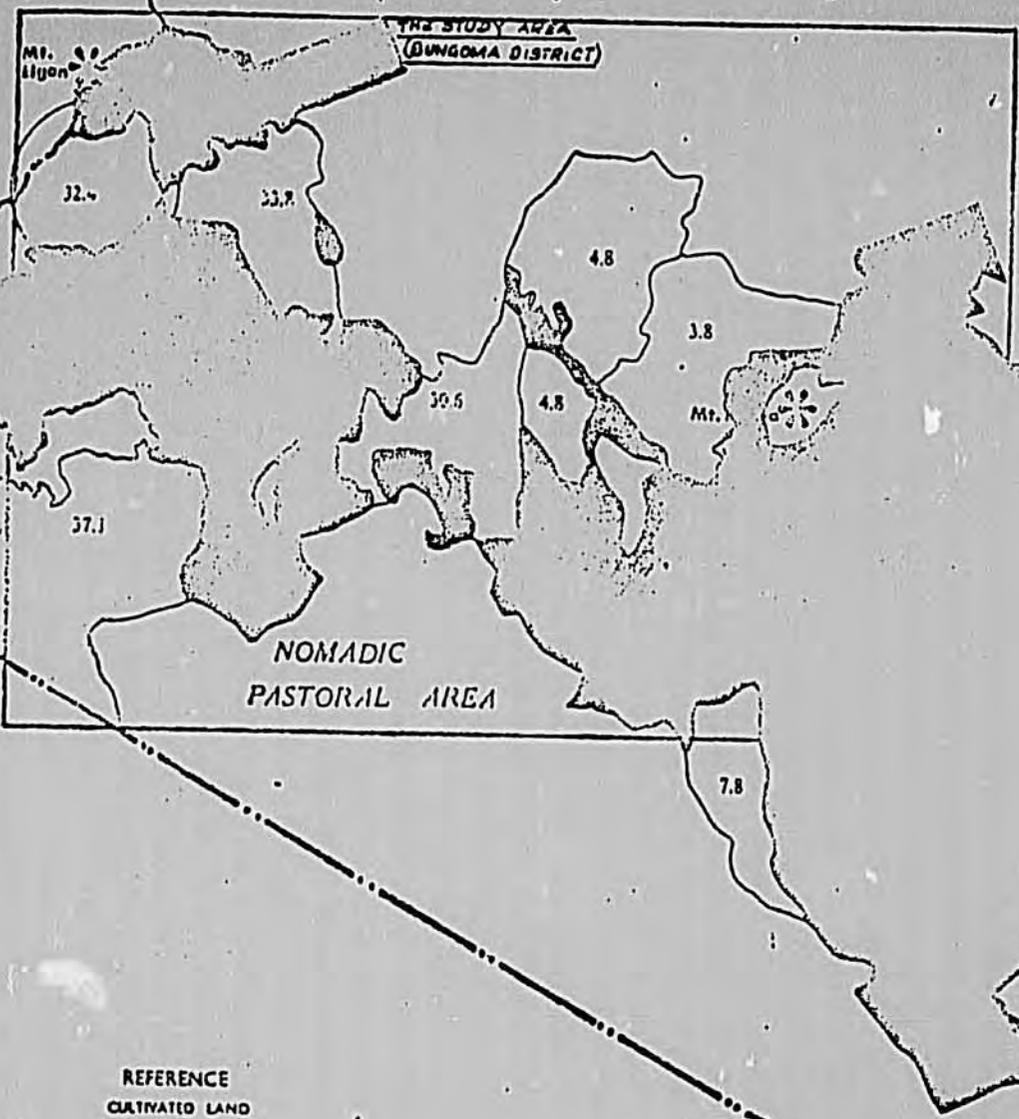
The typical study area selected, has a combination of the following elements:-

1. a high density of rural population (Ref. Appendix 1) 168 people per sq.km. or 432 people per sq.km. of cultivated land;
2. a greater proportion of small holdings with very few large estates;
3. large agricultural resources of various types (Ref. Chapter 5.3 of the report);
4. a relatively good network of Trunk and Primary roads but very poor network of other roads which are the back-bone of the rural areas as they provide connection to markets and growth centres (Ref. Appendix 1);
5. little industrialization and a high rate of migration to larger towns and cities such as Nairobi, Mombasa, Kisumu, Nakuru and of late, even to Kakamega and the newly started town of Webuye.
6. Large proportion of uncultivated land (Ref. Map 4

4.3 PHYSICAL CONDITIONS:

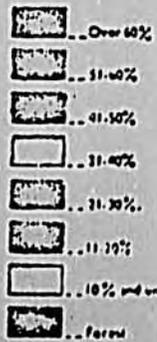
Land form in the Study area consists of gently rolling volcanic crystalline hills, with more or less wide plains or relatively flatter depressions.

The overall drainage pattern in the Study area is radial with



REFERENCE
 CULTIVATED LAND
 BY DISTRICTS (1960 & 1)

Percentage of total land



Notes:
 1. Some European and Asian agricultural estates (1/4th - 1/2nd) are included under
 2. Some African agricultural estates (over 1/4th & 1/2nd)
 No figures were available for the former jurisdiction of the Coastal Province and
 for the former areas of Provincial Councils, now under transfer for some areas of the
 Coast Province
 Compiled from the information supplied by the Department of Agriculture and
 the Ministry of Lands, Kenya

CULTIVATED LAND

Scale 1:3,000,000

Source: Atlas of Kenya

rivers emanating from high grounds flowing first south then westwards and ultimately to Lake Victoria. Due to the high rates of evaporation (ref. Map 4.1) the flows are small and vary strongly with the seasonal changes of rainfall.

The main geological features encountered in the Study Area consist mainly of the Nyanzian and Kavirondian System (Precambrian) consisting of sediments and volcanics. These result in a predominance of red to dark sandy weathering. The geology is summarized in Map 4.2 and physiographic features are on Map 4.3.

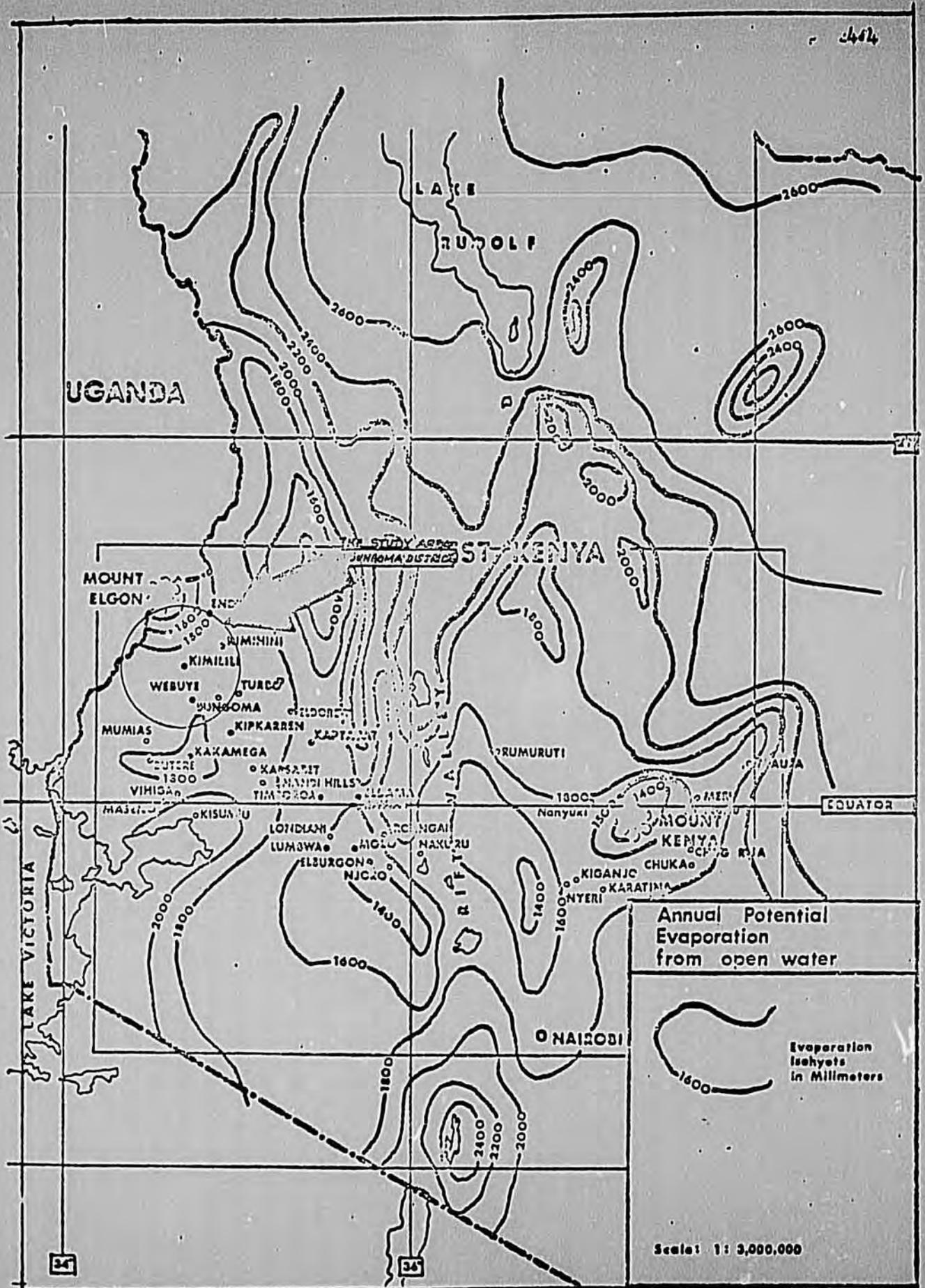
4.4 CLIMATE:

Mean temperature in Kenya is closely related to ground elevation. The coldest temperatures within the Study area are experienced on top of Mt. Elgon. In general hourly temperatures show considerable variation between day and night.

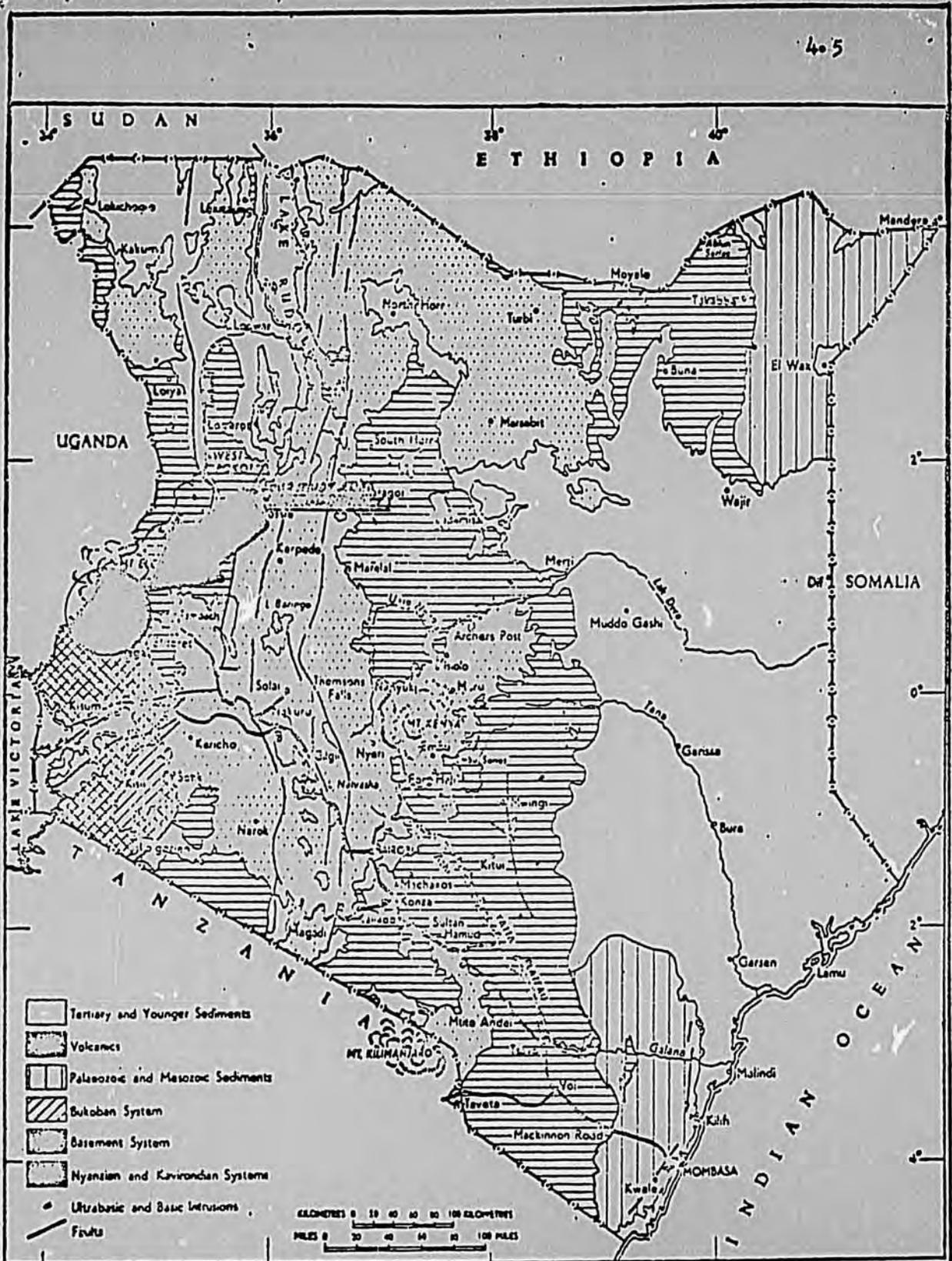
Annual rainfall follows a strong seasonal pattern and in the Study area it ranges from 1,200 - 2,100 mm. per annum. Ref. map 4.4 and 4.5 depicting mean annual rainfall and maximum temperature respectively.

4.5 HUMAN AND SOCIAL PATTERNS:

The Study area has a dense population of 168 people per sq. km. The basic social structure in the past used to be the extended family i.e. a group consisting of several units of fathers, mothers and children in which there used to be as strong a relationship between uncles, aunts and cousins as between fathers, mothers and children. A main characteristic was polygamy leading to matrilinear or patrilinear hierarchies. This basic structure was very strong and common to most parts of Kenya, however, there is rapid deterioration of the system caused by the cities and the formal academic system of education. There is a solidarity within inhabitants of the Study area and also a sense of equality of opportunity. The inhabitants of the Study area are mostly settled small scale agriculturalists and cattle raisers. They are hard working, open to new agricultural techniques and crops, industrious and traditionally engaged in crafts such as tool making, leather clay etc.



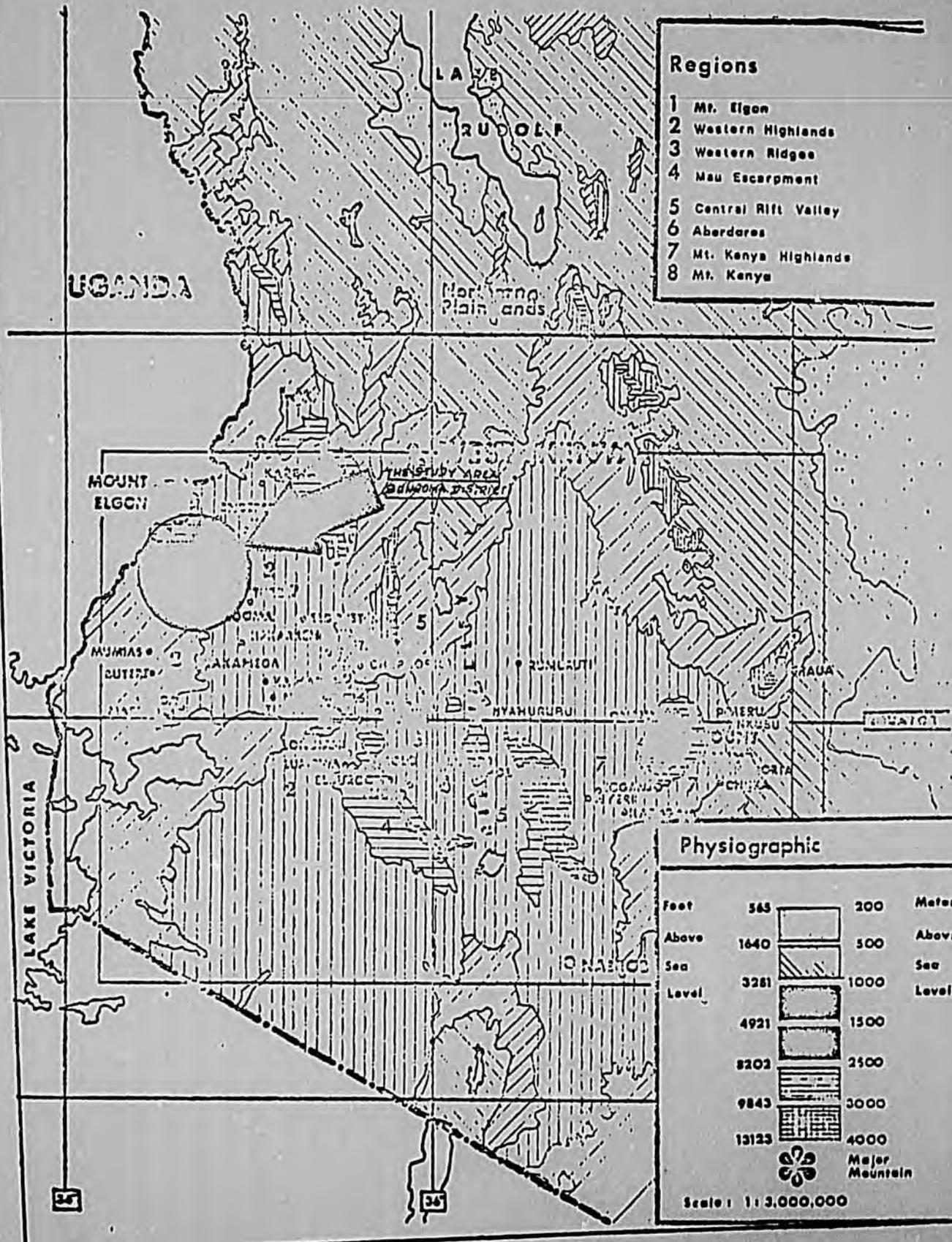
MAP 4.1



Map 4.2 Geology

Source: Pulfrey and Walsh, The Geology and Mineral Resources of Kenya, 1969

MAP

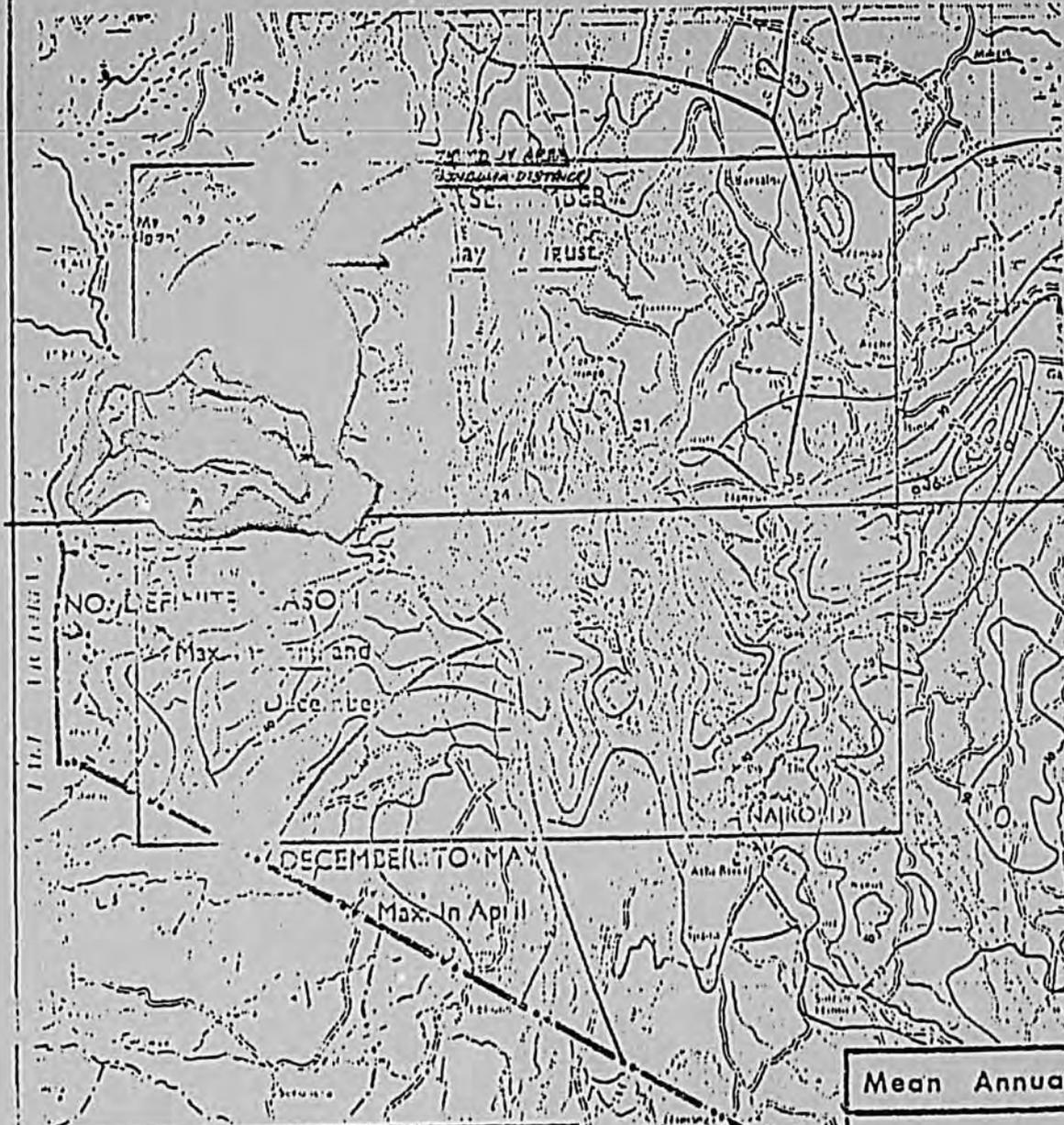


- ### Regions
- 1 Mt. Elgon
 - 2 Western Highlands
 - 3 Western Ridges
 - 4 Mau Escarpment
 - 5 Central Rift Valley
 - 6 Aberdares
 - 7 Mt. Kenya Highlands
 - 8 Mt. Kenya

Physiographic

Feet	565	200	Meter
Above	1640	500	Above
Sea	3281	1000	Sea
Level	4921	1500	Level
	8202	2500	
	9843	3000	
	13123	4000	
			Major Mountain

Scale: 1:3,000,000



Key to Centres

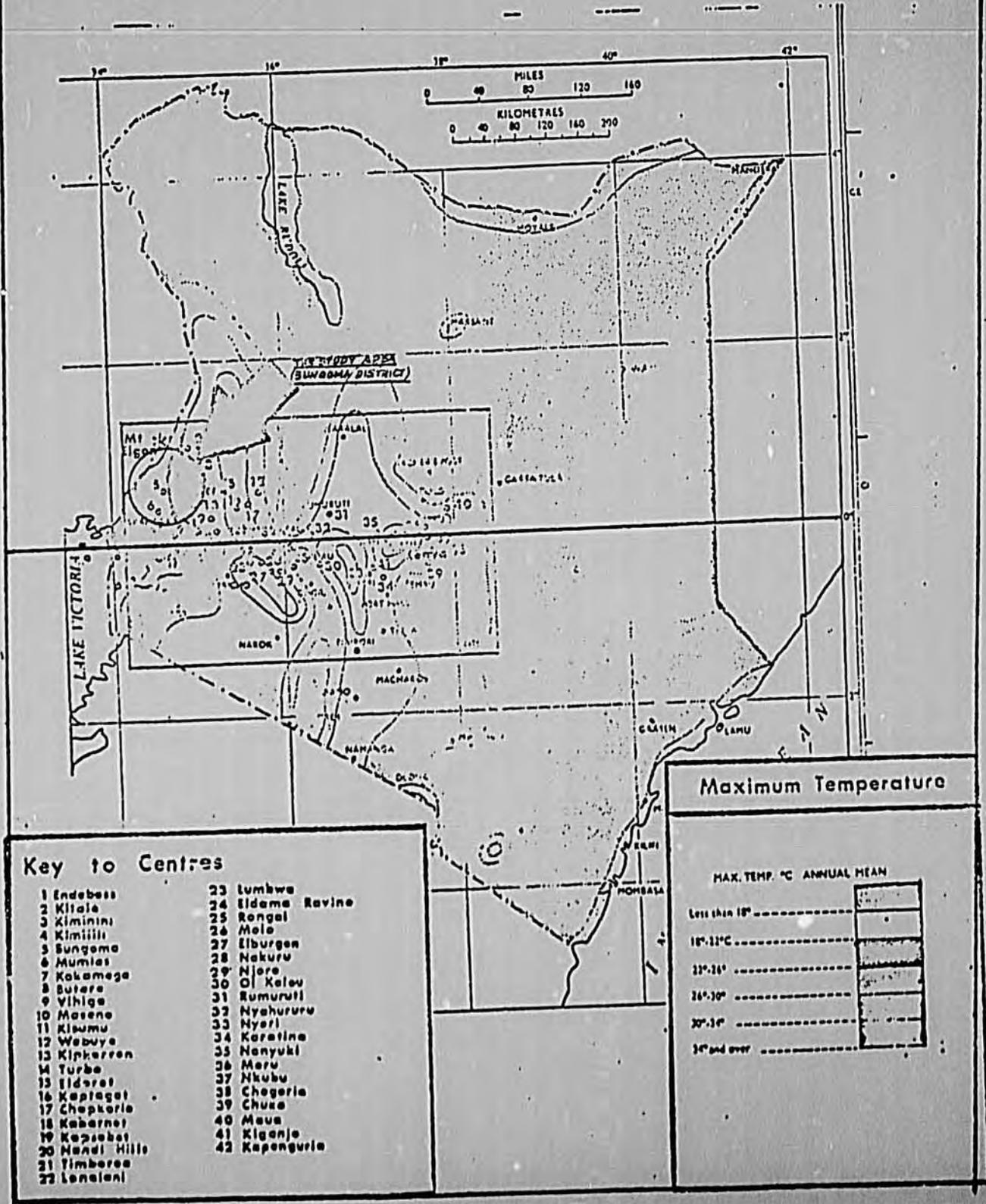
1 Enaoossi	23 Lumbwa
2 Kitale	24 Eldama Ravine
3 Kimini	25 Rongai
4 Kimili	26 Malo
5 Bungoma	27 Ilburgen
6 Mumias	28 Nekuru
7 Kakamega	29 Njere
8 Butera	30 Ol Kalou
9 Vihiga	31 Rumuruti
10 Maseno	32 Nynhururu
11 Kiumu	33 Nyari
12 Webuye	34 Keratina
13 Kipkarren	35 Nenyuki
14 Turba	36 Maru
15 Idjirat	37 Nkubu
16 Kapinget	38 Chegeria
17 Chepareria	39 Chuka
18 Kabarnet	40 Maua
19 Kapinbet	41 Kigenje
20 Nandi Hills	42 Kapenguria
21 Timboroa	
22 Londiani	

Mean Annual Rainfall

REFERENCE

Reference	Symbol	Reference	Symbol	Reference	Symbol
OVER 30 IN	[White Box]	OVER 50	[Black Box]	105-127.5	[Black Box]
17.5-37.5	[Black Box]	75-90	[White Box]	140-165	[White Box]
112.5-170	[White Box]	90-75	[White Box]	165-200	[White Box]
127.5-152.5	[Black Box]	60-45	[White Box]	200-225	[White Box]
NATIONAL PARK ZONES	[Dashed Line]	37.5-30	[White Box]	225-250	[White Box]
		30-15	[White Box]	250-300	[White Box]
		15-10	[White Box]	300-350	[White Box]
		10-5	[White Box]	350-400	[White Box]
		5-10	[White Box]	400-450	[White Box]
		10-20	[White Box]	450-500	[White Box]
		20-30	[White Box]	500-550	[White Box]
		30-40	[White Box]	550-600	[White Box]
		40-50	[White Box]	600-650	[White Box]
		50-60	[White Box]	650-700	[White Box]
		60-70	[White Box]	700-750	[White Box]
		70-80	[White Box]	750-800	[White Box]
		80-90	[White Box]	800-850	[White Box]
		90-100	[White Box]	850-900	[White Box]
		100-110	[White Box]	900-950	[White Box]
		110-120	[White Box]	950-1000	[White Box]
		120-130	[White Box]	1000-1050	[White Box]
		130-140	[White Box]	1050-1100	[White Box]
		140-150	[White Box]	1100-1150	[White Box]
		150-160	[White Box]	1150-1200	[White Box]
		160-170	[White Box]	1200-1250	[White Box]
		170-180	[White Box]	1250-1300	[White Box]
		180-190	[White Box]	1300-1350	[White Box]
		190-200	[White Box]	1350-1400	[White Box]
		200-210	[White Box]	1400-1450	[White Box]
		210-220	[White Box]	1450-1500	[White Box]
		220-230	[White Box]	1500-1550	[White Box]
		230-240	[White Box]	1550-1600	[White Box]
		240-250	[White Box]	1600-1650	[White Box]
		250-260	[White Box]	1650-1700	[White Box]
		260-270	[White Box]	1700-1750	[White Box]
		270-280	[White Box]	1750-1800	[White Box]
		280-290	[White Box]	1800-1850	[White Box]
		290-300	[White Box]	1850-1900	[White Box]
		300-310	[White Box]	1900-1950	[White Box]
		310-320	[White Box]	1950-2000	[White Box]
		320-330	[White Box]	2000-2050	[White Box]
		330-340	[White Box]	2050-2100	[White Box]
		340-350	[White Box]	2100-2150	[White Box]
		350-360	[White Box]	2150-2200	[White Box]
		360-370	[White Box]	2200-2250	[White Box]
		370-380	[White Box]	2250-2300	[White Box]
		380-390	[White Box]	2300-2350	[White Box]
		390-400	[White Box]	2350-2400	[White Box]
		400-410	[White Box]	2400-2450	[White Box]
		410-420	[White Box]	2450-2500	[White Box]
		420-430	[White Box]	2500-2550	[White Box]
		430-440	[White Box]	2550-2600	[White Box]
		440-450	[White Box]	2600-2650	[White Box]
		450-460	[White Box]	2650-2700	[White Box]
		460-470	[White Box]	2700-2750	[White Box]
		470-480	[White Box]	2750-2800	[White Box]
		480-490	[White Box]	2800-2850	[White Box]
		490-500	[White Box]	2850-2900	[White Box]
		500-510	[White Box]	2900-2950	[White Box]
		510-520	[White Box]	2950-3000	[White Box]
		520-530	[White Box]	3000-3050	[White Box]
		530-540	[White Box]	3050-3100	[White Box]
		540-550	[White Box]	3100-3150	[White Box]
		550-560	[White Box]	3150-3200	[White Box]
		560-570	[White Box]	3200-3250	[White Box]
		570-580	[White Box]	3250-3300	[White Box]
		580-590	[White Box]	3300-3350	[White Box]
		590-600	[White Box]	3350-3400	[White Box]
		600-610	[White Box]	3400-3450	[White Box]
		610-620	[White Box]	3450-3500	[White Box]
		620-630	[White Box]	3500-3550	[White Box]
		630-640	[White Box]	3550-3600	[White Box]
		640-650	[White Box]	3600-3650	[White Box]
		650-660	[White Box]	3650-3700	[White Box]
		660-670	[White Box]	3700-3750	[White Box]
		670-680	[White Box]	3750-3800	[White Box]
		680-690	[White Box]	3800-3850	[White Box]
		690-700	[White Box]	3850-3900	[White Box]
		700-710	[White Box]	3900-3950	[White Box]
		710-720	[White Box]	3950-4000	[White Box]
		720-730	[White Box]	4000-4050	[White Box]
		730-740	[White Box]	4050-4100	[White Box]
		740-750	[White Box]	4100-4150	[White Box]
		750-760	[White Box]	4150-4200	[White Box]
		760-770	[White Box]	4200-4250	[White Box]
		770-780	[White Box]	4250-4300	[White Box]
		780-790	[White Box]	4300-4350	[White Box]
		790-800	[White Box]	4350-4400	[White Box]
		800-810	[White Box]	4400-4450	[White Box]
		810-820	[White Box]	4450-4500	[White Box]
		820-830	[White Box]	4500-4550	[White Box]
		830-840	[White Box]	4550-4600	[White Box]
		840-850	[White Box]	4600-4650	[White Box]
		850-860	[White Box]	4650-4700	[White Box]
		860-870	[White Box]	4700-4750	[White Box]
		870-880	[White Box]	4750-4800	[White Box]
		880-890	[White Box]	4800-4850	[White Box]
		890-900	[White Box]	4850-4900	[White Box]
		900-910	[White Box]	4900-4950	[White Box]
		910-920	[White Box]	4950-5000	[White Box]
		920-930	[White Box]	5000-5050	[White Box]
		930-940	[White Box]	5050-5100	[White Box]
		940-950	[White Box]	5100-5150	[White Box]
		950-960	[White Box]	5150-5200	[White Box]
		960-970	[White Box]	5200-5250	[White Box]
		970-980	[White Box]	5250-5300	[White Box]
		980-990	[White Box]	5300-5350	[White Box]
		990-1000	[White Box]	5350-5400	[White Box]

Scale: 1:3,000,000



4.6 PRESENT ROAD SYSTEM:

The network of classified roads is 50,090 km. approximately 7% of them paved, in length as at December, 1975. The following road classification is adhered to:-

International Trunk Roads	....	2,827.5 km.
National Trunk Roads	.....	2,403.5 "
Primary Roads	.....	7,891.0 "
Secondary Roads	.....	10,147.7 "
Minor Roads	.....	20,210.2 "
Special Purpose Roads	.....	6,301.7 "
Municipality Roads	.....	308.4 "

In addition to the above, there are over 60,000 km. of unclassified roads and tracks. Out of the above road length, the Study Area, Bungoma District, enjoys:-

99.2 km.	of International Trunk Roads.
Nil km.	of National Trunk Roads.
207.8 km.	of Primary Roads.
330.1 km.	of Secondary Roads.
324.5 km.	of Minor Roads.
77.1 km.	of Special Purpose Roads.
650.0 km.	of Rural Access Roads are being planned.

Over the past five years, the Government has spent an average of K.£15 - 18 million per year on new construction, improvements and maintenance. Most of these funds have been used to upgrade the trunk road system to accommodate the increase in traffic especially in the transport sector. This growth is reflected in the number of vehicles imported into the country each year.

	<u>1968</u>	<u>1971</u>	<u>1974</u>
Passenger Cars	..... 5,631	6,850	9,407
Trucks, Buses	..... 1,760	2,251	5,849.

Policy paper produced in 1975 as a result of the present energy, money and trade crises puts emphasis on the gravelling of secondary and minor roads, rural access roads and maintenance of existing roads in addition to major projects involving selected heavily trafficked road segments for new construction.

The following table shows the progress so far made on major road improvement in the district since independence:-

ROAD DESCRIPTION	ROAD NUMBER	REMARKS
WEBUYE - MALABA	A.104	Fully paved road (1st ADB); <small>first paved road in district</small>
WEBUYE - KITALE	C43(A1)	Under construction to bitumen standard (IBRD financed), part of the proposed Kunda - Baringo Road.
MUMIAS - BUNGOMA	C.33	Under construction to bitumen standard (IBRD financed).
KAKAMEGA - BUNGOMA	C.41	Engineered Gravel Standard Road (IBRD financed).
KIMILILI - CHWELE - BUNGOMA	C.33	Planned for future improvement to bitumen standard.
KIMILILI - CHWELE	C.33(Part)	Improved to Engineered Gravel Standard (IBRD financed).

CHAPTER 5—OTHER RURAL DEVELOPMENT EFFORTS IN THE STUDY AREA:

5.1 GENERAL:

A clear and detailed description of the present and other planned efforts in the study area is now essential since these developments efforts would mostly end up in a fiasco unless proper roads are provided particularly the secondary and minor roads which basically stem from the already well established Trunk and Primary road network.

5.2 POPULATION AND GROWTH CENTRES:

Total area of Bungoma District is 3,074 sq.km. and this constitutes 37 per cent of Total Province (Ref. Table 5.1). From 1962 to 1969, the population grew at a rate of 5.2% p.a. in the study area. Assuming the same growth rate, ceteris paribus, the rural population should now be 457,100. This figure gives an average population density of 168 people per sq.km. or 432 people per sq.km. of cultivated land.

With the creation and expansion of settlement schemes, immigration has increased the total population in the district.

In 1969, the urban population was 4,401 and was concentrated in Bungoma. Assuming a 5.2% p.a. rate of growth, the urban population should now be about 6,000. Given the rapid development of Webuye town, the total urban population should be around 9,000. The average size of household is 4.5. Table 5.1 and 5.2 depict population in rural areas and urban centres within Bungoma District. Appendix 1 shows population distribution in the district.

TABLE 5.1
POPULATION RURAL ('00) AND LAND UTILIZATION

ADMINISTRATIVE UNIT	1962	1969	TOTAL LAND AREA SQ.KM.	LAND UNDER UTILISATION SQ.KM.	UNDEVELOPED LAND SQ.KM.	FOREST RESERVE SQ.KM.	SERVICE CENTRES SQ.KM.
BUNGOMA DISTRICT	2,419	3,404	3,074	901	1,410	740	34
<u>Kavujai Division</u>	793	1,183	1,141	271	760	100	10
S. Malikisi Location	-	213	-	-	-	-	-
W. Bukusu Location	-	290	-	-	-	-	-
E. Bukusu Location	-	580	-	-	-	-	-
<u>KIMILILI DIVISION</u>	883	1,206	645	332	219	80	14
Kimilili Location	-	383	-	-	-	-	-
Ndivisi Location	-	375	-	-	-	-	-
Bokoli Location	-	448	-	-	-	-	-
<u>Elgon Division</u>	451	616	925	83	297	540	5
N. Malikisi Location	-	294	-	-	-	-	-
Elgon Location	-	322	-	-	-	-	-
<u>Tongaren Division</u>	292	399	374	215	134	20	5
Ndalu Location	-	176	-	-	-	-	-
Naitiri Location	-	223	-	-	-	-	-

TABLE 5.2
1969 POPULATION - URBAN (EUNGOMA)
BY SEX, AGE AND EDUCATION STANDARD

AGE YEARS	TOTAL NO.	NONE/ NOT STARTED	STANDARD		FORM				
			1 - 4	5 - 8	I	II	III	IV	V
<u>TOTAL</u>	4,401	2,387	630	1,008	76	124	42	106	28
0 - 9	4,408	1,239	169	-	-	-	-	-	-
10-14	454	144	199	109	2	-	-	-	-
15-19	480	147	74	201	23	23	10	2	-
20-24	559	161	50	215	25	39	17	46	6
25-29	424	137	51	155	9	25	8	33	6
30-39	612	249	65	224	10	29	6	18	11
40-44	279	150	18	88	6	6	1	5	5
50-59	114	95	3	11	1	2	-	2	-
60+	61	65	1	5	-	-	-	-	-
<u>MALES</u>	2,469	1,198	329	654	53	91	41	88	25
0 - 9	711	620	91	-	-	-	-	-	-
10-14	101	50	83	57	1	-	-	-	-
15-19	239	859	38	108	13	14	6	1	-
20-24	297	67	21	116	16	26	12	34	5
25-29	253	58	50	98	8	18	6	31	4
30-39	432	139	47	181	8	25	6	15	11
40-49	226	107	17	79	6	6	1	5	5
50-59	76	59	1	11	1	2	-	2	-
60+	44	39	1	4	-	-	-	-	-
<u>FEMALES</u>	1,932	1,189	301	354	23	33	11	18	3
0 - 9	697	619	78	-	-	-	-	-	-
10-14	263	94	116	52	1	-	-	-	-
15-19	241	88	36	93	10	9	4	1	-
20-24	262	94	29	99	9	13	5	12	1
25-29	171	79	21	57	1	7	2	2	2
30-39	180	110	18	43	2	4	-	3	-
40-49	53	43	1	9	-	-	-	-	-
50-59	38	36	2	-	-	-	-	-	-
60+	27	26	-	1	-	-	-	-	-

TABLE 5.3
SCHEDULE OF PRINCIPAL TOWNS AND SERVICE CENTRES
BUNGOMA DISTRICT

ADMINISTRATIVE DISTRICT	URBAN CENTRE	RURAL CENTRE	MARKET CENTRE	LOCAL CENTRES	
<u>BUNGOMA</u>	Webuye Kimilili Bungoma	Sirisia Kapsakwany Chwele Tongareni Malakisi	Mayanja Makatero Sangalo Kabula Cheptai Nyanga Kamakoiwa Misikhu Kaptama Kapkatery Bokoli Nalondo Lugulu Naitiri Ndal Bumala	Chebukwa Kibabii Kimaeti Chepkube Changara Chesakaki Mateka Nalianda Sibembe Butonge Chesamisi Sikhendu Ndivisi Namorio Chemoge Kaboywa Sikusi Nzoia	Lukhome Kuywa Khachonge Chebukwabi Makhe Matisi Lukusi Sitikho Mbakalo Makutano Kongoli Makukuywa Majaha Milo Muchi Kandunyi Kibuke

N.B. Appendix I depicts the above named towns and service centres.

TABLE 5.4
WAGE EMPLOYMENT AND ANNUAL EARNINGS ON
SMALL FARMS AND SETTLEMENT SCHEMES

PROVINCE AND DISTRICT	EMPLOYMENT NO. '000			EARNINGS K.£'000			AVERAGE EARNINGS PER ANNUM PER EMPLOYED PERSON K.£
	REGULAR EMPLOYEES	CASUAL EMPLOYEES	TOTAL	REGULAR EMPLOYEES	CASUAL EMPLOYEES	TOTAL	
<u>WESTERN</u>							
Kakamega	24.1	81.6	105.7	1453.2	1042.2	2495.4	24
<u>Bungoma</u>	61.8	3.3	65.1	741.6	145.2	886.8	14
Busia	3.2	.2	9.4	504.0	296.4	800.4	85
TOTAL	89.1	91.1	180.2	2698.8	1483.8	5182.6	23

5.3 —AGRICULTURE, LAND SETTLEMENT AND CO-OPERATIVES:

5.3.1 General:

As stipulated elsewhere in this report, the Government intends to put greater emphasis on rural development over the coming years. The Ministry of Agriculture, recognising the inherent difficulties in such a project, has proposed a unified, national approach in tackling this challenge. The vehicle for achieving this objective is the Integrated Agricultural Development Programme (I.A.D.P). The first phase of the I.A.D.P is to commence in 1976 and the development is to be completed in 5 years. The initial phase plans to reach 56,513 holdings involving 79 locations in 22 Divisions of 14 selected Districts in Kenya.

The IADP would be a continuous scheme for small farm development which essentially should remain flexible, adjusting its emphasis to the changing national and local circumstances between successive phases. The Programme would, at any one time provide the "Package" of facilities necessary to allow small farmers to achieve the overall national objectives. Arising from the forementioned the Project would tackle communications and community services by upgrading tracks and improving human water supply. The roads will be designed to provide good access to the small farming areas involved during the dry season, and minimum access during the wet season.

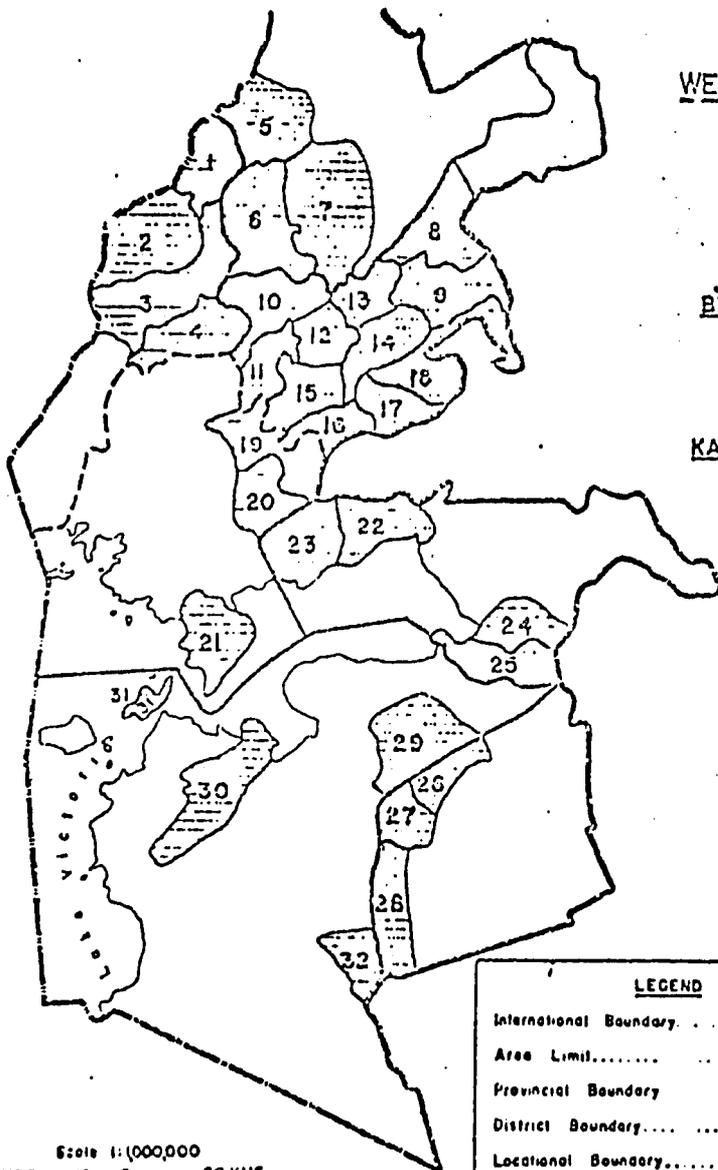
Out of the estimated Kenya's population of 13.5 million people (1975) 7.9 million or 58.9 percent live within the districts containing IADP Phase 1. Table 5.4 shows districts involved in the integrated Agricultural Development Programme and their total land area in sq.km. Map 5.1 depicts western Kenya's Integrated Agricultural Development Project Area.

TABLE 5.4
DISTRICTS AND AREA OF DISTRICTS INVOLVED IN
THE PROJECTS

PROVINCE AND DISTRICT	TOTAL LAND AREA SQ.KM.	PERCENTAGE OF TOTAL PROVINCE
<u>NYANZA:</u>		
Kisumu	2,093	17
Kisii	2,196	17
S. Nyanza	5,714	46
Siaya	2,523	20
Sub total	12,525	100
<u>WESTERN:</u>		
Kakamega	3,520	43
* <u>Bungoma</u>	<u>3,074</u>	<u>37</u>
Busia	1,629	20
Sub-total	8,223	100
<u>CENTRAL:</u>		
Nyeri	3,284	25
Kiambu	2,448	19
Muranga	2,476	19
Kirinyaga	1,437	11
Sub-total	9,645	100
<u>EASTERN:</u>		
Embu	2,714	
Meru	9,922	
Machakos	14,178	
Sub-total	26,814	100

* The Study Area

WESTERN KENYA INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT AREA



WESTERN PROVINCE

BUSIA DISTRICT

- 1 North Teso
- 2 South "
- 3 Bukhuyo
- 4 Merachi

BUNGOMA DISTRICT

- 5 Malakisi
- 6 West Bukusu
- 7 East "

KAKAMEGA DISTRICT

- 8 North Kabras
- 9 South "
- 10 North Wanga
- 11 South "
- 12 East "
- 13 Donyalo
- 14 Dulceto
- 15 Maroma
- 16 Kisa
- 17 Idukha
- 18 Isukha

NYANZA PROVINCE

SIAYA DISTRICT

- 19 North, South & East Cam
- 20 East Cam
- 21 Uyoima

KISUMU DISTRICT

- 22 East & West Kisumu
- 23 East & West Seme
- 24 North, South & West Nyakach
- 25 South Nyakach not included in the project

KISII DISTRICT

- 26 West Kitulu
- 27 Wanjare
- 28 South Mugaranga

SOUTH NYANZA DISTRICT

- 29 Kasipul
- 30 Lambwa Valley
- 31 Rusinga
- 32 South Sakwa

LEGEND

- International Boundary
- Area Limit
- Provincial Boundary
- District Boundary
- Locational Boundary
- Development Project Area

Scale 1:1,000,000
 KMS 20 10 0 20 KMS
 MILES 10 5 0 10 MILES

Range Management Division Office

MAP 5.1

The study area (Bungoma District) which has been included in the first phase of the Intergrated Agricultural Development Programme is endowed with soil types and climate suitable for cultivation of wide range of cash, food and horticultural crops. The average family farm cash is about K.Shs.680/= p.m. *

Coffee, cotton, sisal and sunflower now occupy a central position in the cash crops sector. Also promising to thrive in future are pyrethrum, wheat and sugar-cane. In the mix of food crops maize is dominant having the highest hectareage of any other crops. Other crops to be encouraged are pulses and sweet potatoes.

The potential for livestock development is profound.

The chief constraints afflicting the performance of agriculture are namely:- poor feeder roads (secondary and minor roads), pests and diseases have been controlled by chemical sprays or dusts, thus adding financial burden to farmers. The problem of poor feeder roads is to be corrected under the proposed gravelling of secondary and minor roads.

Settlement schemes operate as separate entities. Farming in the schemes is primarily mixed, with maize and dairying taking lead. The average maize production per hectare has been 25 bags but this figure is occasionally as high as 55 bags.

The cooperative societies have been responsible for the buying and selling of agricultural produce.

5.3.2 Crop Production:

a) Cash Crops:

i) Castor: Farmers have been harvesting what grows wild or on its own in home-stead areas. There are plans to provide seeds of high yielding or improved varieties to farmers in future.

ii) Coffee: The crop commands second place in importance to maize in the District. Farmers have always shown keen interest in expansion of the crop. In 1974 farmers earned approximately K.Shs.3,500,000/= from cherry processed.

* Per MOW planner "p.m." means "per family per year."

- iii) Cotton: This is another popular cash crop in the district. In 1973 hectares planted and yields in kg. were 4,400 and 1,894,354 respectively. The following year the hectares planted were 4,550 and yields in kilogrammes were 2,372,947.
- iv) Fengreak: In 1974, 8 experimental plots of 0.2 acres each were distributed in all parts of the district.
- v) Kenaf: The growing of this crop has yet to be properly reviewed.
- vi) Macadamia Nuts: The number of trees available in the district are about 300.
- vii) Pyrethrum: The crop is grown mainly in Elgon location with scattered bits in higher areas of North Malakisi. Farmers have shown keen interest in planting more pyrethrum. In 1974 the revenue earned by small farmers more than doubled 1973 figures. The hectares planted, flowers picked, and cash received during 1972-74 are as follows:-

TABLE 5.5
HECTARES PLANTED AND REVENUE RECEIVED

YEAR	HECTARES	DRY FLOWERS SOLD IN KG.	REVENUE RECEIVED K.SHS.
1972	28	4,751	25,750
1973	138	10,774	55,233
1974	210	27,137	162,991

- viii) Sisal: The sisal boom which commenced during the middle of 1973 continued throughout 1974. The amount of sisal growing in the district is on approximately 400 hectares of land.
- ix) Sugarcane: The production of the sugarcane in 1973 was as follows:-

Kavujai Division	-	52 hectares
Settlement	-	42 hectares
Kimilili	"	34 hectares
Total		128 hectares

- x) Sunflower: The hectares planted in 1974 more than doubled those planted in 1973 which were 1030. The 1974 hectares were 2,473 distributed as follows:-

Settlement Schemes	1,865	hectares
Kavujai Division	462	"
Kimilili " m	146	"
TOTAL	<u>2,473</u>	hectares.

The main varieties grown were white and grey striped sunflowers.

- xi) Tea: Farmers are still pressing for more tea planting particularly in Kimilili and Elgon locations.
- xii) Tobacco: In 1974 the British American Tobacco Company started a programme of introducing tobacco growing in the district. After one year's trial tobacco growing is now in full swing in Malikisi area.
- xiii) Wheat: The variety Kenya Kudu has shown the best results under Elgon conditions. The enthusiasm to grow more of this crop is picking-up momentum in Elgon locations. Hectares planted in 1973 were 186.
- b) FOOD CROPS:
- i) Bananas: Very popular crop and enjoyed plantation to the tune of 467 hectares in 1973.
- ii) Cassava: Gradually giving way to cash crops. Crop acreage dropped from 3,000 hectares in 1972 to 2,000 in 1973. The problem associated with this crop is its subsistence nature and lack of varieties resistant to mosaic diseases.
- iii) English Potatoes: The crop is mainly grown in settlement schemes.
- iv) Groundnuts: Nearly 8,000 bags was harvested from the 1974 crop. The production was therefore more than double 1973 figures.
- v) Maize: Remains the number one crop in the district. Hectares of both local maize and hybrid maize planted in 1974 are given in the table below:

TABLE 5.6
HECTARES PLANTED

PLACE	HYBRID (Hectares)	LOCAL (Hectares)	TOTAL (Hectares)
Kimilili Division	23,396	780	24,176
Kavujai Division	9,776	515	10,291
Settlement "	9,694	Nil	9,694
TOTAL	41,866	1,295	43,161

TABLE 5.7
ESTIMATED REVENUE FROM MARKETED MAIZE

YEAR	ESTIMATED REVENUE K.SHS.
1972	5,200,000
1973	7,200,000
1974	7,800,000

vi) Finger Millet: This crop increased acreage from 2,400 to 2,933 hectares in 1974. Finger Millet is a subsistence crop and it is also used in brewing local beer.

vii) Pulses: The main varieties of pulses grown in the district are:

Mixed Beans.
Rosecoco Beans.
Canadian Wonder
Cow Peas.
Green Grams.
Mexican 142 Beans. and
Soya Beans.

The production increased from 5,735 hectares in 1973 to 6,937 hectares in the following year.

viii) Rice: The production which is mainly concentrated in Kavujai Division, amounted to 4,391 bags in 1974. Rice consumption is becoming increasingly popular in many parts of Kenya and its production will definitely be encouraged.

ix) Simsim: This crop is also grown mainly in Kavujai Division for local market and consumption. In 1974, about 210 hectares were planted compared to 196 hectares during previous year.

x) Sorghum: The hectares grown in 1974 were as shown belows:-

	<u>Hectares</u>
Kavujai Division	463
Kimilili	<u>115</u>
Total	<u>578</u>

xi) Sweet Potatoes:

This crop is grown for home consumption and as a fodder crop for grade animals. It is grown throughout the District. The hectares grown in 1974 were about 2,000.

c) HORTICULTURAL CROPS:

i) Cabbages: The most popular and widely planted vegetables in the District. A total of 220 hectares were planted in 1974. Main varieties grown are sugar loaf drums, and Kale.

ii) Capsicum and Chillies:

Not grown on commercial basis but are grown mainly in Kitchen gardens for home consumption.

iii) Carrots:

Mainly grown by 4-K Club members and in kitchen gardens for home consumption and very little enters local markets. The hectares grown in 1974 were about 40.

iv) Citrus: The old trees of citrus can be seen throughout the District. A small citrus nursery was established at Sang'alo in the District in 1974 and 170 lemon seedlings were budded to Washington Naval.

v) Local Vegetables:

Cow peas are the main type grown being quite popular because of their palatability and drought resistance. Nearly 730 hectares of various types of local vegetables were grown in 1974.

vi) Onions: Grown widely in the District. Some farmers transport their produce to Eldoret, Kisumu and Kitale. Nearly 300 hectares of the crop were planted in 1973.

vii) Passion Fruits: Mature seedlings sufficient to plant over 260 hectares were available in 1974.

viii) Pineapples: About 55 hectares of this crop were grown in various parts of the District. The 1974 hectares were far more than 1973 hectares which were only 30.

ix) Tomatoes:

Very important within the District. About 40 hectares were planted in 1974.

5.3.3 ANIMAL PRODUCTION:i) Dairy Societies:

There are four milk dairy societies in the District. These are Kitanda, Kimilili, Webuye and Kimalewa Dairy. The table below shows the milk intake for the whole of 1974 by different societies excluding Kimalewa. The income from milk intake is also shown below:-

TABLE 5.8: MILK INTAKE AND INCOME

DAIRY	MILK INTAKE IN LITRES	INCOME IN K.SHS.
KITINDA	210,844	179,203
KIMILILI	33,800	28,000
WEBUYE	45,142	41,561
TOTAL	289,786	248,854

ii) Dairy Cattle Population:

The table below shows the number of grade cattle in the district as at 1974:-

TABLE 5.9

DIVISION	COWS	HEIFERS	STEERS	HEIFER CALVES	BULL CALVES
Kimilili	806	267	181	309	272
Kavujai	233	53	67	43	Nil
TOTAL	1,038	320	248	352	272

iii) Zebu Cattle Population:

Zebu cattle are still the majority of the cattle in the District. Campaigns are frequently carried out with a view to up-grading the indigenous animals through the use of Artificial Insemination. The estimated number of Zebu animals as at 1974 is shown below:-

TABLE 5.10

DIVISION	NUMBER
KIMILILI	43,800
KAVUJAI	39,200
TOTAL	83,000

iv) Sheep and Goats:

A vigorous extension campaign for sheep and goat management is going on in the District. By the close of 1974, there were 13,974 sheep and 14,135 goats in the District.

v) Pigs:

A few farmers have shown interest in pig husbandry in the District although, the level of general husbandry is still low. Apart from the pigs at Sang'alo Animal Husbandry Research Station, all the other pigs are kept on free range.

The population of pigs by the end of 1974 was follows:-

TABLE 5.11

TYPE	NUMBER
Sows	96
Boars	9
Gilts	14
Piglets	29
TOTAL	148

vi) Poultry:

Due to sudden rise in demand for poultry and eggs, many farmers have demonstrated the desire to start serious poultry keeping. The desire has also been generated by the fact that Agricultural Finance Cooperation are prepared to allow farmers to apply for poultry loans.

At the close of 1974, there were 1,747 exotic birds and 29,399 indiginecus birds in the District. The forementioned figures are far below the current demand and as such, vigorous campaign has been mounted for energised supply of poultry and eggs in the District.

5.3.4 LAND SETTLEMENT:

All Government sponsored settlement schemes are organized by the Department of settlement in the Ministry of Lands and Settlement. In addition to these official schemes, people generally settle in new areas in the traditional way whenever land resources permit. The forecast budget of the settlement Department for 1974 - 78 plan period amounts to K£15.8 million.

Development of the settlement schemes has been hindered by poor roads, and inadequate water supplies, although reticulated water supply schemes have now been installed on 55 settlement schemes throughout the Republic of Kenya. It is the Kenya Government's intention to develop both water supplies and roads in the settlement schemes during the current development plan period 1974 - 78. As far as roads are concerned, the proposed Rural Access Roads, and the Graveling of the Secondary and Minor Roads will cater for the demand.

The following table shows the number of schemes and plots in Bungoma Area:-

<u>Scheme Name</u>	<u>Plots</u>
1) Kamukuywa	552
2) Naitiri	316
3) Kiminini	365
4) Ndalul	189
5) Kabisi	701
6) Kabuyefwe	395
7) Tongaren	544
8) Scysambu	371

In 1974, 9,739 hectares were under maize and approximately 229,170 bags of maize were produced and sold. There were 1,870 hectares under sunflower. In the whole scheme there are about 14,401 dairy cattle.

5.3.5— CO-OPERATIVES:

The Co-operative movement has now been in existence in Kenya for about 30 years as an officially recognised movement and has grown steadily since independence. In 1970 when the sessional Paper on "Co-operative Development Policy for Kenya was published there were 1,494 societies in the register and slightly over 1,000 active. The total turnover has increased from Kshs. 370,709,000 in 1970 to Kshs. 660,000,000 by the end of 1974, an increase of well over 75%. The total turnover of co-operatives accounts for about 25% of the country's gross farm revenue and about 45% of gross marketed smallholder production. In the Sessional Paper No. 14 of 1975, the Government accepts that the co-operative movement has an extremely important role to play particularly to the small scale farmers and the salary and wage earners in the urban areas. In addition the paper sets out co-operative policies and measures which the Government would adopt to strengthen the movement to ensure it was organised and developed in a purposeful and orderly way.

The Co-operative Development in Bungoma District indicates increase in the cash turn-over for the year ending 1974 which realised Kshs. 8,166,594/75 compared with Kshs. 6,631,851/55 in 1973.

Important co-operative crops in the District are:-

1. Coffee: Fifteen (15) out of the twenty-nine (29) active co-operative societies in the District deal with Coffee. The output of cherry at the end of 1974 was 4.4 million kg. compared with 3.0 million kg. in 1973. Farmers are very keen and willing to enlarge and improve their coffee farms in the District.
2. Cotton: Cotton acreage in the District increased from 4,400 hectares in 1973 to 4,550 hectares in 1974. Cotton sales for 1974 were Kshs. 2,547,685/90.
3. Maize: Maize in the District is not essentially a co-operative crop though it is both the staple food and produced with the highest quantities as a single crop. Two Co-operative societies were in operation and handled 2,500 bags in 1974.

4. Pyrethrum: This crop seems to do well on the slopes of Mt. Elgon. The plant contains 1.6% pyrethrin which is considered as very good quality. This crop is likely to become a very important crop for the co-operative societies in pyrethrum growing areas of the District. The development of pyrethrum in the district has been as follows:-

TABLE 5.12

YEAR	HECTARES	DRY FLOWERS (KGS)	AMOUNT KSHS.
1972	28	4,751	25,750
1973	138	10,744	55,233
1974	210	27,137	162,992

5. Sisal: About 2 million kilogramme was harvested by farmers in 1974.
6. Sunflower: The importance of Sunflower as a Co-operative Crop is increasing in a commendable rate. This is partly because Sunflower requires less labour and less fertilizers.
7. Miscellaneous Crops: About 6.550 hectares of beans were planted in 1974. Sugar Cane increased by 128 hectares. Both sugarcane and vegetable still face distribution problems especially because of poor road network from farm to market places.

5.4 — FORESTS, FISHERIES AND MINERAL RESOURCES

a) Forests:

The Mount Elgon area has a government forest reserve covering 533 sq. km and contains soft woods only. Paper wood plantation need to be expanded into the Kavujai Division. There exists one nursery in the whole district and its annual sale averaged 60,000 seedling. The possibility of manufacturing resin, and medicinal products from trees is being considered. Map 5.2 depicts forest plantations in parts of Western Kenya.

Eucalyptus saligna has the highest percentage in germination compared to other species. In 1974, 59,405 *Eucalyptus saligna* and 111,720 *Pinus Patula* were bricked. Total number of seedlings sold during 1974 were 61,156 and fetched a total sum of Kshs. 4,613/10. About 13,390 plants were issued free, worth Kshs. 1,001/25. Forest extension service is fully being appreciated by the people however, transport problem is still a stumbling block particularly the roads leading to and from the forest areas within the District are in extremely poor condition.

b) Fisheries:

Traditionally, the people of the district are not keen fish-eaters. The fisheries department has however, assisted local communities in building fish ponds, which numbered over 1,000 in 1974. Fish farming will be more successful in the draught stricken areas of Kimilili and Kavujai divisions when the 1974 - 78 planned water projects are extended to the villages.

c) Mineral Resources:

A little prospecting is currently being undertaken by private companies and groups. Investigations are to be mounted on finding out whether the Tororo cement rock structure extends into Kavujai division via North Teso Location. Similarly, consideration is being given to investigating the mineral composition of the shiny rocks found in Kimilili division.

5.5 — WATER SUPPLIES

The majority of the people in the rural areas in Bungoma district obtain water from natural springs, which are well distributed in the district and from the Nzoia river, whose tributaries radiate and span almost the whole district.

A total of about 20 water schemes are presently active. The medium term requirements of the district are to implement the 1974 - 78 planned water projects which include:-

i)	Bungoma Scheme water reticulation (a)...	K£ 108,000
ii)	Chesikaki Schemes (a)	K£ 35,000
iii)	Kibichori Scheme (a)	K£ 23,900
iv)	Ndivisi Schemes	K£ 225,361

v	) Chesikaki Scheme (b)	K£ 175,000
vi	) Kibichori Scheme (b)	K£ 263,000
vii	) Bungoma Schemes (b)	K£ 146,500

The longterm requirements entail increasing the capacity of completed schemes, and extending supplies to principal markets, school, health centres, and homes.

5. 6 — COMMERCE AND MANUFACTURING

The level of trade is still low in the district partly because of the poor road communication. The number of trade licences issued in 1974 was 1,663. Retail services are developed particularly in the Urban and larger rural centres. Wholesale facilities are not yet extensive. The volume of loans to commercialists and industrialists averages Kshs. 1,168,000 p.a. In the current plan period emphasis is given on giving loans to potential African entrepreneurs.

The paper manufacturing at Webuye is expected to give rise to the development of ancilliary industries like chemical engineering, paper-bag enterprises, printing press e.t.c. Other enterprises to be considered during the current plan period are

- Starch Industry;
- Maize Milling;
- Sugar Milling;
- Furniture Works e.t.c.

5. 7. — TOURISM AND WILDLIFE

The planned Mt. Elgon National Park will go along away in attracting game viewing tourists. Scene-observers and mountneers will also be attracted to view and climb Mt. Elgon.

The development plans emphasise on the necessity for good roads in the Mt. Elgon area. It also calls for the establishment of recreational centres, tourist lodges and hotels e.t.c. The District Development Committee has proposed a lodge at Chepkitale.

The development of this tourist potential is envisaged in the current plan 1974 - 76 and is related to that of Lambwe Valley in South Nyanza district as a circuit.

5.8— EDUCATION AND TRAINING

There are over 270 primary schools in the district offering over 2,000 classes to over nearly 70,000 pupils of both sexes, females and males each totalling about 30,00 and 40,000 respectively. There is a teacher for each class, that is over 2,000 teachers. The number of pupils per teacher, and the enrolment per class ratios are similar to National targets of 32.1 and 34.4 respectively.

There are 29 secondary schools, 14 of which are of self help nature. Total secondary school enrolment is about 6,000. The females in secondary schools are $\frac{1}{4}$ the number of males. The number of teachers is 153.

Enrolment for higher school certificate totals about 160 of which nearly $\frac{1}{4}$ are females.

There are plans to establish one Teachers Training College and Nurses' School in the district soon.

Two village polytechnics are active in the district. There are plans to shift emphasis from formal selfhelp secondary school education to agricultural, commercial and industrial education. Appendix I depicts how some of the schools are served by Secondary and Minor Roads.

5.9— HEALTH SERVICES:

Bungoma is the principal district hospital. There are other 14 health centres and dispensaries, of which 4 are mission hospitals and one dispensary. The distribution of these health centres is fairly even, although some people travel an average of $5\frac{1}{2}$ miles to the nearest one. In total, only 216 hospital beds are available for the district's entire population. Most of these health services are linked to the rural populace by secondary and Minor Roads(Ref. Appendix I).

Future plan policies is aimed at increasing hospital beds, training more medical staff and opening more dispensaries in the remote areas of the district. The current satisfactory self help spirit is being utilized in construction of more health centres.

There is abundant local knowledge about traditional medicines used for curing all manner of diseases and infirmities.

5.10 —SOCIAL SERVICES

The local populace proudly spares part of their time on self-help projects. Popular projects include the construction of:-

- Primary Schools;
- Nursery Schools;
- Cattle dips;
- Teachers houses;
- Harambee Secondary Schools;
- Health Centres.

5.11 —LOCAL GOVERNMENT:

There are only two town councils, in the district namely Bungoma and Webuye. These are responsible for providing essential services to the town's population. The County Council whose headquarters is at Bungoma, renders services to outlying areas of the district apart from the above named towns. During the year 1975/76, Bungoma and Webuye town councils have planned to spend Kshs. 6.78 million and Kshs. 222,000/= respectively for Capital development.

CHAPTER 6 - ROAD DEVELOPMENT, MAINTENANCE AND TRAFFIC FLOW

6.1 — GENERAL:

As stated elsewhere in the text, the objectives for Roads and Road Transportation during the current Development Plan 1974 - 78 are as follows:-

- i) Major emphasis will be placed upon the improvement of secondary and minor roads in rural areas.
- ii) High priority will be given to new access roads in agricultural areas where communication is not possible in the wet season, or where the cost of road transport is excessively high.
- iii) Staged construction is to be a basic policy guiding the entire highway development programme. Standards will be directly correlated to the present and anticipated traffic volumes.
- iv) New construction on the Trunk roads is to be limited to works which will eliminate bottlenecks or other congestion points.

6.2 — STRATEGY FOR ACHIEVING OBJECTIVES

The Roads Department of the Ministry of Works will undertake projects in each of the following programme areas:-

- i) International Trunk Roads: Roads linking centres of international importance and crossing international boundaries or terminating at international ports.
- ii) National Trunk Roads: Roads linking nationally important centres.
- iii) Primary Roads: Roads linking Provincially important centres to each other or to higher class roads.
- iv) Secondary Roads: Roads linking locally important centres to each other, to a more important centre or to a higher class road.

v) Minor Roads: Any road linking a minor centre.

In sessional Paper No. 4. of 1975 this strategy is qualified and the size and distribution of development expenditures changed as follows:

Emphasis in road building must be shifted from expensive major roads to access and feeder roads in rural areas. This modification is intended to assure the small farm sector of access to markets and create more employment opportunities to people in the rural areas."

Furthermore, the Government is to encourage the development of small transport firms and to assist the small transporters to meet the legal requirements that have to be met to obtain necessary transport licenses.

6.3 — THE ROAD DEVELOPMENT AND MAINTENANCE PROGRAMMES:

An indicative programme has been prepared within the financial resource ceiling allocated to roads. This programme whose detailed breakdown initially called for an expenditure to the tune of K£ 87,545,000 is currently under rediscussion with the Treasury for reduction purposes. During the subsequent years more emphasis is to be placed on unclassified roads and secondary and minor roads in order to carry out Country-wide exercise on rural development programme with the primary objective of providing all-weather access between high-potential farming areas and marketing centres. More-over this programme is intended to provide meaningful employment opportunities during the off-agricultural-season to the people in whose areas the programme is to be implemented and also encourage shifts in land use and to bring more people out of "Subsistence" into "Market" economy.

Financial and staff constraints have in the past, resulted in insufficient attention being given to the maintenance of the existing road network. The implications of this neglect were recognized during the last Plan period and steps were taken to strengthen the maintenance organization of the Ministry of Works.

During 1973 - 74, about K£ 7.3 million were provided for road maintenance expenditure and it is expected that in the subsequent years up to 1978/79 a total of over K£ 40 million will have been spent on road maintenance alone. Steps will be taken to ensure that the roads which are improved under Graveling Programme receive the required maintenance.

6.4 — ROADS IN BUNGOMA DISTRICT:

6.4.1— CLASSIFIED NETWORK

A total of 1,038.7 km of roads in Bungoma District, are classified by the Ministry of Works. Out of the above mentioned figure, Secondary and Minor roads are predominant, totalling 654.6 km. Bitumenized roads totalled 99.2 at the end of 1974. The Elgon division and the settlement scheme areas are on the average very poorly served by roads. The following table (6.1) shows a summary of classified roads in the district.

TABLE 6.1

SUMMARY OF CLASSIFIED AND
SPECIAL PURPOSE ROADS (JAN. 1975)

ROAD TYPE	TOTAL NATIONAL ROAD LENGTH (KM)	TOTAL PROVINCIAL ROAD LENGTH (KM)	TOTAL ROAD LENGTH BUNGOMA DISTRICT (KM)	TOTAL PAVED ROADS KENYA (KM)	TOTAL PAVED ROAD BUNGOMA (KM)
INTERNATIONAL	2,827.5	178.8	99.2	1,770	99.2
NATIONAL	2,403.5	24.4	NIL	749	NIL
PRIMARY	7,891.0	513.5	207.8	1,127	4.2
SECONDARY	10,147.7	775.9	330.1	267	NIL
MINOR	20,210.2	809.3	324.5	131	NIL
SPECIAL PURPOSE	6,301.7	444.4	77.1	-	NIL
TOTAL	49,781.6	2,746.3	1,038.7	4,044	103.4

NB. Municipalities have an additional 308.4 km of paved roads in Kenya

6.4.2 — A BRIEF SUMMARY OF EXISTING CONDITION OF ROADS IN BUNGOMA DISTRICT

There are two major types of roads in the district. The first type include the Trunk and Primary road and the second type include secondary and minor roads.

The following table gives a summary of the existing condition of the roads:-

TABLE 6.2
SUMMARY OF ROAD CLASSES IN BUNGOMA DISTRICT (KM)

ROAD TYPE	ROAD CLASS					
	BITUMEN	V	IV	III	II	I
TRUNK	99.2	-	-	-	-	-
PRIMARY	4.2	-	31.8	59.4	87.3	25.1
SECONDARY	-	4.2	-	8.5	82.9	220.1
MINOR	-	-	-	-	21.3	377.1

The Trunk and Primary roads in the district are either paved, under construction or are planned for major improvement during the current or next development plan period.

From the above table it can be seen that most of the roads to be included in the gravelling programme (Secondary and Minor Roads) are at present in very poor condition. Table 6.3 depicts Secondary and Minor roads most of which will naturally qualify for the proposed improvements.

The roads in question tend to have the following characteristics in common:

1. Most of the area where they are located consist of sediment and volcanics resulting in predominance of red to dark sandy weathering making the roads impassable after even moderate rainfall.

2. The roads lack adequate drainage and it is usual to find evidence of flooding at the low points of vertical sag curves.

TABLE 6.3
SUMMARY OF SECONDARY AND MINOR ROADS IN
(BUNGOMA DISTRICT)

a) SECONDARY ROADS:

ROAD DESCRIPTION	ROAD NUMBER	TOTAL LENGTH (KM)
Busia - Mateka	D 257	11.8
Mungatsi - Bungoma	D 258	21.8
Namaganda - Webuye	D 269	30.4
Sangalo - Makatero	D 270	9.4
Webuye - River Nzoia	D 271	4.7
Kaptama - Chwele	D 275	17.6
Malikisi - Uganda Brd.	D 276	20.7
Mayanja - C 32	D 277	27.4
Malikisi - Mayanja	D 278	11.7
Kacunya - Kimilili	D 279	27.2
Matisi - Kuywa	D 280	16.9
Misikhu - Kimilili	D 281	8.5
Mbakalo - Kakamega Brd.	D. 282	17.9
Naitiri - Makutano	D 283	30.9
Makutano - Ndalú	D 284	33.3
Kamakaiwa - Kaptama	D 285	14.4
SUB - TOTAL		330.1

b) Minor Roads:

ROAD DESCRIPTION	ROAD NUMBER	TOTAL LENGTH(KM)
Kolanya Hills - Namubira	E 158	11.1
Changara - Bukokholo	E 159	21.9
Kamareti - Omudeki	E 160	12.9
Chebukaka - Chesikaki	E 162	14.9
Malinda - Lwadanji	E 277	26.0
Ndalu - Provincial Budy	E 278	4.5
Butonge - Kolani	E 291	3.8
Sirisia - Sikusi	E 298	10.8
D 284 - B 2 - A 104	E 307	27.6
Lugulu - Namarambi	E 308	15.8
Namarambi - Lugari	E 309	18.3
Webuye - Bungoma	E 310	34.1
Makotelo - Chebukas	E 311	31.3
Chebukwa - Chwele	E 312	17.0
Sirisia - Kuywa	E 314	7.8
Kapkateny - Kuywa	E 315	6.7
Chebukwabi - Majaha	E 316	31.9
Maeni - Kapsakwony	E 317	8.2
Kaptama - Kabon	E 318	9.2
Provincial Bound - D 283	E 328	10.7
SUB - TOTAL		324.5

c) Special Purpose Roads:

ROAD DESCRIPTION	ROAD NUMBER	TOTAL LENGTH
A 104 - E 311	x 6001	16.6
D 277 - C42(Bukokhola)	x 6002	6.3
E 308 (Lukusi - Lugari	x 6003	11.0
Kimilili - Namorio	x 6004	5.3
Kimilili - E 317	x 6005	0.8
Walanga - Uganda Border	x 6006	3.0
Kaboywa - Mt. Elgon Forest	x 6007	4.0
Sangalo - C33	x 6008	18.7
A 104 - D 279	x 6009	10.6
SUB - TOTAL		76.3

3. Most of the roads suffer from the presence of longitudinal and transverse erosion channels which effectively reduce vehicle speeds in dry weather as well as placing severe stress on suspensions and transmissions.
4. In wet conditions the natural road formation material remain in a relatively stable mechanical state, but the surface becomes slippery to an extent which renders movements, even of four-wheel-drive vehicle, extremely hazardous.
5. Attention by traffic and consequent loss of fines from the materials as dust, has caused the majority of the roads which the Ministry has been maintaining to become sunken.
6. Some of the roads have been maintained to certain points however, most of them have not been touched upon due to shortage of funds.
7. The road reserves are overgrown with bush which in places cover the carriageway.
8. Some of the roads cross very fertile low lying swampy areas which cause difficulties for access.
9. Spur roads are generally tracks through the grass.
10. Horizontal and vertical alignments are mostly substandard and occasionally very dangerous to road users.
11. The roads are also characterised by narrow widths about 3.0m - 3.5m.

6.4.3 — REQUIRED IMPROVEMENTS TO REASONABLE ALL WEATHER CONDITION:

The basic requirements, to improve the existing tracks to a reasonable all-weather condition are:-

- 1) Widening, raising of vertical alignment where necessary, reshaping and compacting to improve drainage.

- ii) The provision of culverts;
- iii) The provision of an adequate thickness of 'gravel' wearing course.

Of these requirements, it is considered that (i) and (ii) are the most important, as a simple gravelling operation will not provide a road with any degree of permanence unless provision is made for adequate drainage.

6.5 — TRAFFIC INFORMATION

Between 1965 and 1970, the number of vehicles on the roads increased at an average annual rate of 8 per cent; 1970 - 74 the rate increased to 10 per cent; After 1974 because of unfavourable world wide economic situation coupled with rocketing oil prices, the growth rate has slowed down slightly.

The average size of freight vehicles has also been increasing over the past 15 years. Before independence, the most popular size was a truck of 3.5 ton capacity; by 1965, this size had been replaced by a 5 - 7.5 ton truck. Since 1965, capacities of 7 tons and more have become common and truck-trailer combinations of 30 tons and more have appeared on the Mombasa - Nairobi - Kampala road, particularly for the transportation of petroleum products.

In 1959 - 69 period, the growth of traffic on trunk roads averaged 13 per cent per annum. During 1967 -70, it averaged 23 per cent per annum. The country's economy is continuing to expand however, due to unfavourable world-wide economic crisis coupled with rocketing oil prices and Foreign exchange problems, the growth rate is likely to drop slightly. This trend compares favourably on other classified roads also.

Traffic count results which have been carried out at several census points on the classified roads in Bungoma district are included in this report to give the general magnitude and composition of traffic in the secondary and Minor roads.

The specific roads are shown on Table 6.3. The following Table 6.4 depicts the weighted average base year traffic flow.

TABLE 6.4

BASE YEAR TRAFFIC (1975A.A.D.T)

SECONDARY AND MINOR ROADS IN BUNGOMA DISTRICT

ROAD NO.	ROAD DESCRIPTION	1975 WEIGHTED AVERAGE DAILY TRAFFIC					
		C	L.G	M.G	H.G	B	T
D 257	Busia - Mateka	3	26	6	0	2	37
D 258	Mungatsi - Bungoma	13	49	12	0	16	90
D 269**	Namaganda - Webuye	8	7	6	0	0	21
D 270	Sangalo - Makatero	13	12	3	0	0	28
D 271*	Webuye - Nzoia River	116	211	98	1	42	468
D 275**	Kaptama - Chwele	11	30	17	0	4	62
D 276	Malikisi - Uganda Brd.	15	35	10	0	3	63
D 277	Mayanja - C 32	7	14	5	0	3	29
D 279	Bungoma - Kibinge	21	56	8	0	5	90
D 280	Matisi - Kuywa	25	10	4	0	1	40
D 281	Misikhu - Kimilili	174	208	139	10	45	576
D 282	Mbakalo - Kakamega	15	27	20	0	0	62
D 283**	Naitiri - Makutano	20	25	6	0	3	54
D 284**	Makutano - Ndalu	24	33	7	1	2	67
D 285**	Kamakoiwa - Kaptama	35	44	33	2	1	115
E 158**	Kolanya Hills - Namubira	1	6	0	0	0	7
E 159**	Changara - Bukokholo	6	4	3	0	2	15
E 160**	Kamaeti - Omudeki	1	6	4	0	0	11
E 162	Chebukaka - Chesikaki	2	1	0	0	0	3
E 277**	Malinda - Lwadanyi	3	8	4	0	2	17
E 278	Ndalu - Provincial	12	40	3	0	3	58
E 291**	Butonge - Kolani	19	23	0	0	0	42
E 298**	Sirisia - Sikusi	2	11	3	0	1	17
E 307	D284 - A 104	29	30	11	1	1	72
E 308**	Lugulu - Namarambi	6	13	5	0	0	23
E 309**	Namarambi - Lugari	6	7	1	0	0	14
E 310**	Webuye - Bungoma	4	5	3	0	4	16
E 311**	Makotelo - Chebukas	2	3	1	0	0	6
E 312**	Chwele - Chebukwa	15	11	3	0	8	27
E 314**	Sirisia - Webuye	0	2	0	0	0	2
E 315	Kuywa - Kapkateny	8	8	2	0	0	18
E 316**	Chebukwabi - Majaha	0	3	0	0	0	3
E 317	Maeni - Kapsakwony	15	36	19	0	6	76
E 318	Kaptama - Kabou	1	8	4	0	0	13
E 328**	D283 - Provincial Boundary	23	32	8	0	3	66

N.B. ** 1973 figures

* Township Road

As can be seen from Table 6.4 and 6.5, the Trunk and Primary roads have higher percentage of vehicle population. This fact is obviously supported by the fact that condition of those roads are much better infact some of them are either bitumenised or improved to high gravel standard. Minor and Secondary roads on the contrary are mostly unimproved and thus mostly used by four wheel drive vehicles. Map 6.1 and Diagram 6.1 show traffic density on existing Trunk, Primary, Secondary and Minor Roads in a typical area within Bungoma.

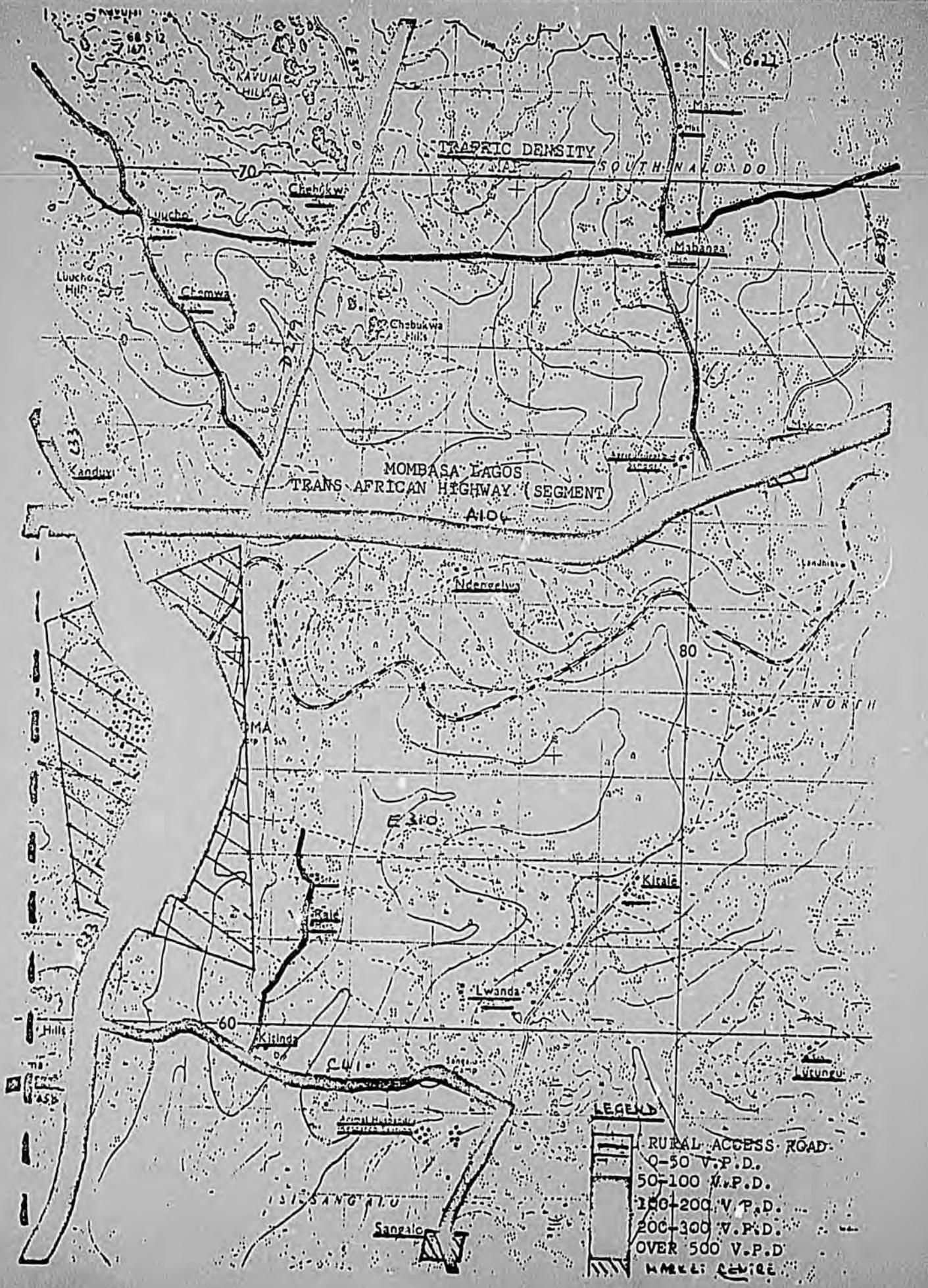
TRAFFIC DENSITY MAP

SOUTH NAIROBI DO

MOMBASA-LAGOS
TRANS-AFRICAN HIGHWAY (SEGMENT)
A104

LEGEND

- RURAL ACCESS ROAD
- 0-50 V.P.D.
- 50-100 V.P.D.
- 100-200 V.P.D.
- 200-300 V.P.D.
- OVER 500 V.P.D.
- RAILWAY



VOLUMES (A.D.T.) BY CLASS OF VEHICLES
BUNGOMA DISTRICT (TYPICAL SAMPLE AREA)

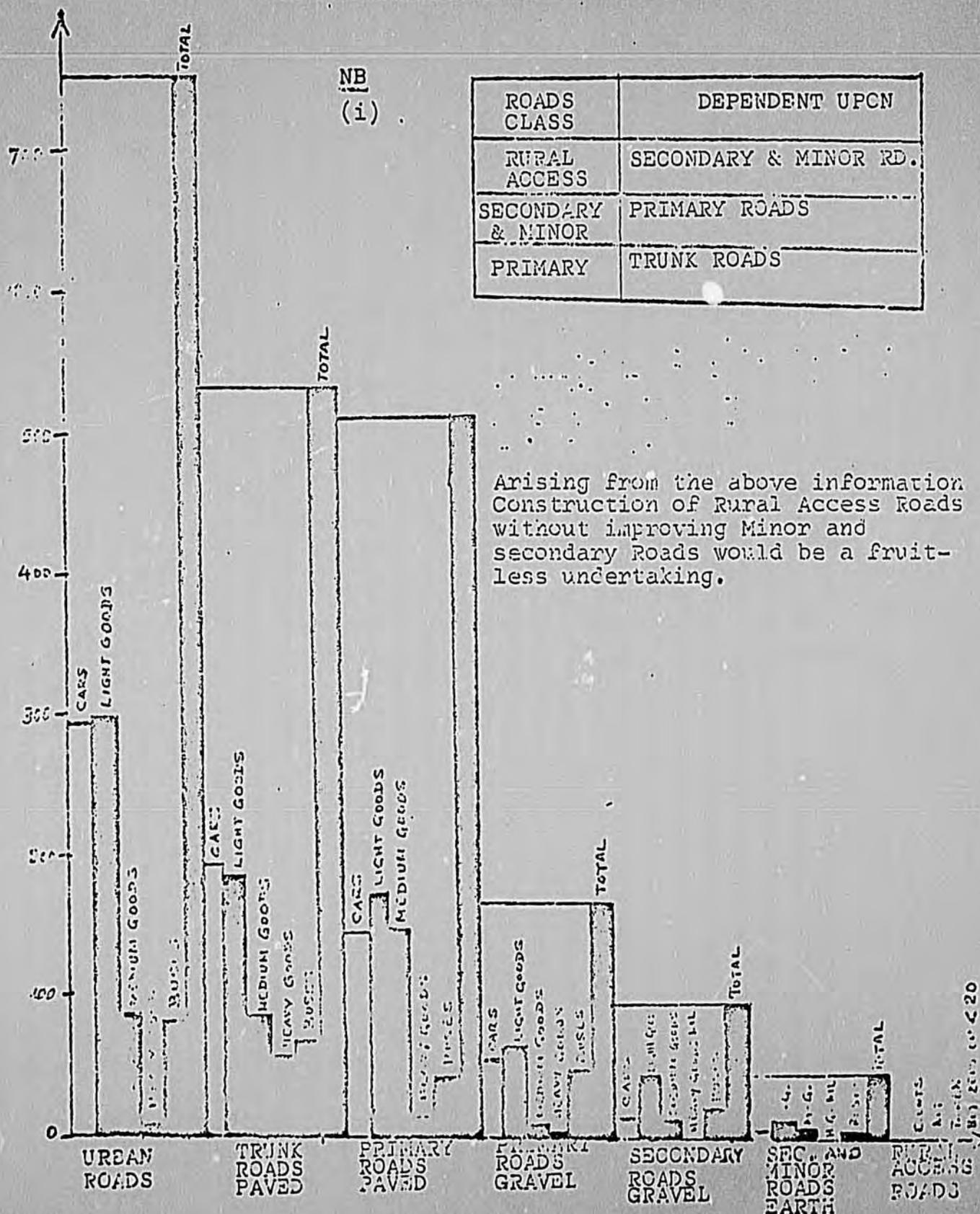


DIAGRAM 6.1

TABLE 6.5

BASE YEAR TRAFFIC 1975 A.A.D.T FOR

OTHER REPRESENTATIVE

TRUNK AND PRIMARY ROADS

BUNGOMA DISTRICT

ROAD NO. & SURFACE CONDITION	ROAD DESCRIPTION	1974 A.A.D.T.					
		C	L.G	M.G	H.G	B	T
A 104 (Paved)	Webuye - Malaba	188	174	74	39	41	516
C 44 (Gravel)	Naitiri - Turbo	25	35	26	0	2	88
C 42 (Gravel)	Malikisi - Kamakoiwa	38	54	15	1	43	151
C 31 (Gravel)	Mumias - Busia	71	109	50	3	20	253
C 33 (Paved)	Mumias - Bungoma	138	176	138	19	40	511
C 33 (Gravel)	Bungoma - Chwele	40	50	9	1	30	130
C 32 (Gravel)	Kimaeti - Malikisi	22	58	22	0	14	116

6.6 — PROPOSED IMPROVEMENTS:

In choosing alignments consideration would be given to economy, consistent with obtaining minimum alignments which are satisfactory from an engineering aspect. In all cases the vertical alignments of sunken routes would be raised to improve drainage and efforts would be made to improve horizontal alignments where these have been particularly poor. However, it is considered that the essential aim of the project is to improve selected secondary and minor roads almost solely to facilitate the needs of small scale farmers living in the rural areas and to do this as economically as possible within the confines of reasonable engineering practice.

In the interest of the economy, and to reduce the extent of land acquisition, the existing horizontal alignments will be adhered to as closely as possible.

6.7 — ROAD MAINTENANCE POLICY:

In developing countries, the dependence of maintenance on local budget allocation, the reluctance, until recently, of donor agencies to consider maintenance financing compared with new construction, militate against it when scarce capital resources are allocated among competing needs.

Despite the above mentioned constraints however, and in recognition of the economic fact that the highest returns on expended resources can be realized by adequately maintaining existing facilities, Governments of developing countries, and Kenya is no exception, are devoting increasing attention to the protection of their earlier investments by taking one or both of the following measures:

- i) Allocating, to the limit of their financial capabilities, funds out of their local budgetary resources; and
- ii) Soliciting international and/or bilateral assistance for strengthening their maintenance capabilities and organizational set-ups.

The following table illustrates the routine maintenance and regravelling costs on existing roads at 1975 Rates:

TABLE 6.6

ROAD TYPE AND A.D.T.	MAINTENANCE COST PER YEAR PER/KM (K£)	REGRAVELLING CYCLES (YEARS)
1. GRAVEL ROADS:		
0 - 50 v.p.d	100	-
51 - 100	150	-
101 - 200	190	-
201 - 300	230	-
301 AND OVER	250	-
2. REGRAVELLING:		
0 - 100		10
101 - 200	1,400	6
201 AND OVER		4

The above principle is likely to be applicable to the Secondary and Minor roads which are to be gravelled.

6.8 — VEHICLE OPERATING COSTS:

Table 6.7 depicts the 1976 vehicle operating costs for five types of vehicles on seven standards of roads varying from unimproved track (G0) to higher standard bitumen (B1).

This table is included purposely in this report in order to indicate the general magnitude of vehicle operating costs on the proposed roads which now fall between G 1 and G 2 standards.

TABLE 6.7

VEHICLE OPERATING COSTS(AS AT 1ST JANUARY, 1976)

Kshs.						
ROAD STANDARD	AVERAGES SPEED (KM/H)	CARS	LIGHT GOODS	MEDIUM GOODS	HEAVY GOODS	BUSES
G 0	20	1.00	1.04	2.23	4.01	2.40
G 1	30	0.90	0.96	2.02	3.65	2.40
G 2	45	0.80	0.86	1.80	3.30	1.98
G 3	60	0.71	0.78	1.61	2.95	1.78
G 4	70	0.63	0.66	1.39	2.63	1.56
B II	80	0.56	0.59	1.26	2.43	1.42
B I	100	0.50	0.52	1.13	2.25	1.28

G 0 = Unimproved track

G 1 = Slightly improved track

G 2 = Improved track

G 3 = Slightly improved gravel track

G 4 = Improved gravel road

G I = Higher Bitumen (7.0m carriageway)

G II = Lower Bitumen (6.0m carriageway)

6.9 — ANTICIPATED EXPENDITURE FOR THE GRAVELLING AND
RURAL ACCESS ROADS PROGRAMME(SPECIAL PURPOSE ROADS)

TABLE 6.6

Y E A R	GRAVELLING K£	RURAL ACCESS K£	TOTAL K£
1976 - 77	9,820,000	1,500,000	11,320,000
1977 - 78	6,900,000	3,000,000	9,900,000
1978 - 79	2,800,000	5,400,000	8,200,000

7.--ECONOMIC IMPACT OF THE GRAVELLING PROGRAMME

Arising from the information available it can be deduced that the potentials for development exist in the selected, representative district of Bungoma, and that the benefits accruing from the improvement of Secondary and Minor Roads in the district in question would be two-fold namely:-

1. Direct Benefits (Primary Benefits)

These include reduced vehicle operating expenses to the users of the improved facilities, savings in time for both passengers and freight, fewer accidents and less damage to goods, reduced maintenance costs, increased comfort, reliability and convenience.

2. Indirect Benefits (Secondary Benefits)

Include, among others, the agricultural production surpluses or development benefits and increases in the value of properties located within the zones of influence of the roads or changes in the activities of traders or other groups established alongside the improved roads. By and large there will be increase in income of the people in the area, resulting in increase in consumption which, in turn, will give rise to additional employment, income, and consumption. This multiplier effect of the Graveling Programme is an additional benefit since the obstacle to expansion as earlier indicated in chapter five of this report is basically the poor condition of the Minor and Secondary Roads which form the back-bone of road network in the rural areas where between 80 and 90 percent of Kenya's population live.

CHECKLIST OF STATUTORY CRITERIA

In the right-hand margin, for each item, write answer or, as appropriate, a summary of required discussion. As necessary, reference the section of the Capital Assistance Paper, or other clearly identified and available document, in which the matter is further discussed.

The following abbreviations are used in the checklist:

FAA - Foreign Assistance Act of 1961, as amended

FAA, 1973 - Foreign Assistance Act of 1973

App. - Foreign Assistance and Related Program Appropriation Act, 1974

MMA - Merchant Marine Act of 1936, as amended.

I. FULFILLMENT OF STATUTORY OBJECTIVES

A. Needs Which the Loan is Addressing

1. FAA Section 103. Discuss the extent to which the loan will alleviate starvation, hunger and malnutrition, and will provide basic services to poor people enhancing their capacity for self-help.

2. FAA Section 104. Discuss the extent to which the loan will increase the opportunities and motivation for family planning; will reduce the rate of population growth; will prevent and combat disease; and will help provide health services for the great majority of the population.

3. FAA Section 105. Discuss the extent to which the loan will reduce illiteracy, extend basic education, and increase manpower training in skills related to development.

4. FAA Section 106. Discuss the extent to which the loan will help solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development.

Kenya does not have a starvation problem and the loan therefore does not address this issue. However, the loan is designed to assist substantial elements of the rural farm population in need of agricultural goods and services to enable them to improve their performance. The improved road linkages between remote areas and main marketing centers will help farmers receive increased services and, at the same time, integrate them more fully into the market economy.

Not applicable.

Not applicable.

The GBC project will improve small holder access to markets and to government technical and social services.

5. FAA Section 107. Discuss the extent to which the loan will support the general economy of the recipient country; or will support development programs conducted by private or international organizations.

B. Use of Loan Funds

1. FAA Section 110. What assurances have been or will be made that the recipient country will provide at least 25% of the costs of the entire program, project or activity with respect to which such assistance is to be furnished under Sections 103-107 of the FAA?

2. FAA Section 111. Discuss the extent to which the loan will strengthen the participation of the urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.

3. FAA Section 112. Will any part of the loan be used to conduct any police training or related program (other than assistance rendered under Section 515(c) of the Omnibus Crime Control and Safe Streets Act of 1968 or with respect to any authority of the Drug Enforcement Administration of the FBI) in a foreign country?

4. FAA Section 113. Describe the extent to which the programs, projects or activities to be financed under the loan give particular attention to the integration of women into the national economy of the recipient country.

The loan will be used to provide, in conjunction with other contemplated assistance, an all-weather road linkage between smallholder farmers and existing and projected rural roads network. The effect will be to aid diversification of Agriculture, expand farmer's access to markets, and support the provision of social services to smallholders.

^{43.2}
The Kenya Government is providing \$3.087 million (26% of total project cost) towards the financing of the recurrent costs of the project and the procurement of certain equipment

The rural poor will benefit from the greater accessibility of local, regional and national markets, and, thus, more fully integrate the farmer into the development process.

No.

The loan will have an impact on both men and women alike. See Social Soundness Analysis.

5. FAA Section 114. Will any part of the loan be used to pay for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?

II. COUNTRY PERFORMANCE

A. Progress Towards Country Goals

1. FAA §§201(b)(5), 201(b)(7), 201(b)(8), 203. Discuss the extent to which the country is:

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

(b) Creating a favorable climate for foreign and domestic private enterprise and investment;

The GOK has reaffirmed its commitment to increased food crop production in the 1974-1978 Development Plan. Current budget allocations reflect that commitment. See Sessional Paper No. 4 (May, 1975), discussed in the PP Project Background Section, which notes a projected increase in expenditures in the development expenditures budget for agriculture, water and rural development. Note as well that between 1975 - 78, 44.3% of GOK budget for roads construction is to be devoted to secondary and minor roads.

Kenya has a growing economy and investment policies that are conducive to foreign investment. U.S. business investment in Kenya by more than 125 companies has doubled in the last two years and now represents an investment in excess of \$170 million. The GOK has signed an Investment Guarantee Agreement.

- (c) Increasing the people's role in the developmental process: The loan will have the effect of increasing the number of farmers integrated into the national and regional economy, as well as the rapidity with which such integration takes place.
- (d) Allocating expenditures to development rather than to unnecessary military purposes or intervention in other free countries' affairs: (d) Adverse economic conditions have forced the GOK to cut back the rate of growth in GOK expenditures on development to 7.8% and on the recurrent budget to 6.3% 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 1975 development expenditures were \$88.3 million, and defense recurrent and development expenditures \$16 million. Kenya maintains a foreign policy which emphasizes regional cooperation.
- (e) Willing to contribute funds to the project or program: The GOK will contribute \$3.087-million 26 percent of program costs.
- (f) Making economic, social and political reforms such as tax collection improvements and changes in land tenure arrangement; 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; 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.

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

The Government has and is continuing in its policy and actions to direct resources toward improving the social and economic condition of its people.

B. Relations with the United States

1. FAA Sec. 620(c). If assistance is to a government, is the government indebted to any U.S. citizen for goods or services furnished or ordered where: (a) such citizen has exhausted available legal remedies, including arbitration, or (b) the debt is not denied or contested by the government, or (c) the indebtedness arises under such government's or a predecessor's unconditional guarantee? No.

2. FAA Sec. 620(d). If the loan is intended for construction or operation of any productive enterprise that will compete with U.S. enterprise, has the country agreed that it will establish appropriate procedures to prevent export to the U.S. of more than 20% of its enterprises annual production during the life of the loan? N/A

3. FAA Sec. 620(e)(1). If assistance is to a government, has the country's government, or any agency or subdivision thereof, (a) nationalized or expropriated property owned by U.S. citizens or by any business entity not less than 50% beneficially owned by U.S. citizens, (b) taken steps to repudiate, or nullify existing contracts or agreements with such citizens or entity, or (c) imposed or enforced discriminatory taxes or other exactions, or restrictive maintenance or operation conditions? If so, and more than six months has elapsed since such occurrence, identify the document indicating that the government, or appropriate agency or subdivision thereof, has taken appropriate steps to discharge its obligations under international law toward such citizen or entity? If less six months has elapsed, what steps, if any, has it taken to discharge its obligations?

3. The U.S. Government made a tentative determination at an interagency staff meeting on Feb. 20, 1976, that an expropriation took place in the case of Mr. John Saul, a U.S. citizen who alleges that he was involuntarily divested of his mining interests in Kenya. The U.S. Government has stipulated that the GOK should accelerate its valuation of the claim and make an offer to Mr. Saul. In April 1974, Mr. Saul obtained a permit from the GOK for the mining of rubies. On June 18, 1974, he was expelled from Kenya and a mining permit for the same locations was issued to a Kenyan national. In August 1974 Mr. Saul obtained injunctive relief in regard to the establishment of the competing claim. The GOK, however, which eventually cancelled the competing claim of record, still prohibits Mr. Saul from entering Kenya and from carrying on mining operations. In Nov. 1974 the GOK entered into discussions with Mr. Saul's representatives. In the course of these discussions Mr. Saul's representative presented appraisals

3. Cont'd: of value to the GOK for its response. The GOK has not responded, explaining the delay is the result of continuing difficulty in arriving at a correct amount to offer for compensation. Information received by the Embassy on March 4, 1976, from the President's office indicated that the GOK intends to make an offer

4. FAA Sec. 620(i). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property, and failed to take appropriate measures to prevent a recurrence and to provide adequate compensation for such damage or destruction? There have been no instances in which it has been necessary for the GOK to take action in this connection.

5. FAA Sec. 620(l). Has the government instituted an investment guaranty program under FAA Sec. 221(b)(1) 234(a)(1) for the specific risks of inconvertibility and expropriation or confiscation? Yes.

6. FAA 6620(o). Fisherman's Protective Act of 1954, as amended, Section 5. Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? If, as a result of a seizure, the U.S.G. has made reimbursement under the provisions of the Fisherman's Protective Act and such amount has not been paid in full by the seizing country, identify the documentation which describes how the withholding of assistance under the FAA has been or will be accomplished. No.

7. FAA Sec. 620(n). Has the country been in default, during a period in excess of six months, in payment to the U.S. on any FAA loan? No.

8. FAA Sec. 620(t). Have diplomatic relations between the country and the U.S. been severed? If so, have they been renewed? No.

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C. Relations with Other Nations and the U.N.

1. FAA Sec. 620(i). Has the country been officially represented at any international conference when that representation included planning activities involving insurrection or subversion directed against the U.S. or countries receiving U.S. assistance?

No, as far as is known.

2. FAA Secs. 620(a), 620(n). Has the country sold, furnished, or permitted ships or aircraft under its registry to carry to Cuba or North Vietnam, items of economic, military or other assistance?

No, as far as is known.

3. FAA Sec. 620(u); App. Sec. 107. What is the status of the country's U.N. dues, assessments or other obligations? Does the loan agreement bar any use of funds to pay U.N. assessments, dues or arrearages?

Kenya has not been delinquent in any obligations to the U.N. The Loan Agreement limits the use of funds to the financing of procurement for the GEC project.

D. Military Situation

1. FAA Sec. 620(i). Has the country engaged in or prepared for aggressive military efforts directed against the U.S. or countries receiving U.S. assistance?

No.

2. FAA Sec. 620(s). What is (a) the percentage of the country's budget devoted to military purposes, and (b) the amount of the country's foreign exchange resources used to acquire military equipment, and (c) has the country spent money for sophisticated weapons systems purchased since the statutory limitation became effective?

Approximately 7% of Kenya's budget (including the Development Budget) is projected to be spent for military purposes during FY 1976. A negligible amount of foreign exchange has been spent for purchase of military equipment, none of which would fall into the classification of "sophisticated weapons".

2. (2) Is the country diverting U.S. development assistance or PL 480 sales to military expenditures?

No.

2. (3) Is the country diverting its own resources to unnecessary military expenditures? (Findings on these questions are to be made for each country at least once each fiscal year and, in addition, as often as may be required by a material change in relevant information.)

No.

III. CONDITION OF THE LOAN

A. General Soundness

Interest and Repayment

1. FAA §§201(d), 201(b)(2). Is the rate of interest excessive or unreasonable for the borrower? Are there reasonable prospects for repayment? What is the grace period interest rate; the following period interest rate? Is the rate of interest higher than the country's applicable legal rate of interest.

The loan terms are concessional and within the country's capacity to repay. The interest rate is 2% during the grace period and 3% thereafter which is below the applicable rate in Kenya.

Financing

1. FAA §201(b)(1). To what extent can financing on reasonable terms be obtained from other free-world sources, including private sources within the 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 U.S. sources do not provide financing of this type.

Economic and Technical Soundness

1. FAA §§201(b)(2), 201(c). The activity's economic and technical soundness to undertake loan; does the loan application, together with information and assurances, indicate that funds will be used in an economically and technically sound manner?

Yes.

2. FAA 8611(a)(1). Have engineering, financial, and other plans necessary to carry out assistance, and a reasonable firm estimate of the cost of assistance to the U.S., been completed? **Yes.**

3. FAA 8611(b); App. 0201. If the loan or grant is for a water or related land-resources construction project or program, do plans include a cost-benefit computation? Does the project or program meet the relevant U.S. construction standards and criteria used in determining feasibility?

The loan is not related to water or land resources construction.

4. FAA 8611(c). If this is a Capital Assistance Project with U.S. financing in excess of \$1 million, has the principal A.I.D. officer in the country certified as to the country's capability effectively to maintain and utilize the project?

Yes. See ANNEX of Project Paper.

B. Relation to Achievement of Country and Regional Goals

Country Goals

1. FAA 88207, 291(a). What is this loan's relation to:

(a) Institutions needed for a democratic society and to assure maximum participation on the part of the people in the task of economic development?

Not Applicable

(b) Enabling the country to meet its food needs both from its own resources and through development, with U.S. help, of infrastructure to support increased agricultural productivity?

This assistance is directly focused on the development of all-weather roads in certain agricultural areas in Kenya. As such, it will enable increased amounts of foodstuffs to be marketed and will encourage increased food production.

(c) Meeting increasing need for trained manpower?

Not applicable.

(d) Developing programs to meet public health needs?

Not applicable.

The loan will be used to expand Kenya's existing all-weather roads network.

(e) Assisting other important economic, political, and social development activities, including industrial development, growth of free labor unions; cooperatives and voluntary agencies; improvement of transportation and communication systems; capabilities for planning and public administration; urban development; and modernization of existing laws?

2. FAA §201(b)(4). Describe the activity's consistency with and relationship to other development activities, and its contribution to realizable long-range objectives.

Although Kenya has a moderate but growing industrial base and an important tourist industry, agriculture is and will remain for some time as the main economic activity of the economy. Government planning and programs reflect this reality. This loan is accordingly consistent with those plans and programs.

3. FAA §201(b)(9). How will the activity to be financed contribute to the achievement of self-sustaining growth?

By providing some of the prerequisites to an expanded and viable agricultural sector.

4. FAA §201(f). If this is a project loan, describe how such project will promote the country's economic development, taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development.

See Sec. II.B-C of Project Paper

5. FAA §201(b)(3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities?

As a result of increased access to rural areas, the GOK may more easily exploit the development potential of the project area.

6. FAA 8281(b). How does the program under which assistance is provided recognize the particular needs, desires, and capacities of the country's people; utilize the country's intellectual resources to encourage institutional development; and support civic education and training in skills required for effective participation in political processes.

See Sec. III.D. of Project Paper.

7. FAA 8601(a). How will this loan encourage the country's efforts 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?

By (a) fostering the increase of agricultural output of some of the crops that have export market or potential; (b & c & d) not applicable; (e) encourage greater use of market facilities on a larger scale than at present, and the use of inter and intra regional commercial facilities; (f) not applicable.

8. FAA §202(a). Indicate the amount of money under the loan which is: going directly to private enterprise; going to intermediate credit institutions or other borrowers for use by private enterprise; being used to finance imports from private sources; or otherwise being used to finance procurements from private sources.

No loan funds will go directly to private enterprises; Most procurement financed by this loan will be from U.S. source, although there will be some procurement of Code 935 off-shelf items. See, generally, PP procurement section.

9. FAA §611(a)(2). What legislative action is required within the recipient country? What is the basis for a reasonable anticipation that such action will be completed in time to permit orderly accomplishment of purposes of loan?

No legislative action required.

Regional Goals

1.. FAA §619. If this loan is assisting a newly independent country, to what extent do the circumstances permit such assistance to be furnished through multilateral organizations or plans?

Not applicable.

2. FAA §209. If this loan is directed at a problem or an opportunity that is regional in nature, how does assistance under this loan encourage a regional development program? What multilateral assistance is presently being furnished to the country?

The loan does not address a regional problem. The U.N., World Bank, W.H.O. and F.A.O provide assistance to Kenya.

C. Relation to U.S. EconomyEmployment, Balance of Payments,
Private Enterprise.

1. FAA §3201(b)(6); 102. What are the possible effects of this loan on U.S. economy, with special reference to areas of substantial labor surplus? Describe the extent to which assistance is constituted of U.S. commodities and services, furnished in a manner consistent with improving the U.S. balance of payments position.

Most procurement, except for off-shelf items, will be of U.S. source and origin. Approximate amount of procurement from U.S. source is \$U.S. 5.0 million.

2. FAA §3612(b); 635(h). What steps have been taken to assure that, to the maximum extent possible, foreign currencies owned by the U.S. and local currencies contributed by the country are utilized to meet the cost of contractual and other services, and that U.S. foreign owned currencies are utilized in lieu of dollars?

U.S.-owned local currencies are not available. Kenya Government Agricultural Budget expenditures in FY-1975 were \$63 million in local currency.

3. FAA §601(d); Ann. 5108. If this loan is for a capital project, to what extent has the Agency encouraged utilization of engineering and professional services of U.S. firms and their affiliates. If the loan is to be used to finance direct costs for construction, will any of the contractors be persons other than qualified nationals of the country or qualified citizens of the U.S.? If so, has the required waiver been obtained?

Complimentary grant funds will / finance technical assistance from a U.S. engineering firm.

No. Not Applicable

4. FAA §608(a). Provide information measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items.

Not applicable.

5. FAA §602. What efforts have been made to assist U.S. small business to participate equitably in the furnishing of commodities and services financed by this loan?

Standard AID procedures regarding small business participation will be followed as applicable.

6. FAA §621. If the loan provides technical assistance, how is private enterprise on a contract basis utilized? If the facilities of other Federal agencies will be utilized, in what ways are they particularly suitable; are they competitive with private enterprise (if so, explain); and how can they be made available without undue interference with domestic programs?

The loan does not provide for technical assistance, however the complimentary grant component will finance technical services which will be procured on a competitive basis under standard AID procurement rules.

7. FAA §611(c). If this loan involves a contract for construction that obligates in excess of \$100,000, will it be on a competitive basis? If not, are there factors which make it impracticable?

Not applicable.

8. FAA §601(b). Describe the efforts made in connection with this loan to encourage and facilitate participation of private enterprise in achieving the purposes of the Act.

Standard AID contracting procedures will be used throughout with regard to off-shore procurement.

Procurement

1. FAA §604(a). Will commodity procurement be restricted to U.S. except as otherwise determined by the President?

In the main, source of equipment will be largely from the U.S. The authority has been asked to procure from Code 941 and Kenya sources, as well. A modest amount of commodities to be procure as shelf items will be of Code 935 origin.

2. FAA §604(b). Will any part of this loan be used for bulk commodity procurement at adjusted prices higher than the market price prevailing in the U.S. at time of purchase?

No.

3. FAA §604(e). Will any part of this loan be used for procurement of any agricultural commodity or product thereof outside the U.S. when the domestic price of such commodity is less than parity?

No.

4. FAA §604(f). Will the agency receive the necessary pre-payment certification from suppliers under a commodity import program agreement as to description and condition of commodities, and on the basis of such, determine eligibility and suitability for financing?

Not applicable.

D. Other Requirements

1. FAA §201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year?

Yes.

2. App. §105. Does the loan agreement provide, with respect to capital projects, for U.S. approval of contract terms and firms?

Yes.

3. FAA §620(k). If the loan is for construction of a production enterprise, with respect to which the aggregate value of assistance to be furnished will exceed \$100 million, what preparation has been made to obtain the express approval of the congress?

Not applicable.

4. FAA §620(b), 620(f);
Has the President determined that the country is not dominated or controlled by the international Communist movement? If the country is a Communist country (including, but not limited to, the countries listed in FAA §620(f)) and the loan is intended for economic assistance, have the findings required by FAA §620(f) and App. §109(b) been made and reported to the Congress?

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

5. FAA Section 620(h). What steps have been taken to insure that the loan will not be used in a manner which, contrary to the best interest of the United States, promotes or assists the foreign aid projects of the Communist-bloc countries?

The standard A.I.D. loan provision will prohibit the comingling of communist block aid.

6. FAA Section 536(i). Will any part of this loan be used in financing non-U.S. manufactured automobiles? If so, has the required waiver been obtained?

No.

7. FAA Section 620(g). Will any part of this loan be used to compensate owners for expropriated or nationalized property? If any assistance has been used for such purpose in the past, has appropriate reimbursement been made to the U.S. for sums diverted?

No.

8. FAA Section 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise?

Certain construction and construction supervision tasks will be performed by local contractors. See p. 53 of Project Paper.

9. App. Section 103. Will any funds under the loan be used to pay pensions, etc., for persons who are serving or who have served in the recipient country's armed forces?

No.

10. MMA Section 901.b. Does the loan agreement provide for compliance with U.S. shipping requirements that at least 50% of the gross tonnage of all commodities financed with funds made available under this loan (computed separately by geographic area for dry bulk carriers, dry cargo liners, and tankers) be transported on privately-owned U.S. flag commercial vessels to the extent such vessels are available at fair and reasonable rates for U.S. flag vessels and that at least 50% of the gross freight revenue generated by all shipments financed with funds made available under this loan and transported on dry cargo liners be paid to or for the benefit of privately-owned U.S. flag commercial vessels?

The standard A.I.D. loan provision will provide for compliance with U.S. shipping requirements.

11. FAA Section 491. Has the Preside
determined that the recipient country has
failed to take adequate steps to prevent
narcotic drugs produced or procured in, 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
United States unlawfully?

No.

12. App. Section 110. Is the loan
being used to transfer funds to world
lending institutions under FAA Sec. 209(d)
and Sec. 251(h)?

No.

13. App. Section 601. Are any of these
funds being used for publicity or
propaganda within the United States?

No.

14. FAA Section 612(d) and Section 40
of PL 93 189 (FAA of 1973). Does the United
States own host country excess foreign
currency and, if so, what arrangements
have been made for its release in compliance
with Section 40 (FAA of 1973)?

No.

15. FAA Section 604(d). Will provisions
be made for placing marine insurance in the
U.S. if the recipient country discriminates
against any marine insurance company
authorized to do business in the U.S.?

Standard A.I.D. loan provisions
will so provide.

16. Section 29 of PL 93 - 189
(FAA of 1973). Is there a military
base located in the recipient country
which base was constructed or is being
maintained or operated with funds
furnished by the U.S., and in which U.S.
personnel carry our military operations?
If so, has a determination been made
that the government of such recipient
country has, consistent with security,
authorized access to such military base
on a regular basis to bona fide news
media correspondents of the U.S.?

Not applicable.

17. FAA Section 640(e). Will a
grant be made to the recipient country
to pay all or part of such shipping
differential as is determined by the
Secretary of Commerce to exist between
U.S. foreign flag vessel charter or
freight rates?

No.

18. App. Section 113. Will any of the loan funds be used to acquire currency of recipient country from non-U.S. Treasury sources when excess currency of that country is on deposit in U.S. Treasury?

No.

19. App. Section 114. Have the House and Senate Committees on Appropriations been notified five days in advance of the availability for obligation of funds for the purposes of this project?

Such notification will be made.

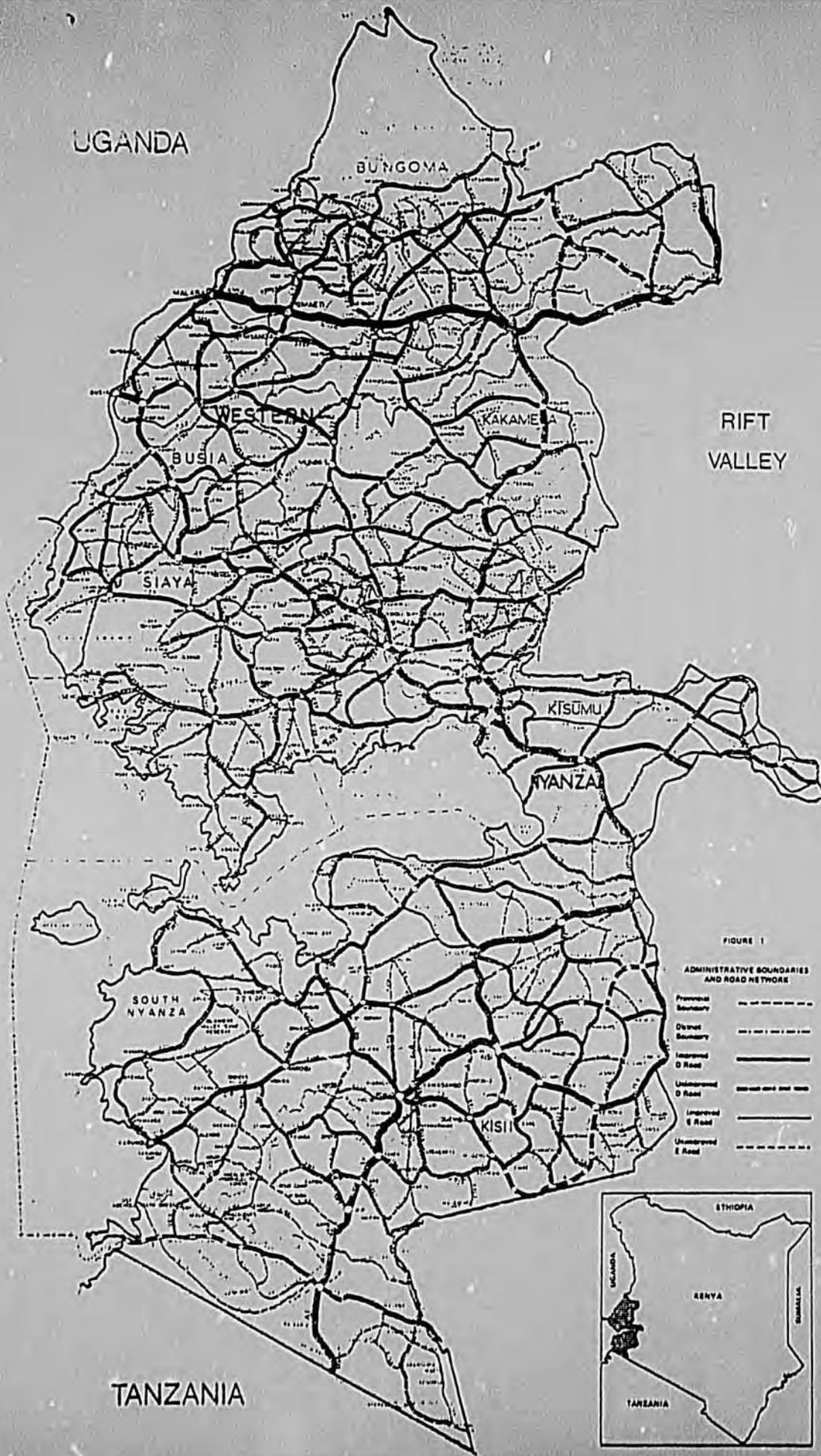


FIGURE 1

ADMINISTRATIVE BOUNDARIES AND ROAD NETWORK

- Provincial Boundary
- District Boundary
- Improved D Road
- Unimproved D Road
- Improved E Road
- Unimproved E Road

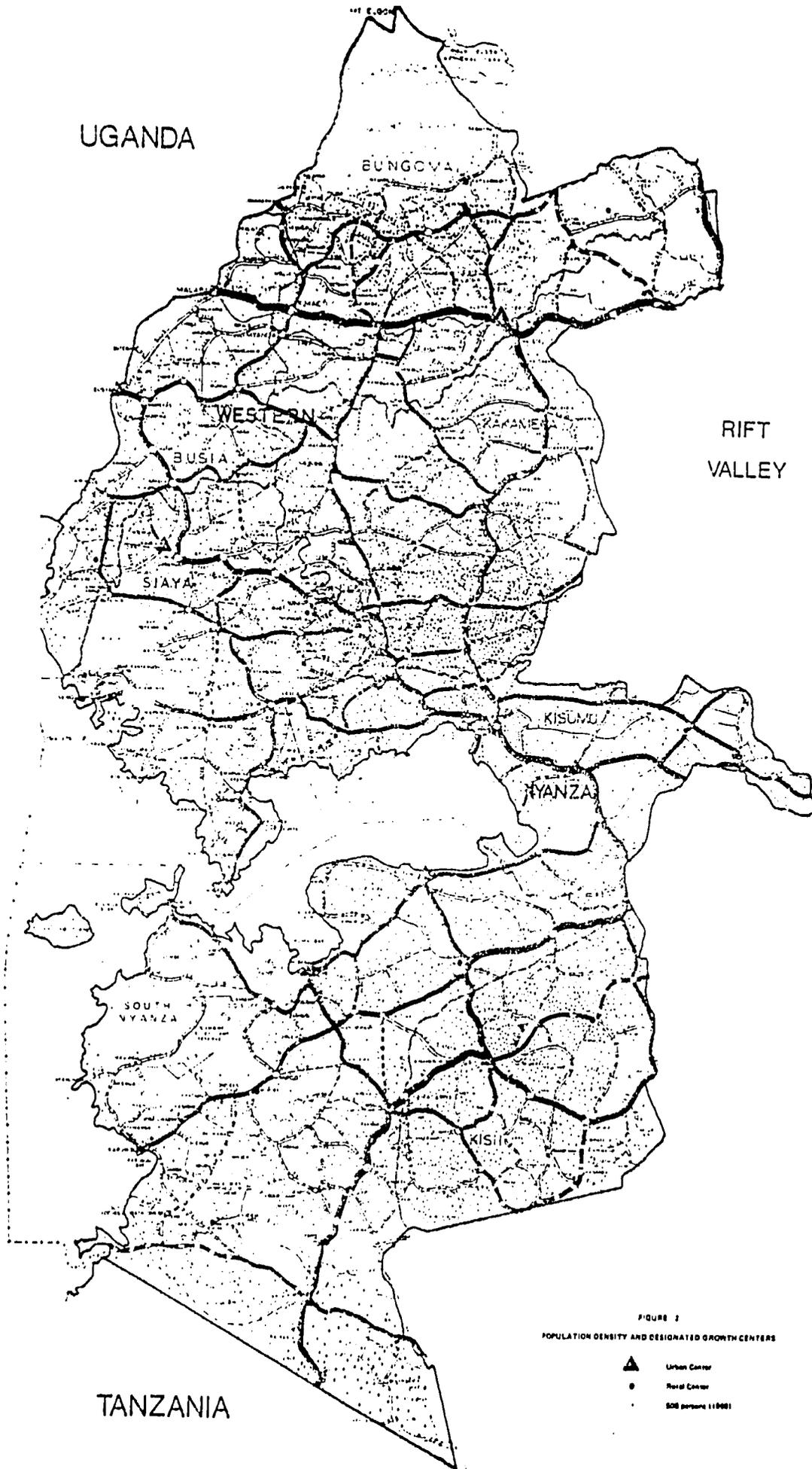
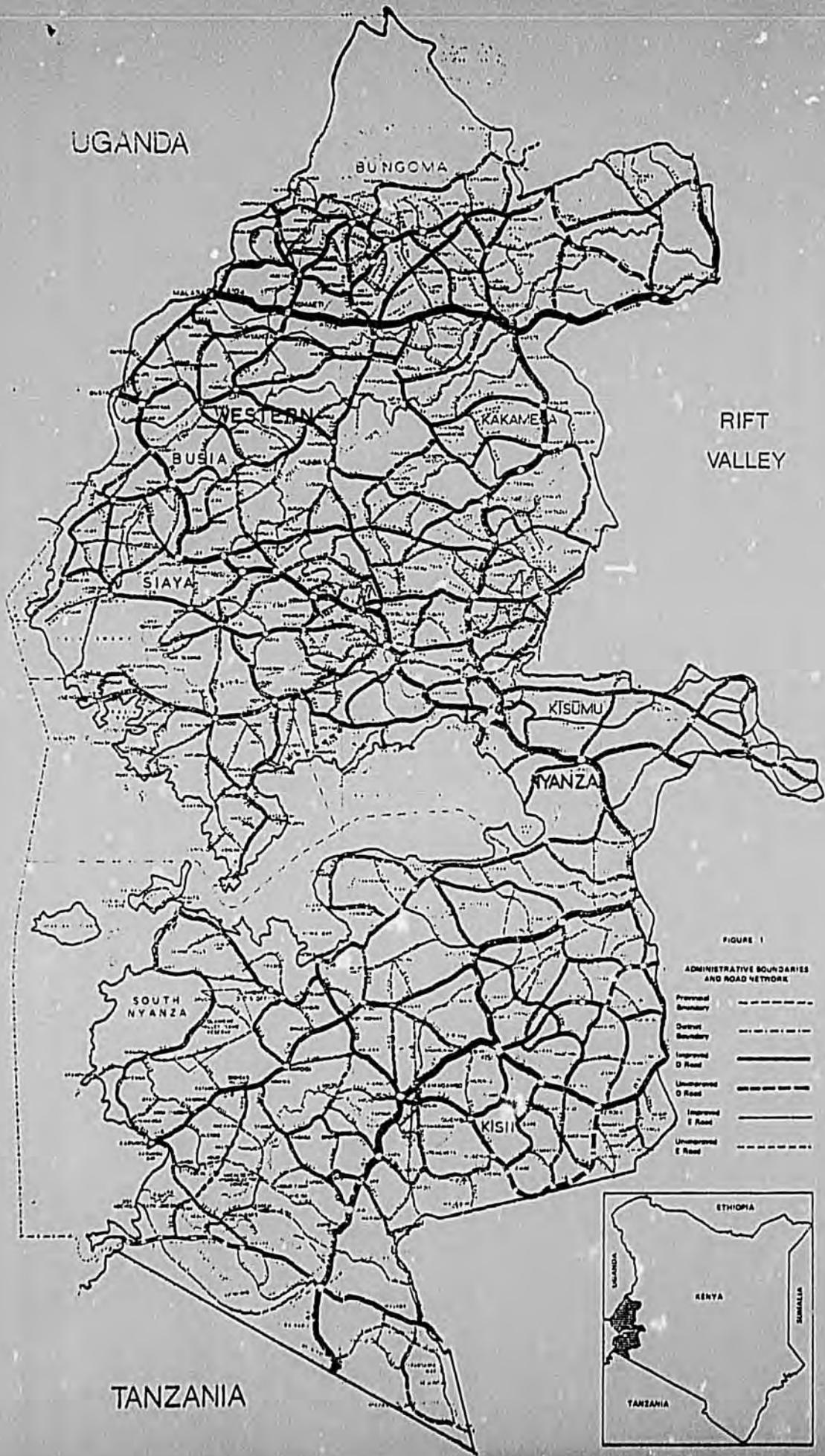


FIGURE 2
POPULATION DENSITY AND DESIGNATED GROWTH CENTERS

- ▲ Urban Center
- Rural Center
- + SOE persons (11000)



RIFT VALLEY

FIGURE 1

ADMINISTRATIVE BOUNDARIES AND ROAD NETWORK

- Provincial Boundary ————
- County Boundary - - - - -
- Improved D Road —————
- Unimproved D Road - - - - -
- Improved E Road —————
- Unimproved E Road - - - - -



TANZANIA

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I. Introduction

A. Relation of Addendum to the GBC Project Paper.

The present addendum modifies the GBC project paper submitted by (USAID-Nairobi) to (AID-Washington) AFR/ESA on March 5, 1976. The sections of this addendum supplement or replace sections of the original PP as indicated parenthetically throughout the text.

The original amount of the loan for materials and equipment remains the same, although a minor modification was made in the type of materials to be supplied under the loan as specified in section IV E. In addition, a program evaluation element was added to the loan in order to help ensure that the engineering and socio-economic objectives of the program are achieved and to provide early feedback on the improvement selection criteria and to recommend improvements in engineering procedures, if required. This element consists of \$141,000 in additional technical assistance and \$69,000 in logistics support for MOW data gathering.

B. Meetings

In order to prepare this addendum the consultant team of P. Cook-Economist, C. Cook-Sociologist, J. Malone-Engineer and H. Kurzman -Team Leader and L. Etryang-research assistant, participated in a number of meetings both individually and as a group. These meetings included the following persons:

1. Ministry of Works

- a) Mr. Radier , Chief Roads Division - Nairobi
- b) Mr. Dennis , Chief Special Projects Branch - Nairobi
- c) Mr. Wambura, Chief Planning Officer
- d) Mr. Omolo , Chief Maintenance Division
- e) Mr. Wabuke , Chief Development Engineer
- f) Mr. Benn , Project Engineer, CIDA GBC unit
- g) Mr. Vedal , Provincial Engineer - Nyanza & Western
- h) Mr. Gjos , Maintenance Engineer
- i) Mr. Weinholst, Planning Officer

2. Provincial Administration

- a) Mr. Mburu - Provincial Commissioner - Western
- b) Mr. Cheluget- " " Nyanza
- c) Mr. Milne - Technical Advisor to the P.P.O. Nyanza
- d) Mr. Kidenda-Provincial Planning Officer - Western
- e) Several members of the Provincial Development Committee in Western Province
- f) Mr. Borgetet - District Development Officer - Kakamega
- g) Mr. Ogol - District Commissioner - South Nyanza
- h) Dr. Ochina - Area Coordinator - Vihiga SRDP
- i) Mr. Wanjala - Area Coordinator - Migori SRDP
- j) Most members of the Vihiga SRDP coordinating committee
- k) Dr. Arnborg - former advisor to Migori SRDP
- l) Mr. Bartola - roads engineer Vihiga SRDP
- m) Mr. Adula - Vihiga SRDP Administrator

These meetings took place over the period July 2, 1976 to July 29, 1976 and information obtained in them greatly facilitated our work. Cooperation with MOW officials was excellent at all levels and this was greatly appreciated by the team.

C. Field Trip Observations

(p.p., p.24, before C(Constr. Methods)

The roads inspected during this field trip were but a small fraction of the 6151 Kms of D and E roads. However, the itinerary was chosen to include a mix of conditions of terrain, soils types, and rainfall patterns that would be representative of the general conditions in the two provinces. Areas of heavy, sparse, and moderate population densities in Nyanza were included; only the densely populated sections of Western Province were accessible at the season and in the time available.

The condition of the roads varied from excellent, through passable to our vehicles (a Toyota Land Cruiser and a Land Rover), to impassable. In some areas the subgrade of a firm mix of small boulders in sandy-clay soils needed only some culverts and "gravel" surfacing to be good all-weather roads. In other areas, reshaping and gravelling had been done in recent years and these were very good roads where speed of 60 Km/hr or greater could be maintained. Other roads with the same subgrade conditions were so rutted by water erosion due to lack of culverting, good ditching, or both, that passage was difficult. Still others, in the "black cotton soil" areas were gullied, crevassed, and cut by the rains so that no passage was possible.

One D road which we traversed in Southern Nyanza was only a track scratched out of the plain. There were innumerable ruts, holes, and rain-cut channels that made progress slow and painful with much shifting into low gear. After some 50 kilometers of this we turned off on E-117 to bypass a loop in the D roads and save some time. Two kilometers along this track (in a "black cotton" soil area) and we could go no farther, the road being cut ahead and one of our vehicles mired in a longitudinal crevasse over a meter in depth. Getting turned around and out of the area took hours of effort with 2 vehicles (with two very skillful drivers), a tow-cable, and the muscle power of some villagers. This was on a classified road, E-117, and any Rural Access Road that might connect to such a track would certainly fail in its purpose of getting produce to market economically. On the slopes of Mt. Elgon the problem is one of steep slopes, heavy rains and the consequent fast run-off; despite firm sub-soils, the lack of culverts gives rise to complete washouts of the roads at low points, isolating large areas of densely populated and intensively cultivated land from schools, markets and social services.

II. General Project Description Supplement

A. Description of the Project Area

The approximately 1300 km. of specific roads or sections of roads to be gravelled under this loan will be selected as part of project implementation from 1,902 km. of existing secondary roads and 4,294 km. of existing minor roads in Western and Nyanza Provinces. With such a broad choice available it is impossible to provide detailed descriptions of the country side through which the project roads will pass or to identify specifically the people whose lives and livelihood will be touched by them. However, gravelling operations are expected to take place in each of the three districts of Western Province (Busia, Bungoma, and Kakamega) and the four districts of Nyanza Province (Kisii, Kisumu, Siaya and South Nyanza) which are highly diverse. For this reason a brief description of each district will be given following a general description of characteristics common to the whole project area.

Kenya has a land area of about 570,000 square kilometers and a population of about 13 million (1975 estimated) growing at about 3.5 percent a year. This high growth rate is largely attributable to one of the highest female fertility rates in the world (1969 average of 7.6 children per woman reaching age 50), a high crude high rate of 50 per 1,000 population, and a low and falling crude death rate of 17 per 1,000 as of the 1969 census. More recent data suggests the crude death rate may now be closer to 10 per 1,000.

According to the 1969 census, some 3,450,000 people then lived in the project area (Western and Nyanza provinces), or about 32% of the total population of the country at that time. The project area occupies only 3.6% of the nation's land area, resulting in uniformly high population densities when compared to the national norm (see Table 1). More recent estimates of population density range from 146 in Busia District and 147 in Bungoma and South Nyanza Districts to 278 in Kakamega District and 379 in Kisii District. The latter has the highest density in the country with the exception of the urban centers of Nairobi and Mombasa.

As of 1969, only three population centers contained more than 5,000 people: Kisumu, the nation's fourth largest city, with a population of over 32,000; Kakamega and Kisii with slightly over 6,000 each. Kisumu, formerly the capital city for both areas, is now the capital of Nyanza Province, while Kakamega is the capital of Western Province. The total population of these major towns then constituted less than 2% of the regional population. Since 1969 other centers may have entered this category (Bungoma, Mumias, and Homa Bay are possible candidates), but the population of the project area is still overwhelmingly rural in nature.

Figure 1 shows the project area, the road network, a major administrative divisions, and the project area in relation to the nation and its neighbors. Figure 2 shows designated urban and rural centers as well as population density in the project area.

TABLE 1

DEMOGRAPHIC FEATURES OF THE PROJECT AREA

District	Land Area (1) (km ²)	Population(1) (x10 ³)	Pop Density(1) (per km ²)	Population per km ² of Agricul tural Land(1)*	1962-1969 Pop Growth (2) (av. annual rate)	Estimated (3) Growth Rate 1969-1976
Bungoma	3,074	345	112	138	6.4	5.0
Busia	1,629	200	123	128	2.4	2.5
Kakamega	3,520	783	222	232	3.8	3.9
Kisii	2,196	675	307	326	4.8	3.8
Kisumu	2,093	401	193	190 **	4.0	3.7
Siaya	2,523	383	151	170	2.4	2.5
S. Nyanza	5,714	663	116	118	4.6	4.5
Project Area	20,749	3450	166	175	3.8	3.8
Nationwide	570,000	10,830	19	70	3.5	3.5

* Includes cultivated land and grazing land, 1969/70

** Estimates of agricultural land exceed total land area.

(1) Source: Central Bureau of Statistics,
Statistical Abstract, 1975.

(2) Source: Provincial Physical Development Plans, 1970

(3) Consultant's estimates and District Development Plans.

Description of the Project Area (cont..)

Despite its current high population density, the project area presents an opportunity for growth through more intensive exploitation of its agricultural potential. In part because of its high annual rainfall and the nature of the soils, land in much of Western Province and most of Nyanza Province is classified as having a high potential for agricultural production with remaining areas classed as medium potential. Two crops a year are harvested in the high density areas.

Altitude is the principal determinant of 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-May i.e. the "long rains", and, secondarily, in November-December, the "short rains". January and July are the driest months.

In Western Province Kakamega and Bungoma Districts are predominantly high zones, receiving a large amount of rain, while Busia District is lower, Kisii District is the high area for Nyanza Province, with Kisumu, Siaya and South Nyanza classified as low. 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. (Figure 3)

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. Kisii District is currently one of the most highly developed districts in the country. Farmers there have benefited more from improved technology, have upgraded their cattle to a much greater extent, and have more advanced farm institutions, such as coffee cooperatives. In part, this is a reflection of the characteristic willingness of the Gusii people, the majority group of the district, to accept and practice a broad range of innovations as quickly as they become available.

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. had been registered by smallholders by the end of 1974 (see table 2). There are a total of about 240,000 holdings averaging about 3 hectares in size, although in the most densely settled areas

(1) Source: Central Bureau of Statistics, Statistical Abstract 1975, Table 5

TABLE 2

LAND TENURE AND LAND USE
AS OF 12/31/74 (1)

DISTRICT	AGRICULTURAL LAND			OTHER LAND USES					TOTAL	TOTAL LAND AREA
	Reserved for small holders		OTHER	Forest reserves	Other reserves	Townships	Alienated land	Parks and game reserves		
	REGISTERED	UNREGISTERED								
Bungoma	1,749 (56.9%)	373 (12.1%)	342 (11.1%)	549	6	31	32	2	610 (19.8%)	3074
Busia	1,324 (81.3%)	303 (18.6%)	-	-	2	-	-	-	2 (0.1%)	1629
Kakamega	2,171 (61.7%)	482 (13.7%)	453 (12.9%)	327	2	50	35	-	414 (11.8%)	3520
Kisii	1,684 (76.7%)	234 (10.7%)	179 (8.2%)	1	-	29	69	-	99 (4.5%)	2196
Kisumu	233 (11.1%)	1,145 (54.7%)	63 (3.0%)	-	28	425	199	-	652 (31.2%)	2093
Siaya	970 (38.4%)	1,508 (59.8%)	-	-	-	4	41	-	45 (1.8%)	2523
S. Nyanza	1,637 (28.6%)	3,822 (66.9%)	11 (0.2%)	8	4	6	121	119	244 (4.3%)	5714
Project Area	8895 (42.9%)	7867 (37.9%)	2021 (9.7%)	885	38	545	487	121	20 (9.5%)	20,749

Description of the Project Area (cont..)

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 farm size 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 than in more prosperous areas of the country.

The bulk of the Province's population falls into the "working poor" category (as defined by a 1972 ILO/UNDP study) with income of less than K. Sterling 60 per year (at 1972 exchange rate of 1 KE = \$ 2.80, this is about \$ 168). The IBRD has more recently estimated the poverty level at \$ 122 but has also concluded that to produce a "minimum acceptable income" (about \$ 196 per year) with current practices, the province could accommodate only about 234,000 holdings averaging 3.3 ha. Holdings not only exceed that total but are significantly below that size in many areas.

- 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. had been registered, and 3,704 sq. km. were being registered. There are about 400,000 smallholdings averaging 3 ha. in size although holding size varies from an average of 2 ha. in Kisii to 5 ha. in South Nyanza. In most instances the larger holdings are on land of lower agricultural potential, particularly in the savannah areas around Lake Victoria's Kavirondo Gulf where soil drainage is impeded.

Intensity of land use varies greatly. Of the area cultivated by Kisii District smallholders, about 23 percent is devoted to such cash crops as tea, coffee and pyrethrum. Maize production is well developed, as is dairying, using 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 make up one-third of the cereal acreage because of the soils problem mentioned above. The IBRD reports that this province, too, has far more holdings than the estimated 260,000 which could provide a decent living under current cropping practices.

Other significant land uses in the project 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 on Lake Victoria. Fishing 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.

Figure 4 shows areas designed for development under Phase I of the Integrated Agricultural Development Program, as well as current and planned development projects.

Road Service by District

Indicators of road service by district are shown in Table 3. Kisumu is the best served district by all criteria, largely owing to traffic generated by its major urban center. Densely populated Kakamega and Kisii have relatively less road kilometers per population, while sparsely populated Bungoma, Busia and South Nyanza have relatively fewer road kilometers.

Approximately 64% of the total road length (6155 km) in the project area is composed of D and E roads. The A, B and C class roads which connect the principal centers have a generally uniform coverage in each district (see Figure 1). Approximately 5000 km. of the D and E roads are earth roads and about 40% of these are not all-weather roads. This road network is least dense and least passable in South Nyanza, Busia, Siaya and Bungoma districts, and these districts would benefit most from the program, although all districts in the two provinces would be involved.

Rainfall intensity and soil stability also vary considerably within the two provinces. The high rainfall intensity on the slopes of Mt. Elgon in Bungoma district creates greater barriers to access there, and in the highlands of Kakamega and Kisii there are similar but lesser problems. The greatest soil problem occurs in black cotton soils of the plain near Lake Victoria and in related valley bottoms. Earth roads in this soil are impassable when wet. Other soils are good for gravel road construction but the distance required to haul suitable gravel to a site varies from 0 to 20 km. within the project area.

The number of kilometers of non-all-weather roads by district shown in Table 4 shows the types of roads which are the target of the GBC program. This table shows that Bungoma and South Nyanza have between them almost one half of the kilometers of non-all-weather road in the two provinces. However there is still a significant proportion of population on non-all-weather roads in Kisii and Kakamega due to their high population densities.

TABLE 3
INDICATORS OF ROAD SERVICE
(Classified Road Network)

	<u>Km/1,000 pop. (1)</u>	<u>Km/Km² area (1)</u>	<u>% of Road Network D & E roads(2)</u>	<u>%D and E roads Non all weather(3)</u>
Bungoma	3.01	0.34	69.9	65%
Busia	2.20	0.27	68.5	20%
Kakamega	1.62	0.36	75.7	35%
Kisii	1.64	0.50	78.8	35%
Kisumu	3.35	0.65	60.8	15%
Siaya	2.87	0.43	53.4	25%
South Nyanza	2.76	0.32	57.7	35%

(1) District Development Plans

(2) M.O.W. Inventory Data

(3) Estimated by Provincial Engineer

TABLE 4

<u>District</u>	<u>Km. of D and E roads non-all-weather <u>1/</u></u>		<u>Number of people (1969 pop) on non-all-weather D and E roads <u>2/</u></u>	
Bungoma	475	21.3%	71,000	17.7%
Busia	65	2.9%	15,000	3.7%
Kakamega	335	15.1%	85,000	21.2%
Kisii	300	13.5%	81,000	20.2%
Kisumu	210	9.4%	16,000	4.0%
Siaya	205	9.2%	37,000	9.2%
So. Nyanza	635	28.6%	96,000	24.0%
Total	2225 Km.	100.0%	401,000	100.0%

(36% of D and E Network)

(11.6% of 1969 population)

Source: Tables 1 and 3

1/ Kms of D and E roads in each District (p. 15 of PP) times percent of non-all weather D and E roads in each District in Table 3.

2/ Percent of persons (1969 population) near D and E roads (column 2 of Table 22, P. 69 this adendum) times population per district (Table 1, Column 2) times percent non-all weather road each district in Table 3.

Bungoma District

Bungoma District has 4 divisions comprising 10 locations. The Town of Bungoma, now about 6,000 in population, is the district headquarters. Other urban centers include Webuye (site of a large pulp and paper mill) and Kimilili. There are five designated "rural centers" (Sirisia, Kapsakwany, Chele, Tongareni and Mulakisi), and 16 additional market centers. The Integrated Agricultural Development Project is planned to cover three locations in Bungoma District including Mulakisi, West Bukusu, and East Bukusu.

Current cash crops include coffee, cotton, sisal, and sunflower, with pyrethrum, wheat and sugar cane slated for future expansion. Food crops are also of major importance, and a portion of these are commercialized. Livestock and dairying activities are growing rapidly. Because of its high rainfall, good soils, and relatively lower population density, Bungoma District is now experiencing rapid growth both in population and in agricultural production.

The upper slopes of Mt. Elgon are held by the government as forest reserves. This area is also seen as having some touristic potential, with the proposed Mt. Elgon National Park bordering the District. However agricultural activity is already moving up the slopes threatening deforestation and severe erosion in the future. In planning future agricultural expansion, care must be taken to avoid directing development into these ecologically fragile areas.

Busia District

Busia District has three divisions comprising 6 locations. The town of Busia is the only urban center in the district. Six settlements qualify as rural centers : Nangina, Nambale, Butula, Amogoro, Hakati, and Port Victoria. There are 10 additional market centers. The Integrated Agricultural Development Program will cover four of the six locations. North and South Teso, Bukkayo, and Marachi. These locations contain an estimated 42% of the district's smallholder population.

Principal Cash crops include cotton sugar cane, oilseeds, fruits and vegetable. Food crops, livestock and dairying are also important agricultural activities. An estimated 92% of the district's population depends on agricultural earning, and some 60% of the land is currently under cultivation. This amount could be expanded with small scale immigration in the dryer lowland areas.

Busia touches a small part of the Lake Victoria coastline, and fishing is another major source of income. There is a fishing co-operative society as well as one for dairying and one for handicrafts. Cotton is the principal cash crop and there are 10 active cotton co-ops formed into three co-operative unions. Some of these groups have received credit through USAID's ASL I loan program.

Kakamega District

More than half of the population of Western Province is concentrated in Kakamega District. The town of Kakamega is both the provincial and district capital. There are 7 divisions including 20 locations. In addition to Kakamega the towns of Mumias, Butere Khayegga and Kaimosi and the areas of Luanda-Maseno and Majengo-Vihiga are designated urban centers. There are ten more rural centers and 18 market centers in the District. Eleven locations will be included in the first phase of the Integrated Agricultural Development Program, including approximately 55% of the smallholder population of the district.

The entire district is very densely populated, with an even greater concentration in the southern part of the district. Two divisions-Vihiga and Hamisi - have benefited from substantial development inputs during the Special Rural Development Program (SRDP) which preceded the IADP. Response has been excellent and these areas, despite stony soils and broken terrain, have become able to support extremely high population levels.

Principal cash crops are coffee, tea, oilseeds, sugar cane and cotton. Interest in cotton is declining while sugar cane is undergoing expansion especially in the western part of the district. A large sugar mill is located at **Mumias** and there are numerous local sugar syrup(jaggery)factories.

Food crops, horticulture, livestock, and poultry raising are also practiced by small holders.

There is a small amount of land in forest reserves (258 km²) on the east side of the district and a substantial reforestation scheme (173 km²) located at Turbo. This scheme is intended to supply soft wood to the pulp and paper mill in Bungoma District.

Kisii District

Kisii District contains four divisions and 15 locations. Kisii is the district capital and three other towns(Keroka, Ogembo, and Manga) are classified as urban centers. In addition there are 7 designated rural centers and 24 market centers. Kisii District is inhabited by a culturally and ethnically homogeneous group which is quite distinct from its neighbors. It is extremely densely populated and has shown high recepti-

vity to agricultural innovations designed to increase the carrying capacity of the land.

Tea and pyrethrum are major cash crops and maize is the most important food crop. 90% of the labor force receives its income from agriculture, with the exception of the tea estates and co-operatively run tea plantations, these are all small-holders and landless laborers. Bananas, soy beans, tobacco, and dairying are being promoted in the lower less developed parts of the District. A rural Industries Development Project is proposed for Kisii. The Integrated Agricultural Development Project will cover only three locations on the western edge of the District.

Kisumu District

Kisumu is the only district in the project area which contains a major city, Kisumu Town (population now nearly 50,000). The municipal boundaries were expanded in 1972 to include the even more rapidly growing urban fringe; population of this "Greater Kisumu" area is now estimated at 158,000, growing at a rate of 6% per year. At this rate the population of the urban area is expected to exceed 500,000 by the year 2000.

Kisumu District is basically an alluvial plain through which several rivers flow into Lake Victoria. This plain is subject to almost annual flooding, causing severe agricultural and health problems. In addition, it contains "black cotton" soils which provide a poor surface for road construction.

About 87% of the District's land is used for agriculture, and 88% of this is in small holdings. Practically all of the large holdings are sugar cane estates, and many small holdings also produce sugar cane as a cash crop. Other cash crops of much less significance include cotton, oilseeds, and ground nuts. Most of the agricultural land, however, is devoted to food crops and pasture. The Integrated Agricultural Development Program will reach five of the twelve locations in the district and approximately 38% of its small holders.

Siaya District

Siaya contains four divisions and 16 locations. It was administratively separated from Kisumu District in 1966. Three towns - Siaya, Ukwala, and Yala - are designated urban centers and five more - Bondo, Asembo, Rangala, Nyangweso and Ngiya - are designated rural centers. In addition there are 12 market centers.

The population of Siaya District has been subject to considerable fluctuations due to the effects of trypanosomiasis and malaria. It is a low lying, often swampy area bordering on the lake with a consequently low population density. Swamp reclamation and drainage schemes offer some prospects for future development. Currently agriculture is at a subsistence level with 20% of the land under cultivation and 95% of the population dependent on agriculture for subsistence.

Efforts to promote cotton cultivation and livestock in Siaya District have so far been largely unsuccessful. The district is poorly provided with the agricultural infrastructure needed to increase productivity and commercialization of crops. Three locations have been selected to receive assistance under the Integrated Agricultural Development Program. A Rural Industries Development Centre is planned for Homa Bay.

Fishing is another subsistence activity which could be made more productive with outside assistance. The District plans to develop two fishing beaches in the current plan period. Although past experience with fishing co-ops does not augur well for this approach in the future, new efforts will be made to promote commercial activity among individual fishermen.

South Nyanza District

South Nyanza is by far the largest district in the project area. Although it also has a large population, the resulting density is low, and the area is capable of sustaining further population growth. Much of the land is not used as intensively as its soil and rainfall characteristics would permit.

There are six divisions and 32 locations in the district. The capital, Homa Bay, and the towns of Migori and Kendu Bay are classified as urban centers. There are nine rural centers and 27 market centers. Three divisions - Migori, Macalder, and Kihancha have participated in the Special Rural Development Program, forming a belt along the Tanzania border from the lake to Narok District in Rift Valley Province.

Mining was once an important economic activity in the southern part of the district. Mineral resources are known and future production depends on changes in world market prices. A planned government takeover of the hydroelectric project supplying power to the mine will facilitate development only insofar as it is linked to rural electrification schemes, as there is little likelihood of finding industrial users.

Fishing has been a major subsistence activity, to such an extent that offshore waters have been overfished and need to be restocked. Local demand exceeds supply at the present time. If the fishing industry were to be developed on a large scale, processing, storage and transport facilities would be required in order to supply fish to inland markets on a regular basis.

There is some potential for touristic development in the area, particularly if the Lambwe Game Reserve becomes a national park. There is also a bird sanctuary in the vicinity of Oyugis. This area hopes to be tied in with a tourist circuit originating in the Masai Mara park. The rugged, unspoiled western coastline and offshore islands in Lake Victoria also offer a potential tourist attraction if services can be provided to these areas.

B. Project Improvements (add to end of page 3)

Three types of road improvements are proposed. The first corresponds to construction to MOW standards for D roads (5.5 m. surface with 1.2 m. shoulders) as described in the PP. The second is to provide only spot improvements to these sections of the road which are impassable where these sections constitute 25% of the road length or less, and this procedure is technically feasible. The third is to build to MOW standard with a bituminous seal on very steep grades (over 8%) on sections with intense rainfall.

The objective of the second improvement type is to allow an economically feasible improvement on roads with lower traffic volumes. (A traffic threshold analysis appears in section VB below). The aim of the third type is to protect the gravel surface in those areas where it is known to wash away within a short period.

(replace para. 1 + 2 of page 4)

Provision of the above inputs and achievement of the output of 800 miles (1300 km) of roads improved to an all-weather status will result in a significant increase in access for approximately 400,000 persons, the great majority of whom (99%) are making a living from small holdings. This represents the most isolated 12% of the total population of the two provinces involved. This increase in access from farmers to markets and service centers will also provide a needed all-weather link between proposed rural access roads and the primary road system and at the same time support the Ministry of Agriculture's Integrated Agriculture Development Program (IADP), and ASL 1 Part C, which is directed specifically at smallholders.

C. Relation to RARP and IADP

The MOW's Rural access Road Program (RARP) is presently being organized (under joint USAID-IBRD financing) to provide farm-to-market access roads in the same project area. An estimated 40% of these access roads will connect to the D and E roads to be improved by the present project. The IADP is a program aimed specifically at increasing the production and incomes of small holders in parts of 14 districts, and seven of these districts comprise the GBC project area. This program will provide an integrated package of inputs (seeds, fertilizer, pesticides and credit), expanded extension services, applied crop research, storage facilities and marketing services. As a condition of the IBRD loan to finance the IADP selection of specific program areas will be dependent on "adequate infrastructure" including 30% of the D and E network in the project area. This program is to be financed by the IBRD and the BADEA in the 1976/77 fiscal year.

III. Project Issues Supplement
(add to page 6)

Three additional project issues are dealt with in the following analysis: selection of road links for improvements, technical characteristics of improvements, and program evaluation. Additional analysis was also given to the MOW's financial capability for maintenance to supplement the discussion in paragraph 4, page 5, of the P.P.

A. Selection of Road Links for Improvement

In order to realise the anticipated benefits of the proposed GBC program, careful attention must be given to the link selection process and criteria. The selection must cope with the trade-off between serving present traffic flows and providing increased access to relatively isolated rural areas, and the present orientation of USAID policy suggests that the second objective should be given the greatest weight in link selection:

This can be accomplished by giving first priority to those links which are presently cut during some part of the year. Knowledge of the location of these links is very limited, although some estimates are available as discussed later. This requirement points to the need for a complete inventory of D and E roads that might be considered in the program. (This should be gathered by the MOW Roads Inspectorate and its verification and review should be one of the first tasks of the project engineer.)

Within this set of non-all-weather links, priority should be given to those areas where the greatest response in terms of rural development can be anticipated. This response is expected to occur in areas where 1) local inhabitants give a high priority to road improvement, 2) planned rural access roads will connect directly to the road link in question, and 3) other agricultural inputs and services will be provided. A selection process is proposed in section VII below which should ensure that these criteria are met.

The selection criteria should be directly linked to the cost benefit analysis described below, and the most economically and socially beneficial links should be selected first. Given the scarcity of existing information on present link condition and use and potential use, it is clear that some additional information must be obtained prior to link selection. In addition to the road inventory mentioned above, a traffic survey should be carried out on each road link identified as a potential program link prior to improvement and at two points in time following the improvement. Evaluation of this data and data gathered by the IRS in the project areas will provide a means of updating and improving the preliminary selection criteria proposed here, early in the life of the program. (A similar evaluation of the CIDA GBC links could also provide valuable information although from different project area) (see evaluation section below).

B. Technical Characteristics of Improvements.

The great variety of soils, rainfall and road condition on D and E roads links within the project area demands a relatively high degree of flexibility in the characteristics of improvements that will be carried out by the proposed GBC unit. In addition the nature and extent of these improvements should correspond to the present and potential use. Therefore four alternative types of improvements were identified as potentially applicable to the GBC project. These were 1) improvement of the entire link to MOW standards (7.9 m. width including shoulders and a 5.5 m. surface), 2) improvement the entire link with one lane (3.5 m.) gravelled (this is slightly less than the present average width of gravelled roads in the two provinces according to the MOW inventory), 3) spot improvement for only poor sections on a link, and 4) improvement of an entire link with a bituminous seal on those sections with a high grade (over 8%) and intense rainfall.

Each of these alternatives can apply to different conditions and traffic levels in the project area. In the case of links with higher volumes of traffic (over 70 ADT), the first alternative is economically feasible. However in the case of lower traffic volumes (20-70 ADT), only a spot improvement level can be justified on the basis of a cost-benefit analysis. Below 20 ADT a road must have additional justification to be feasible, such as direct connection to development project or a new rural access road.

On the basis of an estimated cost per km for alternative 2 (see section IV-E) it was determined that only a 10% cost savings would be realised over the first alternative. Because maintenance is made more difficult for MOW equipment and the road is more prone to accidents this alternative was ruled out as less cost effective than the first alternative.

The fourth alternative is more expensive, but necessary to hold the gravel in place on steep slopes areas such as the foothills of Mt. Elgon. An unsealed surface in this area allows the gravel to be washed away within 2 years rather than the expected 5 year period, resulting in a very low benefit-cost ratio for unsealed surfaces.

One of the final three alternative improvement levels will be programmed for each eligible link by the project engineer on the basis of present and future traffic levels, road condition and priorities as assigned by District Development Committees, in section VII below.

Program Evaluation

Due to the insufficient amount of data available on key criteria for project selection (road condition, traffic levels, potential benefits) the realisation of projected benefits and costs is not ensured. Consequently a yearly evaluation of the program is included for at least the initial three years of the project to determine whether the initial estimate of costs and benefits are being achieved and to identify potential methods of improving construction or maintenance effectiveness and realising greater benefits as program results become available.

The evaluation can be divided into two parts, the engineering evaluation which can be carried out by the project engineers, and the economic and social evaluation which will require additional expertise. The engineering evaluation will determine whether equipment utilisation, output per day and overall cost projections are being followed and where they could be improved and whether the road condition and all-weather passage is being achieved as forecast. The economic and social evaluation will determine if the forecast benefits are being achieved and the distribution of these benefits between farmers, traders and consumers, and how this distribution might be improved.

As mentioned above, this information will be fed back in the form of a revision of the selection criteria and construction or maintenance methods as early as possible in the program. This evaluation will also be closely coordinated with the parallel evaluation of the Rural Access Road program, the IADP, and ASL 1 Part C.

D: Financial Capability for Maintenance
(to be added to para. 4 page 5)

The financial burden on the GOK for road maintenance in the project area must increase by 15% if the proposed improved D and E roads are to be kept in good condition following the present program. This represents a significant commitment by the GOK through the MFPL^{1/} and should be explicitly recognized in the loan agreement. However the increase is well within the present budget capability of the MOW, even when future maintenance requirements of rural access roads are taken into account (see section IV C2 for details). A budgeting procedure of increasing the project roads by two categories (from MOW category I to III) is suggested as a means of accomplishing this increase within present MOW budgeting procedures.

1/ Ministry of Finance and Planning

IV. GBC Program Description Supplement

A. Objectives and Scope of the GBC Program

The GBC Program for Kenya envisages the complete gravelling of all secondary and minor roads within a period of six years. This objective is found to be uneconomic in Section V below and an alternative program which introduces extensive spot improvements, where technically feasible, is proposed. In addition the sealing of certain high grades in areas of intense rainfall has been added to the original program to preserve the investment in gravelling. The primary objective of the GBC program is still to upgrade D and E roads to 1) all-weather accessibility and 2) a condition where maintenance is practical.

The GBC force will consist of 3 units provided by Canada (C.I.D.A.) which now have most of their equipment delivered in Kenya and expect to begin in a few months, one unit under this Loan (U.S.A.I.D.) and 1 other proposed for AID financing in fiscal year 1977. (This is a reduction of one unit from the MOW proposal based on the analysis of total kilometers to be improved in section V below). Each unit is expected to produce approximately 250 km. per year of MOW standard or 500 km. per year of spot improvements with an average of 400 km. per year.

B. Classification and Inventory of the Kenyan Road Network

1. Classification Scheme (A,B,C,D, and E roads). The M.O.W. has responsibility for all classified roads in the country. These are classified in descending order of importance (of areas connected) as follows:

- | | |
|-----------------------------|------------------------------------------|
| a. International Trunk Road | (Bituminized) |
| b. National Trunk Roads | (Bituminized) |
| c. Primary Internal Roads | (some Bituminized some Gravel) |
| d. Secondary Roads | (some Gravelled some Earth) |
| e. Minor Roads | (most are earth, some only earth tracks) |

This classification is administrative in nature and does not necessarily denote the relative standard of a road or the level of traffic it carries. Therefore, some E roads have higher traffic levels than some D roads, (see section V for traffic figures) and are constructed and maintained to a higher standard.

A great part of the roads now classified as D and E roads were added to the former MOW - maintained network by a national decision in 1971 to add much of the formerly Provincial, District, and County Council roads to the National classified road network. In doing this the MOW assumed responsibility for their improvement and maintenance.

2. Inventory of D and E roads in July 1976 (Nyanza and Western Provinces)

In general the D roads are at a higher standard than the E roads. Of D roads 42% are gravelled to an average width of 4.4 meters while only 10% of the E's have been so surfaced and on a narrower average width (3.9 meters). The D roads inventoried are also better drained, averaging 3 times the number of culverts per kilometer than the E's. There are bridges on the average of one for each 17 km. in the D roads while only two bridges exist on over 2000 kilometers of E roads surveyed. Within each classification significant differences are found between the number of culverts per kilometer for gravelled roads compared with the earth surfaced majority. Gravelled D roads have 50% more culverts than earth D's while the 10% of E roads that is gravelled has 6.5 times the number of culverts on the earth-surfaced 90%.

TABLE 5

SUMMARY OF INVENTORY OF D ROADS IN WESTERN AND NYANZA PROVINCES. (INCLUDES D 201 to D 312, EXCEPT D 226 to 236, 238, 286-9, 294-7, D 304 & 305 WHICH ARE IN RIFT VALLEY)

		Km. Done	Road Surface	Road Width	Road Signs	Junct ions	Culverts	Bridges
Average	Negl.	6	Bitumen	5.3		0.33	3.6	0
Pr. Km	42%	866	Gravel	4.4		0.41	1.73	0.06
	58%	1205	Earth	3.9		0.40	1.15	0.05
Total	100%	2077	Total	4.1		0.40	1.4	0.06

TABLE 6

(SUMMARY OF INVENTORY OF E 101 to E 240 LESS ROADS IN RIFT VALLEY PROVINCE AND NON-INVENTORIED E ROADS IN WESTERN AND NYANZA WHICH EXTEND TO E-328)

	%	Km. Done	Road Surface	Road Width	Road Signs	Junct ions	Culverts	Bridges
			(Gravel)				396	0
			(Earth)				532	2
Average	0	0	Bitum	-			-	-
Per Km.	10%	182	Gravel	3.9			2.18	0
	90%	1627	Earth	3.5*			0.33	(0.001)
Total	100%	1809+	Total	3.54			0.51	negligible

* varies widely from 2.4 to 5.0

+ Ested. (extra P, olated) Total of E rds. in Western & Nyanza = 2,700 Km.

Notes: The statistics on which these numerical averages are based have the following limitations:

- a) they are based on an inventory made by MOW in the period 1971-1975 and are not complete. That is to say that some few D roads were not inventoried and only two-thirds of the E roads in Western and Nyanza provinces were included.
- b) the data collected was length, average width, type of surface, topography, number of junctions, culverts and bridges. The MOW data for the D roads had been tabulated and averaged, that of the E roads had not. Many of both classification were in Rift Valley Province and we removed these for our analysis.
- c) The inferences drawn from this statistical analysis are of varying degrees of reliability. For example, only about two-thirds of the E roads were inventoried; the average width of earth surface roadways (E) is 3.5 approximately but measured widths ranged from 2.4 to 5.0 meters so the standard deviation is quite large. Few width measurements were made during the inventory so the new data itself is only approximate.

C. Capability of the MOW to Maintain D and E roads

1. Technical Capability

The MOW forces and budget have been inadequate to the task of maintaining the D and E roads which were generally of poor quality when added to the national system in 1971.

In the present condition of some of these roads (unculverted, undrained, unsurfaced) maintenance really means rebuilding; the annual cost of maintaining an undrained earth track can approach its construction cost and it would still be impassable after the rain. The GBC program will reduce maintenance on a road of this type to achieve the same conditions, although more MOW effort is required to keep them in good condition.

The roads upgraded by the GBC unit would be maintained by an expanded M.O.W. work force in the project area. A training school in Nairobi is now functioning and is currently undergoing expansion of plant, facilities and faculty so as to produce the increased number of operators, mechanics and artisans necessary to the success of these interrelated programs of GBC, R.A.R. and expanded M.O.W. maintenance forces. Financing and implementation of the school is assured by S.I.D.A. and others.

2. MOW Financial Capability for Maintenance of D and E roads

The present maintenance allocation for D and E roads in the project area is £ 804,000 or £ 130 (\$310) per km. This money is not all presently spent on maintaining the D and E roads as part of it is spent on higher-priority road maintenance and part on the road "regravelling" program which the GBC is supposed to supplement. Therefore the actual amount spent on D and E road maintenance is closer to £ 100 per km., and the lower-traffic roads receive hardly any maintenance.

The inadequacy of maintenance funds is witnessed by the condition of the less-travelled D and E roads and by the present necessity of the provincial MOW to forsake the use of its available machines for 6 months of the year due to lack of funds. There is a clear capacity to do more maintenance with additional operating funds using the same personnel and equipment. This problem has been exacerbated recently with the allocation of 54% of requested funds in 1975/76 as compared with 80% in previous years.

The allocation procedure for budgeting used at present is based on road traffic levels and starts from £ 100/km/yr in the lowest category and rises to £ 160 and £ 210 for the next two higher categories. The present D roads are found mostly in the lower category but some roads appear in the two higher categories. Almost all E roads are relegated to the lowest budget level.

It is estimated in the project paper that an additional \$210 (£90) is required per km in order to keep the project roads in good condition. This implies an increase of $90 \times 1300 = \text{£}117,000$ per year to maintain the roads to be improved by this one GBC unit over present budget conditions. At project completion this represents an increase of 15% in the budget for D and E roads. This amount would increase proportionately with additional GBC roads if they are properly maintained and it will increase with price inflation. The whole impact of course will not be felt until the end of the 5 year project period.

This represents an increase of 3% per year (or 6% per year for 2 units) which may be possible with an adequate effort by the Ministry of Finance and Planning and the MOW. The effort is clearly much more significant for more than one unit, and the additional maintenance required for RAR roads will also be a factor in the amount of effort that the GOK can make.^{1/}

Within the present budgeting structure this increase can be accomplished by upgrading the project roads two categories. This increase may in fact be partly justified by a traffic increase which would upgrade the budget category in any case.

^{1/} The RAR maintenance will amount to approximately £ 30 per km. x 1200 km. = £ 36,000 per year (in 1975 £) by 1982 or an increase of only 4% in the project area.

D. Technical Feasibility

1. Gravelling

(append to a) p.26 P.P.)

- a) The organization plan set forth in IV. Implementation Arrangements (PP of March 6, 1976) is simple and workable. However the spare parts procurement procedure should specify procurement through the USAID Project Engineer independently of Kenya purchasing policy (now imposed on the MOW) which is a cause of much down-time because of unrealistic limits on the size of purchases without formal advertising and tenders. This policy could easily cripple the entire GBC program through loss of equipment time while waiting 6 months and more for parts. If the above seems overstressed, consider that one grader idled means the capacity of the entire unit is cut in half.

The working arrangements over the long run will probably evolve into a policy of cooperation between the USAID Construction Superintendent and Maintenance Mechanic and their counterparts in the MOW, the Provincial Engineer and his Mechanical Chief. This is also the opinion of Mr. Benn, CIDA's Project Engineer for the GBC program in Eastern Kenya. At the present state of development of GOK, Nairobi exercises little real control of month-to-month activity in the provinces of Nyanza and Western. The people in charge in the field are realistic and dedicated operators, including the NORAD-furnished Provincial Engineer, Mr. Vidal.

P.26 before ii

- b) The "gravelling" is the application of "murrum" as surfacing on a subgrade of existing material. Murrum is a catchall term like "laterite" in West Africa. It is applied to select material containing particles from larger than gravel size, gravel sand, silt and/or clay in varying proportions. The gradation curve can 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. At times suitable murrum may be found along the road to be surfaced, at other times it must be hauled some distance. Generally it provides a good and durable surface for the traffic volume anticipated on these roads.

In areas of high rainfall and steep grades (e.g. Mt. Elgon region in Western Province) murrum surfacing will not be sufficient and some areas will have to be bituminized for resisting the torrential runoffs, especially in sag of profile.

- c) There are many areas where the subgrade of existing material is quite hard (small boulders and outcroppings in more or less sandy clays) but of rugged riding quality. In some of these areas, only 3 to 4 inches of murrum will suffice to produce an adequate surface. In other areas, where traffic is light, existing width less than the MOW specified 5.5 meter width of surfacing will suffice. Contract "regravelling" costs more than MOW's and is of poorer quality, judging from field observations.

P. 24, after title (C Constr. Methods)

2. Reshaping, ditching and culverting

a) There is a great variation from road to road in the amount of these works required for a viable all-weather road. 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 conforms well to the average for Western and Nyanza Provinces developed by the MOW pragmatically over these last 5 years of limited GBC, and is sufficiently flexible to allow shifting of dozers, trucks and loaders to keep two crews efficiently employed.

2. In general, shaping, ditching and surfacing will be equipment-intensive, culverting and bridging, labor-intensive.

P.24 C.4

i) Most culverts should be of plain concrete pipe of local manufacture. For diameters up to 90 cm. (36") the only machine work necessary is trucking to the jobsite. Unloading, grading, placing of pipe and rough stone headwalls can all be done efficiently and well by labor only. Small box culverts of short span can also be hand-built with masonry walls and headwalls, concrete or masonry inverts and lightly reinforced concrete decks.

ii) This work will be done in advance of the reshaping, and some local casual labor could be employed.

3. Bridges

a) Bridge work is to be started well in advance of earthwork and regravelling because of 1) the slower pace of such work, and 2) the advantage of a completed bridge in reducing the cost of gravelling; fewer trucks will be needed to keep the grader and roller on a high daily output, and 3) bridge (and culvert) work can be pursued during the initial period between agreement and delivery of the road-building machinery.

b) Bridges of masonry substructure, reinforced concrete deck and masonry parapets are adequate, labor-intensive, and already widely used in Kenya. This is the expected "standard" type to be used in the GBC program. Provincial contractors should be encouraged to bid this work so as to better distribute the benefits.

c) Where Bailey bridges or other truss structures are necessary, for example where flood conditions, riverbed configuration, temporary need because of planned stage construction for future programs, et al, some are available in Kenya and could probably be used economically, perhaps more than once.

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

E. Cost Analysis

1. Cost of Alternative Improvements.

The cost of four alternative improvements were estimated in relation to the cost of the MOW standard improvement calculated in the PP. The four alternatives were:

1. MOW Standard (5.5 m gravel surface with 1.2 m shoulders and good drainage)
2. A 3.5 m. gravelled surface with the same drainage as above.
3. Spot improvements averaging 20% of the length, based on two low sections with culverts per km and 100 m. of earth work and gravel on each.
4. MOW standard with a bituminous seal on high grades (8% or more) in intensive rainfall areas.

The costs for each are shown in Table 7 below along with the key assumptions.

TABLE 7
ESTIMATED CONSTRUCTION COSTS BY ALTERNATIVE IMPROVEMENT
TYPE

	<u>MOW Standard</u>	<u>3.5 m. Gravel</u>	<u>Spot Improvement</u>	<u>MOW standard with sealed grades</u>
<u>derivation</u>	1. same as PP	1. 30% of gravel haul cost is saved or 12.5% of total cost. 2. Other operations slightly more expensive per unit	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.
<u>cost/km.</u>	\$ 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.

These costs are used in the economic analysis of section V below except for the 3.5 m. gravel alternative. This alternative is only 8% cheaper than MOW standard and incurs other costs due to higher maintenance and accidents which offset this savings and eliminate this alternative on cost-effectiveness grounds.

2. Change in Loan Cost Elements

In order to account for recommendations on reduction of steel girders and pipe and allow for sealing of steep gravel surface in intense rainfall areas. The following argument is put forward.

The provincial MOW has the necessary crew and equipment and experience to apply the bituminous sealer using a bituminous surface treatment. The GBC program, however, should provide the bituminous material. Due to the reduction in cost of other inputs this material can be supplied without increasing the total amount of the proposed loan as shown in the following table:

<u>Item</u>	<u>Original PR^{1/}</u>	<u>Present Report</u>
2. Steel for bridges	20(@) 25,000= \$500,000	(cement-beams) ^{2/} \$ 0
2a Bitumen Material	\$ 0	\$ 400,000
3. Reinforcing Steel	1000 tons(@)500 = \$500,000	1200 tons (@) 500=600,000
2 + 3 total	\$1,000,000	\$ 1,000,000

By substituting reinforced concrete for the steel beams envisaged in Item 2 just above (see II, G. 4, above), more than sufficient funds will be freed for the purchase of the required bitumen. (\$400,000).

^{1/} from Annex III page 3, prices are CIF Mombasa.

^{2/} MOW contribution to construction costs would be an estimated \$75,000 greater for 20 cement beam bridges than for steel.

V. Economic Analysis Supplement.

This section replaces the economic analysis of pages 33-39 of the P.P. It is organised into a discussion of economic benefits, traffic threshold analysis, cost-benefit analysis and incidence of benefits.

A. Benefits to be derived from the GBC Program

Both economic and social benefits are derived from the GBC program. Only the economic benefits are discussed here. (See section VI B for social benefits). The economic benefits can be classified as direct and indirect, and they apply to road users and non-road users.

1. 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 have been estimated by the MOW in terms of standard road types based on an updating of a table in the Scandia-consult report. This updating was done by simply multiplying all the figures in the table by 1.49 to take into account price changes since the original figures were calculated 1/

The estimated average savings per vehicle was computed in Annex B and is shown in table 8 below for each improvement type.

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)

2. Direct Benefits to Non-Road Users

This category includes maintenance cost savings due to the lower effort needed to keep the improved road in good condition. Since there are not enough maintenance funds allocated to keep the present D and E roads in good condition, these savings are somewhat academic, although additional maintenance funds would have a high economic return (much higher than the present project). Therefore these benefits will not be realised (except through better-maintained project road links and lower user costs) and a higher maintenance expenditure is included as a project cost below.

1/ This procedure is not accurate for different vehicles but it is adequate for the overall average used in this P.P.

TABLE 8

Weighted Average User Cost Savings per Vehicle ^{1/}

<u>Improvement</u>	<u>Savings per vehicle</u> ^{2/}	
	<u>K.shs.</u>	<u>\$U.S.</u>
a) MOW standard (G1 to G3)	.250	.0298
b) Spot Improvement (G1 to G2-G3)	.189	.0225
c) Sealed Grades (G1 to G3 in mount. terrain +20% bitum.)	.405	.0482
d) MOW standard on poor soils (G0 to G3)	.354	.0421

^{1/} This procedure is not accurate for different vehicles but it is adequate for the overall average used in this P.P.

^{2/} See details in Annex B \$1 = 8.4 shs.

3. 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 (see discussion under motivation in section VI A below).

There is only very indirect evidence that these savings will be passed on by the transporters (based on an assessment of the competitiveness of the transport industry in the Scandia-consult report). This 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 below and related data collection on transport price changes are the only way to obtain an estimate of these benefits. For the purpose of this PP, these have been lumped with the estimate of benefits to non-road users described below. (see incidence of benefits for more discussion of this point).

4. 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 described in section VI B below and political and administration benefits to the project area residents and their government. There are also benefits to the USAID credit program under ASL 1 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 GOK Rural Access Road Program and the Integrated Agricultural Development Program. The logic of this analysis is as follows:

a) For the RARP

- a certain proportion of RAR will connect with D and E roads (estimated as 32% on the basis of population served only by D and E roads).
- The GBC will provide the necessary all-weather connection to RAR on the 36% D and E roads to be improved which ~~are~~ **non-all-weather**.
- those benefits to the RAR which are dependent on GBC improvement of non-all-weather D and E roads should be allocated between the two programs.(a 50-50 split is used based on the ratio of costs for a spot improvement).
- Therefore 5.8% of the RARP benefits in the project area are attributable to the GBC program ($.32 \times .36 \times .5 = .058$)

b) For the IADP

- The IADP will not reach a proportion of farmers in the project area which are presently isolated due to non-all-weather D and E roads. (estimated at 36% of D and E roads, serving 30.4% of the farmers in IADP locations, or $0.36 \times .304 = 9.9\%$ of IADP served farmers).
- The proportion of gross benefits from IADP attributable to GBC program is the ratio of GBC costs in the IADP area as to other IADP costs (2.0%)
- Therefore 0.198 % of the gross IADP benefits in the project area are attributable to the GBC program ($.02 \times .099 = .00198$)

The application of the results of this logic to the benefit estimates computed by the IBRD in appraisal of these two projects is shown in Table 9.

The total estimated indirect benefits of \$ 7 million shown in this table amounts to 11% of the total project benefits shown in Table 10, which is within the range of 1-17% found for other road projects in Kenya (as mentioned on page 33 of the P.P.)

Since this calculation is based only on improvement of non-all-weather roads, it may understate the total indirect benefits. It should also be noted that these indirect benefits arise later in the project period due to the time required for indirect linkages between access and agriculture to take place.

B. Traffic Threshold Analysis.

In order to estimate the traffic ranges where each alternative improvement would be economically feasible, a traffic threshold analysis was carried out as documented in Annex B. 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%. The results are shown below:

- A) MOW standard on good soils - 76 ADT
- B) Spot improvements on good soils - 43 ADT
- C) MOW standard with sealed grades - 61 ADT
- D) 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 as a second stage when traffic levels warrant it. Also 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, in the following section.

TABLE 9

Additional Benefits Induced by the GBC Unit

(000's of US dollars)

Year	Benefits of RAR Program <u>1/</u>	RAR Benefits <u>2/</u> Attributable to GBC	Benefits of IAD Program <u>3/</u>	IADP Benefits <u>4/</u> Attributable to GBC
1978	-	-	-	-
1979	-	-	-	-
1980	15.9	0.3	182.2	8.1
1981	50.0	1.0	1068.2	19.6
1982	175.4	3.3	3138.7	33.6
1983	457.7	8.7	7438.1	51.7
1984	976.8	18.6	10281.2	60.8
1985	1791.7	34.1	12435.2	66.9
1986	2945.7	56.0	13664.0	70.1
1987	4211.4	80.1	13664.0	70.1
1988	5604.4	106.4	14773.7	72.9
1989	7131.9	135.4	14773.7	72.9
1990	8805.3	167.2	14773.7	72.9
1991	10635.5	202.0	14773.7	72.9
1992	12631.6	239.8	14773.7	72.9
1993	14354.5	272.6	14773.7	72.9
1994	17187.9	326.4	14773.7	72.9
1995	19761.6	375.3	14773.7	72.9
1996	22566.2	428.6	14773.7	72.9
1997	25609.8	486.4	14773.7	72.9
1998	28912.7	549.1	14773.7	72.9
1999	32641.6	619.9	14773.7	72.9
2000	36851.4	699.9	14773.7	72.9
2001	41604.1	790.2	14773.7	72.9
Total	294,923.1	5,601.2	268,703.4	1,401.5

1/ From Table 3 Annex 7 of the IBRD project appraisal report for the RARP of Feb. 1976. Kenyan pounds were converted to shillings(\$ 2.38 = 1 K£.)

Continuation Table 9 - Footnotes

- 2/ Assuming that 33% of the RARP is in the project area (0.33 RARP benefits in area x 0.58 benefits attributable to GBC program = 0.019 times total RARP benefits shown in column 1).
- 3/ From table 1 annex 16 of the IBRD project appraisal report for the IADP of January 6th, 1976. Kenyan shillings were converted to dollars at the ratio of 8.4 shs = \$1.
- 4/ Assuming that half the IADP is to take place in the project area (0.5 benefits in project area x benefits attributable to the GBC program). Earlier benefits are attributable in higher proportions to the GBC improvement due to the GBC investment concentrated in the earlier years. GBC represents 4.4% of project area IADP costs in 1980, declining to 0.5% in later years.

TABLE 10

Benefits for the Project

(000's of dollars)

Year	User Cost Savings ^{1/}				Total Savings	RARP ^{4/} related Benefits	IADP ^{4/} related Benefits	Total Benefits
	MOW ^{2/} Standard	Spot ^{3/} Improvement	Sealed ^{2/} Grades	Poor ^{2/} Soils				
1978	-	-	-	-	-	-	-	-
1979	97.9	82.1	66.5	0	246.5	-	-	246.5
1980	125.4	225.0	119.4	0	469.8	0.3	8.1	478.2
1981	282.3	355.4	128.9	0	766.6	1.0	19.6	787.2
1982	353.8	548.0	139.3	0	1041.1	3.3	33.6	1078.0
1983	431.1	715.5	150.4	48.9	1345.9	8.7	51.7	1406.3
1984	*	*	*	*	1453.6	18.6	60.8	1533.0
1985					1569.9	34.1	66.9	1670.9
1986					1695.4	56.0	70.1	1821.5
1987					1831.1	80.1	70.1	1981.3
1988					1977.6	106.4	72.9	2156.9
1989					2135.8	135.4	72.9	2344.1
1990					2306.6	167.2	72.9	2546.7
1991					2491.2	202.0	72.9	2766.1
1992					2690.5	239.9	72.9	3003.3
1993					2905.7	272.6	72.9	3251.2
1994					3138.2	326.4	72.9	3537.5
1995					3389.2	375.3	72.9	3837.4
1996					3660.3	428.6	72.9	4161.8
1997					3953.2	486.4	72.9	4512.5
1998					4269.4	549.1	72.9	4891.4
1999					4611.0	619.9	72.9	5303.8
2000					4979.9	699.9	72.9	5752.7
2001					5378.2	790.2	72.9	6241.3
Total					58306.7	5601.4	1401.5	65309.6

^{1/} based on calculations shown in Annex B and table L Initial conditions will vary from G0 to G2 depending on weather and maintenance.

^{2/} assuming an average traffic of 90 ADT in the opening year and 8% annual growth

^{3/} assuming an average traffic of 50 ADT is achieved in the opening year and 8% annual growth.

^{4/} see table 2

^{5/} assuming an average traffic of 60 ADT is achieved in opening year and 3% annual growth.

* all user cost savings are assumed to grow at 8% after 1983, but only the total is shown.

C. Road Length to be improved in the GBC Program.
(replace para. 2 page 19)

The number of kilometers which would be eligible for each type of improvement under the link selection criteria described in section VII can be estimated from the percentage of non-all-weather roads and the distribution of roads by traffic volume as shown in Tables 11 and 12 and 13 below.

Of these, non-all-weather roads, approximately one half of those in Kisumu, Siaya and So. Nyanza are located on structurally very poor but productive black cotton soils. This amounts to approximately 600 km.

Of project roads, 42% of the D roads (800 km.) and 10% of the E roads (400 km)^{1/} are already gravelled and are, therefore, excluded from the GBC program. These correspond essentially to roads in the higher traffic ranges. This leaves 4951 km of D and E roads with an earth surface (see Table 13).

Table 13 also provides an estimate of the total kilometrage of road in each of the three GBC selection categories described in section VII. These totals are based on estimates of the distribution of road types by traffic levels derived from limited periods of field observation. However, a variation of 20 to 25% between categories, would only change the total 4000 eligible kilometers by 10% and the allocation within GBC categories by approximately 400 km.

On the basis of these figures it appears that only 313 km. or 8% of the eligible roads would qualify for the MOW standard, (75 ADT as calculated in Annex B) unless there is a dramatic increase in traffic levels over the next 5 years ^{2/}. This means that one GBC units (which could complete 250) per year at MOW standard or 500 km per year of spot improvements) can handle approximately 2000 Km. during the 5 year project period, and that a total of two units would be required to accomplish the 4000 Km. program within the period. Only one of these units is proposed in the present project paper and a second is proposed for the following 1977/1978 fiscal year.

In the interim, it is proposed that the MOW inventory the road network and review the traffic count data in order to verify or revise the figures in Table 13 as necessary. (See link selection section VIII).

^{1/} If some of these roads are non-all-weather certain sections could be included on a spot basis.

^{2/} In fact, more roads will qualify for MOW standard due to future projects or for technical reasons, and 500 kilometers of MOW standard (or 20% of the total) are allocated to the proposed program.

TABLE 11
Length of Non-All weather Roads

<u>District</u>	<u>Kilometers D & E Roads <u>1/</u></u>	<u>Estimated percent non all- weather D & E roads <u>2/</u></u>	<u>Estimated Kilometers non all-wea- ther D & E rds.</u>
Bungoma	730.9	65	475
Busia	326.8	20	65
Kakamega	959.5	35	335
Kisii	861.7	35	300
Kisumu	1042.7	20	210
Siaya	815.3	25	205
So. Nyanza	1414.6	45	635
Total	6151.5	36	2225

1/from page 15 of the PP (MOW)

2/estimate of the Provincial Engineer for the project area

TABLE 12
Length of Roads by Traffic Range

<u>Province</u>	<u>Road type</u>	<u>kilometers</u> ^{1/}	<u>Traffic Range</u> (AADT)	<u>Percent Links in range</u> ^{2/}	<u>Kilometers of roads in Range</u> ^{3/}
Nyanza	D	1,126	over 125	8	90
			50-125	27	304
			10-50	51	574
			0-10	14	158
	E	3,008	over 125	0	0
			50-125	8	241
			10-50	50	1504
			0-10	42	1263
Western		776	over 125	10	78
			50-125	31	241
			10-50	53	411
			0-10	6	46
	E	1,241	over 125	12	149
			50-125	25	310
			10-50	38	472
			0-10	25	310

^{1/} from Table on page 15 of PP (MOW)

^{2/} from analysis of sample traffic counts in Appendix 1 of the Scandia consult report (50% of D roads, 25% of E roads)

^{3/} Percent Links in range times kms

TABLE 13
Road Length Eligible for GBC Program

<u>1978-79</u> <u>Traffic</u> <u>Range</u>	<u>1973/1974</u> <u>Traffic</u> <u>Range</u>	<u>Total</u> <u>D & E</u> <u>Kms.</u>	<u>Kilometers</u> <u>already</u> <u>gravelled</u>	<u>Earth</u> <u>D & E</u> <u>Roads</u>	<u>Non</u> <u>All-wea-</u> <u>ther rds.</u>	<u>GBC</u> <u>Category</u> <u>A-<u>1</u>/ B-<u>2</u>/ C-<u>3</u>/</u>			<u>Total Km</u> <u>Eligible</u> <u>for GBC</u>
over 180	Over 125	317	317	0	0	0	0	0	0
75-180	50-125	1096	783	313	125	125	188	0	313
20-75	10-50	2961	100	2861	600	600	1211	150	2861
0-20	0-10	1777	-	1777	1500	0	750*	0	750*
	<u>Total</u>	<u>6151</u>	<u>1200</u>	<u>4951</u>	<u>2225</u>	<u>725</u>	<u>2149</u>	<u>150</u>	<u>3924</u>

* 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.

- 1/ Non all weather roads with a traffic level greater than 20 ADT in 1978 (assumed to be the same as 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.

D. Cost-Benefit Analysis

Based on the number of kilometers identified above in each category that are eligible for the GBC improvement, a set of 2000 km. of the highest priorities were selected, and allocated to each year of the program in Table 14. This allocation takes into account the programming constraints which favour improving lower-priority links located near certain high-priority links in order to minimize the transportation and related downtime of GBC equipment.

The total benefits to road users are shown in Table 10. These were obtained by multiplying the kilometers in each category by the unit benefits per vehicle in Table 8 and by 365 times the traffic level on the link. The opening year traffic is assumed to be an average of 50 ADT on spot improved links, 90 ADT on MOW standard links and 60 ADT on poor soils links. This traffic is assumed to increase at a rate of 8% per year during the period after improvement.

The total costs associated with the improvement schedule in Table 14, are shown in Table 15. An additional regravelling cost of 45% of the initial construction cost is added in three 5-year cycles after construction. Annual maintenance costs are assumed to increase by \$210 per kilometer as shown in table 16. 1/

The total cost including regravelling and annual maintenance costs are shown in Table 15.

The resulting total costs and benefits and the stream of net benefits are summarized in Table 17. The evaluation period shown in this Table averages 23 years in order to take into account the staging on construction over a 5-year period. The net present value of the proposed project when discounted at 10% is \$210,000 and the economic rate of return is 10.2%.

This relatively low rate of return is the result of the orientation of the project toward providing access to isolated small holders along presently non-all-weather roads. It is possible that the response of these small holders, particularly in the areas where IADP inputs and the credit provided by ASL I Part C is available, will be sooner and more wide-spread than the relatively conservative assumptions used above. This can only be determined by means of the evaluation program described in Section VIII below.

1/ The maintenance of the improved roads should be sufficient to keep the road surface in good condition. As traffic increases this cost increases. However the costs of maintaining the present earth roads even in a poor but passable state is assumed to increase at a slightly higher rate than maintenance costs on the improved road, so that the differential maintenance cost remains constant.

This simplifying assumption undoubtedly under-estimates the benefits of the improvement, as much higher maintenance cost would be required to keep the earth road in its present condition at higher traffic levels. Under the assumed costs the actual condition of the earth road would decline, leading to significantly higher base user costs and, therefore, much higher user cost savings than those shown in Table 10.

TABLE 14

Kilometers Improved by Type of Improvement ^{1/}

Year	MOW Standard	Spot Im. improvements	MOW standard with sealed grades	MOW standard on poor soils	Total kilometers
1978	100	200	50	0	350
1979	20	400	30	0	450
1980	150	200	0	0	350
1981	50	400	0	0	450
1982	50	300	0	50	400
Total	370	1500	80	50	2000

^{1/} Assuming so that all of category A is accomplished in the first two years. Total for one GBC unit only.

TABLE 15

Costs of the Project

(000's of dollars)

	Construction and Regravelling Costs ^{1/}				Main- tenance	Total Costs
	MOW Standard (\$7,700/km)	Spot Improvement (\$3,900/km)	Sealed Grades (\$10,200/km)	Poor Soils (\$15,400/km)		
1978	770.0	780.0	510.0	0	73.5	2133.5
1979	154.0	1560.0	306.0	0	168.0	2188.0
1980	1155.0	780.0	0	0	241.5	2176.5
1981	385.0	1560.0	0	0	336.0	2281.0
1982	385.0	1170.0	0	770.0	420.0	2745.0
1983	346.5	351.0	229.5	0	420.0	1347.0
1984	69.3	702.0	137.7	0	420.0	1329.0
1985	519.8	351.0	0	0	420.0	1290.8
1986	173.3	702.0	0	0	420.0	1295.3
1987	173.3	526.5	0	346.5	420.0	1466.3
1988	346.5	351.0	229.5	0	420.0	1347.0
1989	69.3	702.0	137.7	0	420.0	1329.0
1990	519.8	351.0	0	0	420.0	1290.8
1991	173.3	702.0	0	0	420.0	1295.3
1992	173.3	526.5	0	346.5	420.0	1466.3
1993	346.5	351.0	229.5	0	420.0	1347.0
1994	69.3	702.0	137.7	0	420.0	1329.0
1995	519.8	351.0	0	0	420.0	1290.8
1996	173.3	702.0	0	0	420.0	1295.3
1997	173.3	526.5	0	346.5	420.0	1466.3
1998	-	-	-	-	420.0	420.0
1999	-	-	-	-	420.0	420.0
2000	-	-	-	-	420.0	420.0
2001	-	-	-	-	420.0	420.0
Total	6695.6	13747.5	1917.6	1809.5	9219.0	33389.2

^{1/} Based on the number of kilometers shown in the Table 4. Regravelling costs are 45% construction in years 6,11,16.

^{2/} From table 5. The additional maintenance cost differential is assumed constant although the total will increase with traffic

TABLE 16

Additional Maintenance Costs per Year

Year	Cumulative kilometers	added cost' per Km. ^{2/}	Total added cost per year
1978	350	\$ 210	73,500
1979	800	210	168,000
1980	1150	210	241,500
1981	1600	210	336,000
1982	2000	210	420,000

^{2/} Based on MOW estimates less estimated actual maintenance.
 This is 240-30= \$ 210/Km. for low traffic (less the 100 ADT)
 At higher traffic levels at (100-200 ADT) there is addition
 maintenance presently carried out so that the differential
 of \$ 210 remains essentially the same even for higher traffic
 volumes.

TABLE 17

Costs and Benefits of the GBC Program

(000's of dollars)

1 9 7 5

<u>Year</u>	<u>Total Costs</u> ^{1/}	<u>Total Benefits</u> ^{2/}	<u>Net Benefits</u>
1978	2,133.5		(2,133.5)
1979	2,188.0	246.5	(1,941.5)
1980	2,176.5	478.2	(1,698.3)
1981	2,281.0	787.2	(1,493.8)
1982	2,745.0	1078.0	(1,667.0)
1983	1,347.0	1406.3	59.3
1984	1,329.0	1533.0	204.0
1985	1,290.8	1670.9	380.1
1986	1,295.3	1821.5	526.2
1987	1,466.3	1981.3	515.0
1988	1,347.0	2156.9	809.9
1989	1,329.0	2344.1	1,015.1
1990	1,290.8	2546.7	1,255.9
1991	1,295.3	2766.1	1,470.8
1992	1,466.3	3003.3	1,537.0
1993	1,347.0	3251.2	1,904.2
1994	1,329.0	3537.5	2,208.5
1995	1,290.8	3837.4	2,546.6
1996	1,295.3	4161.8	2,866.5
1997	1,466.3	4512.5	3,046.2
1998	420.0	4891.4	4,471.4
1999	420.0	5303.8	4,883.8
2000	420.0	5752.7	5,332.7
2001	420.0	6241.3	5,821.3
Total	33,389.2	65309.6	31,920.4

Net Present value at 10% = \$ 210,000, Economic Rate of Return = 10.2%

^{1/} From Table I5

^{2/} From Table 10

E. Incidence of Economic Benefits

The direct economic benefits of the GBC program 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%) matatus, "pick ups or buses; a significant number of cars or jeeps (31%) and some trucks (20%).

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% of the total savings.

The matatus, buses and pickups 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, 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 and the PP). Therefore, some of the cost savings are likely to be passed on to the passengers. These vehicles will receive 40% 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 small-holders. To the extent that these rental rates are competitive some of the savings will be passed on. Trucks will receive 35% of the savings.

The exact proportions 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% 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% large farmers in the area, they are estimated to receive only 5% of these indirect benefits. Another estimated 10% will go to traders and transporters, and 20% to cooperatives in the project area.

Table 18 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 VIII.

1/ The speed of this passing on of savings is a pertinent concern. These mechanisms 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.

ABLE 18

Estimated Distribution of Benefits from the GBC

	Recipient Group					
	<u>Transporters</u>	<u>Traders</u>	<u>Government</u>	<u>Cooperatives</u>	<u>Large Farmer</u>	<u>Smallholder</u>
1. Direct Benefits						
a) initial savings						
cars %group	-	30%	50%	15%	5%	-
(25%) %total	-	7.5%	12.5%	3.8%	1.2%	-
Pickups %group on matatus	75%	10%	-	10%	5%	-
(40%) %total	30%	4%	-	4%	2%	-
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%
2. Indirect Benefits						
Net % received	5%	5%	-	20%	5%	65%
3. Total Benefits ^{1/}						
initial % received	55%	15%	11%	9%	3%	7%
net % received	22%	16%	11%	14%	8%	29%

^{1/} 89% of Direct Benefits plus 11% of indirect benefits, rounded to nearest %.

E. contd

From Table 18 it can be seen that if smallholders and coop farmers are grouped together, that group will receive almost half (43%) of the benefits. The remainder of the benefits are divided between transporters (22%), traders (16%), government (11%) and large farmers (8%). These figures are very imprecise but the order of magnitude of this distribution is indicative of the distribution of benefits to be expected. This distribution will be checked during the evaluation program described in Section VIII.

The small holders favoured 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. Consequently data from surveys such as that shown in Annex A indicate 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 additional emphasis on improving non all-weather roads put forth in this addendum will shift the benefits even more in favor of the isolated small holder. This emphasis will also favor those districts with lower per-capita income: South Nyanza, Bungoma, Busia and Siaya.

Therefore, more than 80% 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% of this group are expected to be below the IBRD-calculated minimum acceptable income level of \$196 per capita.

VI. Social Soundness Analysis

A. Social Characteristics of the Project Area

In comparison with the rest of Kenya as well as other parts of the world, the whole project area is quite densely populated and almost entirely rural in nature. With the exception of a few sugar estates in Kakamega, Kisumu (and a projected new one in South Nyanza), and cooperatively run tea estates in Kisii, most of the agricultural land is owned by small holders. However, the population pressure is so great that many farms are too small to support the number of people dependent on them. Thus there is emerging a class of landless laborers who are seasonally unemployed in the agricultural sector.

1. 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. (See table 1) High growth in Kisumu District is largely attributable to the growth of Kisumu Town at 5.7% 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 net outflow (-8.8%) from Western Province and a very slight net inflow (+ 0.3%) 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.

2. 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 (20.6% of the African population). The Luo and the Abaluhya are the next largest groups (14.3% and 13.6% 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% 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

2. Cultural Patterns(cont.)

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.

2 Cultural Patterns (cont..)

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.

3. 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 & 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.

3. Decision Making Institutions (cont..)

. 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.

4. Social Services

Social services such as schools and hospitals are highly valued in the project area. Education is seen as the way to a better life, not only for the educated individual, but for the entire family. When the Government of Kenya eliminated school fees for the first four grades of primary school in 1974, total primary enrollment in Western Province jumped from 246,000 to 400,000. In Nyanza Province enrollment nearly doubled from 291,000 to 573,000. Although "building fees" are now being established at many school and fees are charged for higher grades, smallholders consider education a top priority use for any money the family may earn. Research in several districts has shown that fees are often paid before agricultural loans even though default on the loans might mean loss of land and/or inability to obtain credit in subsequent years.

Available school and health facilities include 1,457 primary schools, 247 secondary schools, and 1,680 hospital beds and cots in Nyanza Province in 1975, and 1,091 primary schools, 191 secondary schools, and 1,657 hospital beds and cots in Western Province. Most of these facilities are well-utilized and probably insufficient to meet existing demand. With population growing rapidly, there will be an increasing demand for these and many other services.

a. Education

According to the 1969 census, nearly 80% of the adult population (over 20) in Nyanza Province and 70% of that in Western Province could be classified as functionally illiterate (less than four years of primary education). Current enrollment in primary schools as a percent of the relevant age grade (ages-7-13) was estimated in 1970 to be slightly over the national average in Western Province and substantially under it in Nyanza Province (see Table 19). Patterns of access to education are similar in both provinces, although significantly fewer opportunities are provided for girls to receive secondary education in Nyanza Province than in Western Province.

Primary schools are generally well distributed throughout the project area, with most people living within a 5-mile radius of a school. Construction of school facilities, particularly under local initiative and self help programs, may have outstripped the capability of the nation's secondary and higher education system to supply qualified teachers and necessary teaching materials to rural schools. However, the current and continuing excess of secondary school graduates is creating pressures that may soon remedy this problem. As of 1970 there was some room to accommodate increased demand for primary education by increasing class sizes to the national target figure of 40, particularly in Busia, Kisii and South Nyanza Districts. This slack in the system has now been taken up by increased enrollment following the abolition of school fees for the early primary grades.

Secondary schools are less evenly distributed and tend to cluster around major population centers. (See Figure 5) This pattern responds to the prevailing practice of sending secondary students to board or live with a relative in town while attending school. Transportation is thus a major constraint affecting access, to secondary education (as is cash income).

A majority of secondary schools are private or locally operated (harambee) schools, which often fail to meet the standards of government-operated secondary schools. Table 19 shows the rapid growth in the number of secondary schools between 1970 and 1975, particularly in Kakamega and Kisii Districts. Relatively few schools offer the full program of secondary education (through Form VI) required for access to higher education. There is an inequality between opportunities offered to boys and girls at the secondary level, as shown by the following statistics from 1970:

	<u>Secondary Schools</u>			<u>Schools Offering Forms V-VI</u>		
	<u>Boys</u>	<u>Girls</u>	<u>Mixed</u>	<u>Boys</u>	<u>Girls</u>	<u>Mixed</u>
Western	32	10	51	3	1	0
Nyanza	81	18	6	5	0	0

TABLE 19

EDUCATIONAL STATUS INDICATORS (1970)

District	PRIMARY		SECONDARY				NUMBER OF SCHOOLS				Library
	Enrollment ratio	Average class size	FORM I-IV		FORM V-VI		SECONDARY		HIGHER		
			Enrollment ratio	Class size	Enrollment ratio	Class size	Aided (2)	Non Aided (2)	Voc. Techn.	Teacher Training Colleges	
Bungoma	84.4	35	10.7	34	1.0	25	10 (29)	14 (14)			1
Busia	52.6	25	10.4	34	None		7 (11)	4 (8)			
Kakamega	62.9	35	10.8	34	0.3	25	21 (27)	37 (102)	2	2	
Kisii	54.5	27	7.7	36	0.3	21	9 (19)	27 (70)		2	1
Kisumu	51.0	35	9.4	34	1.1	21	8 (14)	10 (28)	1	1	1
Siaya	63.3	33	7.4	28	0.6	21	7 (14)	12 (26)			
S. Nyanza	37.2	22	7.2	34	0.4	21	9 (19)	23 (57)		1	

National Average

61.6

40
(1)

11.1

35
(1)

0.7

25
(1)

(1) Target figures from the 1970-1974 plans

(2) Values in parentheses are for 1975 and are taken from the draft District Development Plans.

This discrepancy is particularly marked in Nyanza Province, where the culture has traditionally offered greater resistance to giving women access to opportunities in the modern sector.

Technical schools are to be found in Kakamega and Kisumu Districts, and teacher training colleges in Kakamega, Kisumu and Kisii Districts. Public libraries are available in Bungoma, Kisii and Kisumu.

Recently, the "village polytechnic" movement has encouraged the development of post-primary schools oriented specifically to the needs of rural life, including courses in agriculture, domestic science, and local crafts and industries. At present such schools are organized and operated by the Ministry of Housing and Social Services. According to the draft District Development Plans, there were over 40 functioning Village Polytechnics in 1975 distributed as follows:

Bungoma	2
Busia	7
Kakamega	7
Kisii	N/A
Kisumu	14
Siaya	8
S. Nyanza	5

The District Development Plans emphasize the need to direct more resources into this type of educational facility and to relate it even more closely to rural employment opportunities.

b. Health

The location of health services in the project area was assessed by regional planners in 1970 as unrelated either to population density or to local service centers. This pattern was established by the region's initial dependence on missions and private enterprises to provide health services. Local self-help efforts in this area and increasing government control over the health service delivery system should result in a more rational distribution of services in the future.

Some vital statistics from compulsory registration areas in 1971 give an indication of current health status in the project area (see Table 20). The extraordinarily high birth and death rates for Kisumu District reflect the concentration of health facilities in this area, as well as, probably, a much more comprehensive system for recording vital statistics. The low rates for South Nyanza District undoubtedly reflect serious under enumeration. These data are not available for Kisii District, which was relatively underserved with health facilities at the time. Indicators of health service provision by district are shown in Table 21.

Of the seven districts, only Kisumu exceeds the 1970 national average in provision of hospital facilities. Kisii District appears to be least well supplied with hospital and health service facilities. Average distance to such a facility is 6 miles in densely populated areas (3 miles around Kisumu Town) and 10 to 20 miles in the more sparsely populated areas.

TABLE 20

VITAL STATISTICS 1971 (1)

District	Recorded Birth Rate (per 1,000 pop.) (2)	Recorded Death Rate (per 1,000 pop.) (2)	Infant Mortality (per 1,000 pop.) (2)	per 100 births
Bungoma	36.4	5.7	1.7	4.8
Busia	20.9	4.4	1.0	4.8
Kakamega	27.7	5.0	1.2	4.2
Kisii	N/A	N/A	N/A	N/A
Kisumu Urban(3)	89.3	29.7	5.2	6.2
Kisumu Rural(3)	45.7	28.5	7.1	15.5
Siaya	27.9	9.2	1.8	6.5
South Nyanza	6.9	1.6	0.3	4.4
Project Area Average				

(1) Vital Statistics from Central Bureau of Statistics, Statistical Abstract 1975, Table 24

(2) Population in 1971 estimated from 1969 census figures grown at Consultant's estimated growth rates (Table 1)

(3) Urban and rural growth rates based on data in Kisumu District Development Plan. (Kisumu Town 5.7%; rural 3.1%)

TABLE 21

HEALTH SERVICE INDICATORS (1)

District	Hospitals			Health Centers			Dispensaries		
	Number		Beds per 1,000 pop (2)	Number		Pop. per Health Ce	Number		Pop. per dispen.(3)
	GOK	Private		GOK	Private		GOK	Private	
Bungoma	1	4	0.47	9		1/51,300	1		1/30,800
Busia (5)	1	3	1.09	5		1/46,400	4		1/17,800
Kakamega	1	6	0.91	2	8	1/35,200	1	3	1/20,600
Kisii (6)	1	3	0.31	N/A		N/A	N/A		1/24,900 (4)
Kisumu	4	7	1.96	3	3	1/80,200	15	1	1/14,600
Siaya	1	4	0.70	4	2	1/74,000	15	2	1/15,900
South Nyanza	1	4	0.68	13	4	1/50,800	15	10	1/11,400
National Average (1970)			1.37			1/65,000			

The nutritional quality of the family diet is usually very low. It is too high in carbohydrates, mainly corn but sometimes potatoes or sorghum or millet, and deficient in protein, vitamins and fats. There is no evidence to indicate whether increased incomes would result in a better nutritional balance in the diet. It is safe to say, however, that for the marginal farmer with an insufficient amount of land, increasing food crop production through higher yields would benefit the farm family, at least from a caloric consumption point of view. Preliminary evaluation data indicate that farmers in the project area prefer to increase family food consumption and to assure a reasonable surplus, before commercializing any of their food crop production.

c. Housing and Social Services

In addition to the Village Polytechnics, the Ministry of Housing and Social Services administers a variety of programs designed to improve rural welfare and quality of life. Most of these programs are operated out of the administrative centers in each district and do not require separate facilities.

Housing activities are concentrated in urban areas - 95% of national housing funds have been allocated to 38 urban centers, including Kisumu. The remaining 5% is available for loans to individuals or co-operative societies in rural areas. Thus there is no organized government activity in the area of rural housing construction or improvement. However, upgrading of housing and construction of permanent structures is a fairly high spending priority for rural households.

The successful conversion of many farm families to cash cropping is visible to the observer in the high percentage of homes with tin roofs or cement block construction sprinkled throughout the project area.

Lack of proper sanitation is currently the most important problem in housing, particularly in the lowland areas around the Lake which are periodically flooded and where cholera has become a serious health problem, in recent years. Provision and installation of pit latrines and sanitary water supply facilities are of the greatest importance for future development in this area. Such facilities are also needed and desired in the highland areas, although water supply is not quite such a serious problem there.

The division of Community Development concerns itself with local self-help (harambee) movements attempting to guide them into projects consistent with national as well as local development priorities. It also works with private service-providing institutions and voluntary groups to coordinate their activities with those of government. The division attempts to ensure the success of harambee projects by providing information about national standards for construction and financial requirements to local self-help committees.

The division of Social Services also organizes and operates day care centers, women's groups, and functional literacy programs. There is a plan to construct one Family Life Training Center in each district of Western Province during the 1976/77 fiscal year. A Vocational Rehabilitation Center is functioning in Kakamega and another, for women only, is planned for Itando in the same district. Another Rehabilitation Center is found in Kisii.

5. Motivation

In Kenya and in the project area, social systems which might be considered both traditional and modern operate simultaneously. Under traditional social systems, kinship, ethnicity and tribalism are important components. Kinship relations determine to a large extent informal learning, the initial placement of individuals in society, social behaviour and obligations. Ethnic systems are cultural groups which center around real or imaginary generic origins and act as social collectives. In comparison, tribalism is a cross-ethnic phenomenon which becomes salient in competition or confrontation with similar large-scale units. Tribal systems are built on commonality, real or imagined, between ethnic groups.

Within modern social systems, groups are mainly categorized on the basis of education, religious affiliation, occupation, and income. Since individuals are simultaneously members of both modern and traditional systems, in any given situation they have the alternative of selecting between the behaviour patterns associated with each. Although persons may function primarily within traditional social systems, guided by traditional values, and beliefs, this does not mean that they will not accept innovations the transmission of which may be facilitated by improved access. Rather, innovations are judged according to their compatibility with the traditional system.

Further, the relationship between motivation and behaviour may be constrained by social structural factors. For example, a male household head may decide to initiate production of a cash crop, expecting that the labor will be performed largely by his wife and children. But, if the income will go to the male household head and if the crop competes for labor with food crops which are under female control, evidence indicates that the cash crop might be neglected until work on food crops is complete. Economic considerations motivate both parties, but the needs of the situation are differently perceived by each.

For the purpose of this project the key questions are whether people in the project area will perceive road improvements as a desirable change, and whether they will be motivated to take advantage of the opportunities offered by improved roads to increase their social welfare through (1) increasing production of food crops for domestic consumption, (2) commercializing a greater proportion of their total production, (3) investing land, labor and capital in the production and marketing of new cash crops, and (4) utilizing newly available services. A further question is assuming that people utilize the advantages of improved road access to raise their cash incomes, whether or not this marginal income will be spent in a way that will enhance rural social welfare.

In answer to the first question, there is no doubt that people in the project area want the roads to be improved. District Development Committees have repeatedly raised the issue with the local representatives of the MOW. Presently programmed rural works expenditures, made at the discretion of the DDC's, contain a major component for road improvements.

It should be noted, however, that road improvements have traditionally been perceived as a responsibility of central government. Therefore people expect to be paid for their labor in road construction and maintenance, and they are unlikely to take the initiative in clearing a road or drainage structure of debris following an accident or a flood. The road is perceived

as serving the purposes of central government, therefore as part of the national development effort. To the extent that people in the project area associate themselves with this effort, they will be desirous of further road improvements.

The actual savings effected by road improvements accrue primarily to vehicle owners: Government Ministries, traders, transporters, urban salaried employees and wealthy farmers. For the purpose of this paper is assumed that negligibly few individual farmers in the project area own vehicles (although vehicles may be owned or operated by farm co-operatives, in which case the savings accrue to the group as a whole). This means that the response of smallholders to new road opportunities is critically dependent on the extent to which such savings are passed along in the form of reduced prices for inputs, reduced transport and travel cost, and reduced physical distance between the smallholder and the service delivery point.

Assuming that such savings are in fact passed on, if not through an actual reduction in costs then through a relatively slower rise in costs then would otherwise be the case, this may provide an economic motivation for farmers to alter their behavior in the direction of spending more (proportionately) for inputs, input and crop transport, and travel. Whether or not they do so then depends on the value attached to such activities compared to alternative possible uses of scarce funds.

In the value system of the project area it is highly desirable for each smallholder to produce enough food to meet the needs of the family, including enough surplus to generate cash income needed for high priority expenditures such as school fees, clothing, and housing improvements. After this locally defined minimum standard of living is met, the value of additional production drops off sharply in relation to the amount of additional labor required.

Insofar as this marginal production is dependent on female labor, it is virtually impossible, under existing patterns, to increase the cultivated area or to change cropping patterns to include cash crops requiring a higher per hectare labor input (irrigation is particularly crucial here, as in most of the project area it depends on female transport of water). To the extent that men assume responsibility for labor required to produce additional cash crops, production is crucially dependent on the extent to which such men have adopted a "modern" (work ethic) value system. The capacity to mobilize additional labor by males is clearly present in the local economy, but the willingness to do so is equally clearly dependent on the level of acculturation.

Extension activities may possibly encourage such a change in salient values by associating "modern" farm practices with education and a more forward-looking way of life. The availability of credit, not to say peer group support, through farmer co-operatives may also act as an incentive to more modern farm management. The strengthening of both services (agricultural extension and co-operatives) through the IADP may be considered as a possible factor marginally increasing the probability of a full response by farmers to new opportunities provided by improved road access.

The utilization of services made accessible by road improvements depends on a number of external constraints (capacity and location of facilities, regular flow of needed supplies perceived competence of staff, local political support for service etc. It also depends on the smallholders' perception of his need for such services and the sacrifices he is willing to make in order to secure them. This clearly differs by type of service as well as between cultural groups or sets of value systems in the project area. Further research in this area is needed in order to make accurate predictions about smallholder response to access-to-service benefits:

6. Role of Women

Women constitute an estimated two-thirds of Kenya's rural population, and an estimated one-third of all rural household heads. This group provides an estimated 80% of the labor necessary for food production and a significant portion of that for cash crop production. This is in addition to women's traditional responsibilities in the home and for the well-being of the family. These responsibilities in fact, have been growing greater and her tasks more difficult over the past few decades. A woman's labor increases when male family members migrate in search of employment. It also increases when she is deprived of the help of her children because free education is provided and when, recognizing the importance of education, major sacrifices are made to pay school fees and to keep children in school as long as possible.

Traditionally, women depend on their husbands to make many of the decisions regarding land and crops; therefore, if male family members are absent, the woman may be less likely to make by themselves decisions on new technology, agricultural innovations and so which may be offered to them. However, there is some research evidence from small-holder areas in the Eastern Province which indicates that receptivity to adoption of innovations is not sex-related. Similarly, in Kakamega District research has shown that women farm managers, i.e., those who are widowed, separated, or who have a husband employed outside of the area, are no more or no less likely than men to adopt such innovations as hybrid maize, chemical fertilizer, and horticulture. It has been found, however, that women from poorer households are less willing than men to accept the risk of using land titles for security against agricultural loans.

Land registration is a major social, cultural, and economic change in Kenya and may have significant effects on women. Under the land adjudication and registration program, the tendency has been to regard the power of allocation (which under the patrilineal system is normally the right of the male head of household and male heirs) as tantamount to ownership; therefore, titles have overwhelmingly been conferred on men although there are some reported instances of widows obtaining registered titles. However, as a market in land has come into being, more and more women are finding it possible to acquire holdings of their own through purchase with cash earnings from wage labor or female crop commercialization. Such land will be a woman's property and may be passed on to her daughters.

The Government of Kenya has, in some cases, created and supported programs aimed at improving women's place in the economy. The Ministry of Agriculture Extension Service trains women for home demonstration work and accepts women in variety of field training courses, for instance at farmer training centers. However, in the case of extension agent train-

ing, there has been difficulty in filling all the places available to Kenyan women because many women do not yet perceive these job opportunities as being either open to them or as appropriate areas for their employment. While graduates of Egerton College have been assigned to Government extension positions, there has been no followup of their activities, further training requirements or further needs for informational materials. In training activities conducted to date under ASL I, Part C, women have formed a large percentage, ranging from 20 percent to over 40 percent, of the attendees at the classes conducted at farmer training centers.

In 1975 the Government of Kenya legally abolished wage differentials based on sex for the same work performed. No information is currently available on how widely this legal requirement is now being applied.

In addition to these Government actions, it appears that women may be increasingly helping themselves. There is some evidence to suggest that more women are becoming members of cooperatives and/or are forming their own cooperatives and that more rural women are insisting on having a say in what happens to money earned from crops for which they are responsible. For example, several of the milk producer cooperatives in Western Kenya have a high percentage of female members who take the milk to the cooperative for marketing, and insist on receiving directly the cash payments for sales. Also, women's groups at the local level increasingly arrange for extension agents to visit them to discuss a variety of topics important to rural agriculture production and family welfare.

For further information see Annex VII.

VI. Social Soundness Analysis

B. Social Impact Assessment

A comprehensive framework for assessing the social impact of a program such as the GBC has yet to be developed. Such a framework should include consideration of both direct and indirect effects of an alteration in the infrastructure of a developing area on the patterns of social behavior to be found in that area. It also requires making a value judgment as to whether such changes are good or bad from a development point of view. A more sophisticated methodology would provide a way of determining the values and priorities of such social changes from the point of view of the people participating in them. Lacking such sophistication in the present instance, it will be necessary only to describe the expected social consequences and allow the reader to form a judgement as to whether they are good or bad for the people concerned.

1. Direct Effects

There are three possible ways in which a program such as the GBC might directly affect the social structure of the project area: through employment, through purchase of goods and services, and through land acquisition.

a. Employment. The GBC as presently planned, will contribute little or nothing to local employment. The unskilled labor required to support the proposed machines and their skilled operators is well within the capacity of the provincial MOW camps to supply from currently under used manpower reserves. Similarly, there will be no direct income effect, as these people are already on the MOW permanent payroll and are spending their money in the local economy.

The use of labor-intensive methods does not appear to be appropriate for most of the tasks involved in the road improvement program. Brush cutting, ditching and culverting are normally done by hand labor. Where needed, the MOW has in the past preferred to hire casual day labor for such tasks rather than add to the permanent pay-roll. Any money spent in this way will circulate in the local economy, representing a benefit to underemployed casual laborers and the system which serves them. The magnitude of this benefit, however, is likely to be quite small.

Use of locally manufactured materials such as bridge beams and culverts will certainly benefit the local economy by generating additional employment in such enterprises and by encouraging the use of local resources (hand crushed stone, for instance). Such projects should also have a demonstration value for communities needing all-weather access on roads which would not be eligible for improvements under the GBC program. Culverting done with local materials and unskilled labor would be well within the capabilities of such communities to undertake, for example, within a rural works program.

To the extent that gravelling and/or bridge construction is done by local contractors using local labor, there will also be a benefit to the local economy. This employment impact will probably affect primarily the more skilled sectors of the local labor market providing back-up services to the contractor, such as machine repair shops, fuel suppliers, tools and materials stockists, and so on. Nevertheless, such a stimulus to the local economy is preferable, from a social standpoint, to the effects of bringing in outside contractors with self-contained support units.

b. Purchase of goods and services. It is expected that the major part of the loan funds would be spent on the purchase of machines and POL through an independent procurement center (i.e. not through normal MOW procurement channels). Within the capability of local suppliers to meet the demands for efficient operation of the gravelling unit, off-shelf procurement of tools and materials would be desirable. A smaller amount of grant funds is earmarked for expatriate technical assistance, a portion of which might find its way back into the local economy. The magnitude of this effect depends partly on the expatriates' choice of a home base and on their consumption patterns.

c. Land acquisition. Widening of roadways and changes in alignment might pose a problem by taking land away from smallholders and out of agricultural production. The GBC program does not propose widening existing roads to MOW standards unless this can be justified by traffic levels, in which case the travelled way may already have encroached on neighbouring smallholdings. Any proposed widening of an existing road should be studied to determine its land acquisition implications. The MOW has provided assurances that any changes in alignment under the GBC program will not go beyond existing rights-of-way.

2. Indirect Effects

Improving secondary and minor roads to (1) all-weather standard and (2) a level when the MOW will assure future maintenance will have an indirect impact on the social structure of the project area as well. The mechanism through which this impact takes place can be summed up under the general heading of a change in accessibility experienced by the people who live near and/or travel on the secondary and minor roads. The magnitude of this change depends on many factors: the previous level of access provided by the road, previous travel patterns and desired changes in travel patterns constrained by lack of access, timely provision of goods and services to which access is desired and so on. In general, however, it is safe to say that improved access will be perceived as a benefit by smallholders in the project area as well as by the people who actually travel on the improved roads.

The implications of improved access for rural social welfare can be discussed under several headings: impacts on education, health, family life, community life, population growth, and migration. Such a discussion would of course, be highly theoretical. Little research, and none in the project area, has ever been directed at evaluating the social impacts of a change in accessibility on an empirical basis. For this reason, it is

recommended that a certain amount of baseline data be collected concerning travel and transport on secondary and minor roads before and after the gravelling program takes place. (See section VIII entitled "Evaluation Program") From these data it should be possible to determine with much greater precision the social consequences of a change in accessibility and the share of the small holder in project benefits.

a. Education: Primary schools are already well distributed over the project area, even in regions not well served by the road network. Since most students walk to school, road access is not a constraint unless there is a major impediment (such as a river without a bridge crossing). However, poor and/or unreliable road service may discourage teachers and education officials from coming to such schools; they will have greater difficulty getting needed books and supplies as well. Improvement of roads leading to schools is a high priority in some communities.

For secondary schools and village polytechnics, distance is probably a more serious constraint limiting access to educational opportunities. However, it is improbable that road improvements alone would solve this problem, as few students could afford to pay for vehicle transport on a daily basis. Some students may commute on bicycles; for these, road improvements would provide a tangible benefit. Such students are likely to come from the more privileged of smallholder families, however, including those with at least one non-farm wage earner.

Other educational efforts such as functional literacy classes, domestic science and agricultural training programs, family planning clinics and so on appear to be constrained more by lack of funds, staff, and vehicles than by the condition of the roads. (It should be noted, however, that the poor condition of many government vehicles can be partly attributed to the wear and tear now occasioned by taking these vehicles over bad roads). However, road conditions are one factor taken into account by administrators in deciding where to provide scarce services. For this reason it can be hypothesized that road improvements will induce a better distribution of such services in the project area. At this point such a statement is no more than an assumption, and one which should be tested by empirical data in the course of the gravelling program.

b. 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 of this nature.

Family planning education is conducted by rural nurses in conjunction with the maternal and child health clinics 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.

Insofar as the graveling program contributes to increased yields of food crops, it will enhance the caloric consumption of some farm families which are currently unable to meet their own food requirements. Insofar as it encourages increased production of cash crops, income will become available for spending on foods that would improve the nutritional quality of the diet. Little is yet known about consumer spending patterns, but current evidence seems to suggest that conversion to a cash economy may actually result in a decline in the nutritional quality of the diet. Certainly it cannot be assumed that increased agricultural production necessarily improves nutrition in the home. This question is another major topic for future empirical research.

c. 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 stand-point 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 small-holders. 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. Since the roads to be gravelled under the GBC program are already part of the classified network and pass through fairly densely populated areas, there is little likelihood that improvements under this program will induce much movement of household heads in search of new agricultural opportunities.

The burden of labor placed on women whose husbands are away earning money and whose children are in school is unlikely to be lightened by road improvements. Many women now find cash employment by transporting agricultural produce to a market or pick-up point. This important source of income for women may be eliminated if roads are improved to a point where it becomes economic either for a transporter to bring vehicles to the farmer or for a farmer (or farm co-operative) to operate a vehicle. In this case the savings would be transferred from rural women to farm owners, independent transport operations, or government crop commercialization agencies. Where women are themselves farm managers and/or provide unpaid labor to transport goods, the effect would be to free them from a time-consuming task. In some cases this labor could be used to increase agriculture production

d. Community Life. By definition, in Kenya the secondary and minor roads serve the least important population centers in terms of size and services available. Growth in these centers is definitely constrained by lack of all-weather access. To the extent that such centers are located on presently impassable or very poor condition D and E roads, they will benefit from increased contact and communication once the roads have been improved. Evaluation data from road improvements constructed under the SRDP in Vihiga and Hamisi Divisions of Kakamega District will provide some indicators of the magnitude of this response in terms of number of new establishments and items stocked in local shops and markets.

Provision of improved road access may also enhance community social life by increasing the probability that new social groups such as farmer's clubs, women's groups, sports clubs and youth groups will form under the impact of an external stimulus. Such social groups may either cross-cut or reinforce traditional intra-and inter-community cleavages. Data to assess either the magnitude or the direction of this effect, in terms of its contribution to national development, are lacking at this time.

e. Population Growth. The entire project area is under very high population pressure at the present time. It is right in the middle of the demographic transition where death rates and particularly infant mortality rates have declined while the birth rate continues to maintain a high level. Family planning programs have so far had no measurable impact on the birth rate. It is likely that official statistics do not present a reliable picture of population growth in the project area.

Improved road access is not likely to materially affect such growth, although in individual cases improved access to health care may prolong the life of an expectant mother or a sick child. Death rates from certain key diseases such as malaria and cholera in the lower lying regions may decline drastically as a result of national health campaigns and the timely provision of medical services in case of need. On the other hand, with increasing numbers of vehicles on rural roads, traffic accidents may become a more significant cause of death or disability. In addition, improved roads may facilitate the expansion of family planning services.

The net effect of road improvements on population growth will therefore be small but positive. (i.e., will probably contribute more to population growth than it will detract from it).

f. Migration. The effect of road improvements on population distribution is somewhat more tangible. The whole project area is densely populated and 85% of this population lives within 5 km. of major (A,B or C) roads. Therefore, if there is any land left to be exploited, it will be found in the areas served by D and E roads. The possibility of making such land more productive by bringing in inputs and taking crops to markets, using vehicle transport, should act as an incentive for the excess population to move into these areas, thus bringing about a more even population distribution. This is particularly likely to be the case where much of the land remains unadjudicated, i.e. in Kisumu, Siaya, and South Nyanza Districts.

Migration outside of the project area is not likely to be materially affected by the GBC program. Improved passenger transport service in response to cost savings on D and E roads will facilitate short-term migration by surplus labor, thus enhancing the flexibility of the rural labor market. Probably more trips will be made to urban centers by residents of previously isolated areas. On the other hand, improvements in rural roads along with the other services to be provided in rural areas under the Integrated Agricultural Development Program are designed to make rural life more attractive to young people and therefore to reduce the flow of migrants to the cities. The net effect will probably be a slight increase in short-term migration and a slight decline in long-term migration.

VI. Social Soundness Analysis

C. Incidence of Benefits and Participation in Planning

The incidence of economic benefits to be derived from the GBC program is discussed in Part V of this addendum. The present discussion concerns the incidence of social benefits as described in the preceding section. The "sociocultural feasibility" of the project and the role of local participation in planning and implementation are then evaluated. In conclusion, the project appears to be feasible from a socio-cultural point of view and the majority of social benefits will accrue to the more isolated, hence less privileged, smallholders in the project area.

1. Incidence of Social Benefits

The GBC program is intended to improve access for those people in the project area who are not now served by all-weather roads. It is assumed that roads above the "secondary and minor" (D and E) category are now all-weather or will become so under the regular MOW construction and maintenance program.

The proportion of the population served by D and E roads can be calculated in two ways. One is to assume that people living within a certain radius of a major road are served by that road, and everyone else is served by the secondary and minor roads. The second way is to assume that each population group is served by the closest road. The results of both calculations (based on 1969 population distribution) are shown in Table 22.

TABLE 22
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. Less than 15% of the population now lives more than 5 km. from a major road. However, many secondary and minor roads serve population within this perimeter as well as outside it. Over 30% of the project area population lives closer to a secondary or minor road than to a major road.

The proportion of secondary and minor roads which do not now provide all-weather access has been estimated by the Provincial Engineer as follows:

Bungoma	65%
Busia	20%
Kakamega	35%
Kisii	35%
Kisumu	20%
Siaya	25%
S. Nyanza	35%

Using the more generous criterion in Table 22, and assuming that all people served by a road benefit from its improvement (probably more true for a link-type improvement than for a spot-type improvement) the maximum number of people whose access will be improved by the proposed GBC Unit constitutes no more than 500,000 or 11% of the total project area population.

Who are these people? They are small holders and landless laborers living on those secondary and minor roads which do not now have all-weather access. By definition, then, they have not received the same steady flow of goods and services as centers which do have all weather access. While we cannot show, on the basis of existing data, that this 10% is the poorest 10% of the rural population, it is probable that this target group contains a high proportion of those producers who are less integrated into the cash economy and who have been relatively deprived of access to inputs, credits, market facilities, and administrative services.

The benefits of road improvements to this group are of two types: (1) access benefits which automatically follow road improvements, and (2) benefits which depend on an increase in farm family income and on patterns of consumer expenditure. The former are of an "opportunity" nature and include such items as: more goods in the local market, more public transport and travel facilities, outreach by government service providers, and so on. The latter accrue to those individuals who (1) have enough disposable income to take advantage of newly accessible opportunities, and (2) make a conscious choice to do so.

In principle, the benefits of improved road access accrue to all the people living along the road which has been improved. In practice, however, the extent to which these benefits can be enjoyed depends upon the way in which the road is used before and after the improvement. This implies a change in travel and transport patterns which can be conceptualized as a behavioral response to new access opportunities, in much the same way as the planting of new crops is interpreted as a behavioral response to new agricultural opportunities.

The type of improvements proposed under the GBC Program are intended to make secondary and minor roads passable to light vehicles throughout the year. This means that access benefits will be realized principally by those who travel in such vehicles, i.e. government officials, traders and suppliers, farmers who can afford to use vehicles for transport (this includes cooperatives), truck, bus and taxi operators, and vehicle passengers. Benefits will also accrue to bicycle owners or users in the form of reduced wear and tear on their vehicles. Animal-powered transport is relatively rare

in the project area; if an intermediate form of transport technology using human or animal power combined with wheels (e.g. ox-carts or wheel barrows) were to be introduced, however, there would be additional benefits for road improvements.

It is clear that such access benefits will be materialized only to the extent that people can afford to pay for vehicle transport and are willing to spend money for it. With respect to government services, the realization of benefits depends on available vehicles and fuel allocations. Traders and transporters are constrained chiefly by vehicle costs; experience with the SRDP, sugar and tea roads suggests that goods and passenger transport services move rapidly into an area where transport costs have been lowered by road improvements. The supply of such services is closely calibrated with demand, indicating that farmers are in fact willing to use vehicles for crop transport and that people in the project area value travel as a consumer good as well.

To the extent that rural development programs make it possible to increase farmers' cash income, then, it is likely that the benefits of road access will in fact be fully realized. To the extent that such programs have a redistributive effect in the rural economy, these benefits will also be redistributed. In addition, there is a distributional benefit deriving from the fact that goods and services will be made available in areas that were previously inaccessible at least part of the time. People in these areas will have more equal opportunities to benefit than they had before, even if the realization of these benefits is still constrained by cash income.

In short, a road improvement program limited to secondary and minor roads will provide fewer benefits to the very rich and the very poor than to the middle groups of smallholders who are in a position to take advantage of new opportunities. Access benefits per se are class-blind; they accrue to the community as a whole. Income-dependent benefits, that is, benefits that require some initial expenditure to be realized, will accrue to individuals in proportion to their disposable income and the value they place on travel or transport.

Presently, there are very few data on which to base a prediction about the behavioral response of smallholders in the project area to new transport opportunities. For this reason it would be highly desirable to implement an evaluation program in parallel with GBC improvements that would provide more solid information on which to base future decisions concerning such improvements. Details of a proposed evaluation plan are given in Section VIII of this addendum.

2. Participation in Planning

Improvement of secondary and minor roads (as well as bitumenization of major roads) is a high priority throughout the project area as expressed in the District Development Plans. This priority has been verbally reinforced by provincial administrators and planning authorities in conversations with the Consultant. Specific links requiring improvement have been identified by the District Development Committees, reflecting the concerns of local communities as well as those of the various Ministries providing services in each district. These lists are then prioritized within the Provincial Development Committees, and the prioritized list is submitted

to the Ministry of Works. In principle, each year the list is updated to reflect current improvements made under the MOW's regular maintenance program and other special programs (sugar roads, tea roads, etc.). In practice, however, there has been relatively little feedback from the MOW to the District Development Committees to show how these local priorities are taken into account in planning the regular construction and maintenance program.

A selection process for links to be constructed under the Rural Access Roads program has already been initiated by the MOW. In this process, District Development Committees are asked to provide some specific information about each link they recommend for construction. These data are then incorporated into the MOW's internal evaluation process, which also includes a technical feasibility and cost study component.

The MOW will then prepare a proposed program of rural access road construction for each district which will go back to the District Development Committee for discussion, amendment and final approval. This process has the advantage of allowing the Committees to see how the data which they provide are used in analyzing the feasibility and cost/benefit ratio of specific links, thus contributing to the development of a real planning capability at the district level.

This planning exercise is expected to have some spinoffs for the GBC program. In the latter case, the Ministry of Works will prepare a proposed program for each district based on a number of objective criteria, as outlined in Part VII of this addendum. (These criteria include, but are not limited to, those which are now used by DDC's in arriving at their recommendations for upgrading of existing roads - i.e. agricultural access, traffic counts, and new development projects). This proposed program will be presented and discussed with the District Committees, and the final selection of links and sites for improvement will be decided in consultation with these committees.

It is unlikely that local people will feel a strong sense of participation in the road selection process and consequent commitment to road utilization and maintenance. This is so not because of any defects in the GBC program but because road construction and maintenance are traditionally perceived as Government responsibilities. Consequently, voluntary self-help efforts have gone into other activities such as schools, health centers, water supplies and cattle dips. This does not mean that people fail to perceive a need for roads, but rather that they perceive the Ministry of Works as one of the more effective government agencies on the ground and they rely on the political process to make this agency responsive to their needs.

Therefore, voluntary maintenance of newly improved roads is neither expected nor appropriate. The standard of the improved roads should be such that the MOW can in fact assume responsibility for their effective maintenance, whether through traditional techniques or by a program of employing local labor. Failure of the government to maintain such roads will not go unnoticed by the District Development Committees, and it is incumbent upon these groups, as the coordinating unit of the national development planning process on the ground, to ensure that road constru-

ction and maintenance is carried out in harmony with other planned development activities.

No groups or individuals have been identified as opponents of all-weather roads for Western and Nyanza Provinces. The roads already exist and the changes in alignment will be so minor as not to generate opposition by farm lands being taken for roads. Similarly, the highly competitive nature of the local transport system indicates that opposition should not be forthcoming from commercial vehicle owners and operators, who stand to benefit both from savings in vehicle costs and from access to new business opportunities. Traders who in the past have controlled marketing of farm production from remote rural areas by acting as the middle man between the farmer and marketing board purchasing offices may suffer a loss of earnings if farmers choose to use the improved road network to market their produce themselves. However, it is doubtful that this concern would be translated into action against proposed road improvements.

The most serious question is whether or not the socioeconomic benefits to which the roads are to contribute will, in fact, be realized. Failure of this to happen may result from one of two causes - either the roads are not selected so as to maximise their contribution in concert with other development activities in the area, or the other development activities do not achieve the results projected for them.

With regard to the first possibility, the proposed link selection criteria and evaluation plan should ensure that selection of roads for gravelling will reflect socio-economic considerations and their relationship to other development activities, such as the Rural Access Roads program, the Integrated Agricultural Development Program and Part C of ASL 1. Also, the concentration by AID of its support for significant parts of ASL 1 and the IADP in the same areas in which AID financing for gravelling and rural access roads programs will operate should provide a means for strengthening coordination of these various activities.

It is evident from previous sections of this paper that there are numerous factors which will affect whether or not improved extension services, farm inputs, increased credit, and so on are actually adopted and/or the increased income derived from the resulting increases in production will be spent in a manner which will improve the quality of life for the rural poor making up the majority of the population of Western and Nyanza Provinces. The socioeconomic studies proposed as part of the other segment of this loan as well as under the proposed FY 1977 rural roads project should shed light on this particular question.

VII. Link and Improvement Selection

A system of link selection is required to identify and assign priorities among the road links to be improved under the GBC program. Such a system should limit these links to those parts of the total D and E roads network which require improvements and which are economically feasible and/or associated with local development projects. This selection process must involve the MOW's evaluation according to technical criteria but should also allow for formal consultation between the MOW and the District Development Committees, which are the lowest level planning bodies in the project area.

The decision on which links to improve should be separated from the choice of a level of improvement. The latter should be decided strictly on the basis of forecast traffic.^{1/} The structure of the link selection process, in contrast, should be designed to maximise small holder access.

A. Link Selection Criteria and Procedures

The link selection criteria proposed below would group the candidate links into three categories corresponding approximately to benefit cost analysis elements described in the preceding sections. These categories are as follows:

category A : Presently non-all-weather road with traffic levels greater than 20 ADT on good or fair soils.

category B : Presently non-all-weather roads with traffic levels under 20 ADT but connected with specific development projects such as rural access roads, and on good or fair soils.

or
presently all-weather roads in poor condition with traffic levels greater than 20 ADT on good or fair soils.

category C : Roads on black cotton soils or other poor soils, with traffic greater than 20 ADT and associated with a specific development project.

The object of using a minimum traffic threshold is to ensure that only roads with some economic value are improved.

The traffic levels used for this selection should be future traffic in the opening year. This traffic should include an allowance of 8% per year for growth from the last traffic count, and 10 ADT for each significant development project to which the road is directly linked 2/. (This would include a rural access road project, or a health center or an agricultural training center or any other project that can be expected to generate some traffic).

1/ This is in accord with the conclusions of the 1975 evaluation of SRDP road programs by the Institute for Development Studies of the University of Nairobi (Chapter 12)

2/ Both the 8% growth rate and the 10 ADT figure are to be verified in the evaluation program described in section VIII.

The present traffic counts taken in the project area are not comprehensive. However, a complete traffic survey is judged to be unnecessary. It is proposed that the MOW estimate current traffic levels on candidate links relative to the 20 ADT threshold, and that a traffic count or survey be carried out on each link selected for improvement prior to improvement to verify the traffic level. (Data obtained through this count or survey would also be used for program evaluation as described below)

The DDCs can play a role in estimating local road need where traffic counts are not available or of limited use. However the primary data required from DDCs would be the specific development project locations associated with each link. This data should be available as a normal part of DDC planning activities. The method of transmission of this data from the DDC's to the project engineer prior to the development of the MOW's proposed program of improvement in each district remains to be determined. (The MOW representative on the DDC could serve this function, however, some relationship between the DDC and the project manager should be encouraged).

The selection procedure would take place in three steps. First the MOW will provide a list of the roads in each category within each district to the District Development Committee. Second the DDC will then decide on the link priority within each category. Third the MOW would program the GBC unit to improve the highest-priority links first in each district.

Given the necessity of keeping transportation costs and unit downtime to a minimum, it is not desirable to move the unit from its base location until all the eligible GBC roads are improved in the service area of that base. In order to improve the maximum number of category A links early in the program, however, the base locations should be selected first in those areas with the highest percentage of category A roads.

This selection procedure focuses the MOW evaluation process on the technical criteria where the MOW staff is most informed, while allowing the DDC's to fulfill their role by determining local priorities and bringing to bear their knowledge of local conditions and potential response. The DDC's could also recommend that additional roads be added to the list if such roads can be shown to qualify on the basis of future development.

B. Link Improvement Selection.

The type of link improvement to be carried out on a given link is to be determined primarily on the basis of future traffic as defined above, in comparison with a traffic threshold (see Annex B).

The following traffic thresholds should be used:

- 75 ADT for MOW standard in flat or hilly terrain
- 60 ADT for MOW's standard with sealed grades, in mountainous terrain with intensive rainfall
- 20 ADT for spot improvements.^{3/}

This procedure is aimed at getting as many links improved to an all-weather standard as possible by the first GBC unit, while assuring that the standard of the road is suitable to the traffic level (and therefore economic benefits are high enough to cover costs) and that the improved road will be maintainable with adequate maintenance support from the MOW. Those links which meet spot improvement thresholds but have more than ^{4/}40% bad sections could be improved to MOW standard in exceptional cases. -

C. Data required from the GOK.

In order to implement the above selection system, three types of data are required from the GOK, two types to be provided by the MOW and one type by the DDC's.

From the MOW, data is required on road condition and on traffic levels. The present road inventory maintained by the inspectorate does not contain information on whether or not a link is an all-weather link or on the average surface condition of each link. It is proposed that the MOW inventory this data for those links which could be candidate links for the GBC program. The AID project engineer can work with the MOW on this inventory but the MOW should have primary responsibility for it.

^{3/} The average for spot improvements is expected to be 40 ADT.

^{4/} Allowance has been made for an additional 12% MOW Standard in the economic and technical evaluation for this circumstance.

VIII. Evaluation Program.

There are three different elements to the evaluation of the GBC Program.

First, within the engineering element it must be ascertained if the unit is achieving its forecast output and cost per kilometer, and whether the resulting road condition is kept at the forecast level. The AID project engineer is expected to perform this evaluation. Feedback from the project engineer concerning improvements in construction techniques and maintenance practices should be formally communicated on an annual basis to supplement regular informal communications within the MOW. This evaluation is of definite interest to the MOW for its own purposes, in addition to USAID.

Second, the program must be evaluated to determine if the forecast benefits are being achieved with the actual links selected for improvement. Review of the initial results should be used as a means of improving the link selection criteria as early in the program as possible. This evaluation is of some interest to the MOW for planning purposes, but USAID is more directly concerned.

Third, the program must be evaluated to determine if the benefits actually reach the smallholder or the low-income agricultural producer. This evaluation will require more detailed information than may be available through a regular MOW sources and it is primarily of concern to USAID rather than to the MOW.

An initial evaluation could be carried out with the CIDA GBC unit which would yield information of use particularly in the engineering evaluation. Some indications of benefits may also be obtained, although they have limited application to the project area.

A. MOW Participation in the Evaluation Program .

There are three alternative structures for carrying out the second and third evaluation elements. In the first alternative these elements could be carried out entirely within the MOW planning unit by MOW personnel with some assistance from USAID in formulation of the evaluation procedures and to provide logistical support.

The second alternative is to have the MOW gather only that part of the information which is of interest to the Ministry, with some logistical assistance from USAID. Then there would be a separate evaluation of these and other data to be gathered by USAID in an external evaluation to the MOW.

The third alternative is for USAID to carry out a completely separate evaluation for its own purposes and to communicate the pertinent results to the MOW.

These three alternatives represent a spectrum of possible MOW participation. This participation should be encouraged to the extent that it strengthens the MOW planning system. However, it should be noted that the cost and effort to the MOW of the evaluation effort also increases with the level of MOW participation and that this burden should be kept to a minimum.

The first alternative would provide the greatest Kenyan participation in the evaluation process. However this participation is only useful to the extent that the evaluation addresses those questions of interest to the MOW.

Given the desirability of strengthening the MOW without passing on to it an undue proportion of the evaluation costs, it appears appropriate to select the second alternative. The training aspect of this alternative could be enhanced by having the personnel responsible for the evaluation work within the planning unit of the MOW. This would also facilitate coordination with the RARP evaluation process.

B. Evaluation Structure and Data Requirements

The evaluation structure for second and third elements will focus on analysis of origin-destination surveys and traffic counts conducted by the MOW and information on operating experience with the GBC units. Collection of traffic count data could begin with the CIDA unit in 1976/77 and this would help in preparation of the base year data collection for the USAID project area.

The above data will be supplemented by information from the DDC's and associated ministries and the IRS.

The evaluation of these two elements will require approximately 3 person-months per year for the evaluation period (3 years). MOW support will consist of provision of survey, traffic count and data processing teams and office space, and a counterpart, if available. USAID will provide for logistic support for the survey teams and transport and secretarial support for the short-term consultants.

The first year tasks will include design of the detailed data collection forms and procedures.

In addition, traffic counts on CIDA GBC-improved links will be made and origin-destination surveys be carried out as a baseline survey on 16 links to be improved in the first year of the proposed USAID GBC unit program.

The O and D survey can then be carried out in two succeeding years to obtain data on the type of responses that the improvements are generating and their associated benefits.

Two O and D teams would be required for eight weeks, to carry out the survey and eight more weeks to process the resulting data. Logistic costs for these surveys as estimated by the MOW are shown in Table 23. The additional costs for the short term consultant who would prepare the survey forms, analyse the data and carry out the evaluation are also shown.

Maximum provision should be made for working closely with the MOW planning unit and also providing feed back to the DDC's through the Rural Planning Unit being set up in the Ministry of Finance and Planning.

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TABLE 23
SUMMARY

Evaluation Program Cost

A. Local Cost

(Origin Destination Survey, Road Inspection & Traffic Counts)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Total</u>
1. Vehicle purchase <u>1/</u> (12,000 each)	\$36,000	\$ -	\$ -	\$36,000
2. POL a) O & D survey	2,600	2,800	3,000	8,400
b) Inspection	1,950	2,200	2,400	6,550
c) Traffic counts	1,950	2,200	2,400	6,550
3. Equipment a) O & D survey & supply	3,000	1,000	1,000	5,000
b) Inspection	-	-	-	-
c) Traffic counts	1,000	200	200	1,400
4. Travel expenses a) O&D survey per diem	700	800	900	2,400
b) Inspection	300	400	500	1,200
c) Traffic counts	400	500	600	1,500
Total	47,900	10,100	11,000	69,000

B. Technical Assistance

1. Fixed Daily Rates				
a) social anthropologist(lm/yr)	10,000	11,000	12,000	33,000
b) senior economist (2 mo/yr)	20,000	22,000	24,000	66,000
	30,000	33,000	36,000	99,000
2. Other direct costs				
a) airfare @	3,800	4,000	4,200	12,000
b) excess baggage	400	450	500	1,350
c) per diem	3,650	3,800	4,000	11,450
d) vehicle rental	3,000	3,500	4,000	10,500
e) secretarial costs	2,000	2,200	2,400	6,600
	12,850	13,950	15,100	41,900
Total Technical Assistance				140,900
Total Evaluation Program Costs				209,900

1/ Cost estimate is C.I.F. Mombasa from U.S. supplier for 4 x 4 vehicle.
See Table II for cost of rental analysis.

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TABLE 24
Cost Estimate
Vehicle Rental
(K.Shs.)

1. Daily Fee:

4 x 4 vehicle 140.00 per day for 90 days or 11,250.00 each vehicle. Three Vehicles:	K.Shs. 33,750.00
-------------------------------------------------------------------------------------------	------------------

2. Mileage Costs

Average of 300 KM per day for 90 days or 27,000 KM by 3.00 per KM or 81,000.00 per vehicle. Three Vehicles:	K.Shs.243,000.00
-------------------------------------------------------------------------------------------------------------------	------------------

Vehicle Rental costs, Year I (\$1.00 = K.Shs.8.40)	K.Shs.276,750.00 \$ 32,946.00
-------------------------------------------------------	----------------------------------

Projected Rental costs, Year II	36,200.00
---------------------------------	-----------

Projected Rental Costs, Year III	39,800.00
----------------------------------	-----------

Total Estimated Vehicle Rental Costs	<u>108,946.00</u> =====
--------------------------------------	----------------------------

The above figures demonstrate the cost advantage of vehicle purchase. In as much as these vehicles will be needed very shortly after Loan signing and CP satisfaction for the first series of surveys, it is proposed that the USAID/Kenya act as the GOK agent and procure these vehicles through the PIO/C procedure. If it is necessary to rent vehicles in Year I the total evaluation costs would increase from \$209,900 to \$246,100.

The contractor will also be required to pay all local costs of the evaluation POL, per diem, equipment and supplies and claim reimbursement from AID under the contract. This procedure will streamline administrative/ logistic support arrangements.

IX. Conclusions Supplement

The GBC program should be modified as described above to concentrate on spot improvements as well as improvements to MOW standards. (5.5 m surface and 1.2m. shoulders), with the aim of upgrading as much of the non-all-weather D and E roads as is possible and economically desirable. Also certain links with high slopes and intense rainfall should have a sealed surface in order to conserve the gravel for more than two years.

The selection procedure for link improvements specified in section VII will allow the MOW to apply its technical expertise while leaving a role for the lowest level planning units (district development committees), and introducing some economic criteria to ensure a minimum project economic feasibility.

If the program proceeds as projected it will now upgrade 2000 km. with the proposed unit, and one additional unit may be needed later to complete the estimated 3900 km. of eligible roads. The program will provide economic benefits primarily to small holders and cooperative members and social benefits almost exclusively to the 99% smallholders and low income share croppers or wage laborers who inhabit the area surrounding the project roads. The program will also facilitate part of the GOK Rural Access Road Program and extend the service area of the Integrated Agricultural Development Program and the smallholder credit program under ASL 1 Part C.

The project appears to be socially sound and is expected to give an internal rate of return of 10.2%. This relatively low rate of return is due to the orientation of the project to the isolated smallholder.

Due to the wide range of factors which will determine the outcome of the program and the uncertainty of the general base data, an evaluation and monitoring program is proposed in section VIII to measure if the project is meeting its objectives and to provide early feed back to the project engineer and the MOW for the purpose of refining the engineering methods and link selection criteria to achieve more benefits and lower costs. This evaluation element adds a total of \$210,000 to the original loan total of \$8,855,000 or an increase of 2% to a revised total project cost of \$9,065,000 of which \$7,655,000 is loan funded and \$1,410,000, grant financed.

Annex A

Analysis of Preliminary Evaluation
Results of Vihiga SRDP Roads

This annex gives the preliminary results of agricultural and traffic survey data collected by the Vihiga SRDP. The general conclusions can be stated as follows:

1. Short Term Agricultural Impact (Tables 1-3)
 - a. Acreage under production increased substantially: 13% and 71% for Vihiga and Mbale respectively
 - b. Most of the increase in maize and beans was consumed but a higher percentage of bean production was marketed in one area (17%)
 - c. A shift in production to more sorghum and millet was observed although total production of these 2 crops is small by comparison with maize in both areas. Only occasional marketing of these crops observed.
 - d. Milk marketing increased significantly (to 30-50%) and milk production in one area increased significantly.

Note: The effect of the road itself on the increase is not clear because the resulting production increase was not marketed, except in the case of milk. Access to other inputs may have been facilitated by the road.

2. Short Term Traffic Impact (Table 4)
 - a) The amount of vehicular traffic increased significantly in each case but the amount of increase varied widely between roads and over time.
 - b) If the lorries collecting sand are excluded as a special case, the average number of vehicles generated by the roads is approximately 10 per day.
 - c) The number of bicycles using the road increased dramatically.

TABLE 1

SUMMARY TABLE FOR TWO SAMPLE AREAS

Road Segment	No. of Farmers	Farm Produce	AVERAGE YIELD ^{1/} (OUTPUT/ACRE)				AVERAGE ACREAGE		AVERAGE PRODUCTION *				AVERAGE AMOUNT MARKETED							
			1972	1973	1974	1975	1972-73	1974-75	1972	1973	1974	1975	1972		1973		1974		1975	
													Amt	%	Amt	%	Amt	%	Amt	%
VHIGA - MBIRI	7	Maize*	3.9	4.6	3.5	2.2	1.5	1.7	5.9	6.9	6.0	3.7	0.4	6.8	0.6	8.7	0.7	11.7	0	0
		Beans	1.6	1.9	1.4	1.4			2.4	2.9	2.4	2.4	0.2	8.3	0.0	0	0.4	16.7	0.4	16.7
		Millet	0.2	-	0.1	0.1			0.3	-	0.2	0.2	0.0	0	-	-	0	0	0.1	50
		Sorghum	-	-	0.8	0.4			-	-	1.4	0.7	-	-	-	-	0.1	7.1	0	0
		Potatoes	-	-	0.3	-			-	-	0.5	-	-	-	-	-	0	0	-	-
		Milk **	-	-	-	-	-	-	27.9	-	8.6	25.7	-	8.6	30.8	-	-	4.3	50	8.6	33.5
MGALE - MBIRI	9	Maize*	4.4	4.3	5.3	4.9	1.4	2.4	6.2	6.0	12.7	11.8	1.3	20.9	1.1	18.3	1.5	11.5	0.1	0.7
		Beans	0.9	1.2	1.7	1.4			1.3	1.7	4.1	3.4	0.16	7.7	0.1	5.9	0.5	12.2	0.1	2.9
		Millet	0	0	0	0			0.1	0	0.2	0	0	0	0	0	0	0	0	0
		Sorghum	0.2	0.2	0.8	0.5			0.3	0.3	2	1.2	0	0	0	0	0	0	0	0
		Coffee	5	7.4	-	-			6	10.4	-	-	6.7	100	9.8	98	0	0	0	0
		Milk	-	-	-	-	-	-	26.7	13.3	30	28.3	10	37	3.3	23	6.7	22	13.3	4.8

* Maize, Beans, Millet, Sorghum, Potatoes, Coffee : all production in bags

** Milk : all production in bottles per month

^{1/} Average yield is calculated on total acreage since the actual acreage for each crop is not known. The numbers may be most accurate for maize. Other numbers only indicate trends.

Source: Averages of Tables 2 and 3

Comments on Table 1

Vihiga - Mbihi and Mbale - Mbihi sample Areas

1. Amount of maize marketed (1972-1975): This is generally on the increase despite a drop in 1975. The amount marketed however is not substantial (between 1 bag per farmer). The amount marketed is small, largely because most of the maize is consumed as the staple crop. The cash obtained from the sale of maize is used for paying school fees for children and for buying essential consumer items e.g. salt.
The percentage of the amount of maize marketed appears to be increasing although none was marketed in 1975 due to the 40% drop in production.
2. Beans marketed (1972-1975): The amount of beans marketed is increasing slightly despite the fact that an almost constant amount is being produced. Furthermore beans are locally consumed hence the amount marketed is only 17% or less.
3. Millet - amount marketed in 1972 - 1975 : Millet is said to be not valued locally this may be the reason as to why not much millet is produced. This may also explain why not much millet is marketed. It has also been observed that the millet produced is locally consumed leaving little if any, for sale.
Initially no millet was marketed, but in 1975 half of the production was marketed.
4. Sorghum - amount marketed (1972-1975): Sorghum is not as valued as maize. Sorghum is, however, also preferred to millet. The little sorghum produced is locally consumed which leaves an insignificant amount to be sold once in a while when money is greatly required (as in 1974 when 7% of production in one area was sold).
5. (Sweet) Potatoes - amount marketed in (1972-1975): Potatoes are grown for basically consumption and not for sale.
The percentage of the potatoes sold is subsequently zero.
6. Milk - amount marketed in the period (1972-1975) : about a third of the milk produces is locally sold in small quantities. The percentage of the milk sold is increasing. Part of this increase may be due to better access and less spoilage.
7. The acreage of the land being farmed has increased approximately 13% on the average from 1972-73 to 1974-75.

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TABLE 2

VIHIGA MBIHI SAMPLE AREA

Farmers	Acreage Farmed	Crop	C R O P S P R O D U C E D A N D S O L D								
			1 9 7 2		1 9 7 3		Acreage	1 9 7 4		1 9 7 5	
			Yield	Amount sold	Yield	Amount sold		Yield	Amount sold	Yield	Amount sold
1st	1½	Maize Beans Sorghum	5 bags 1 bag -	0 ½ bag -	2 bags 1 bag -	0 0 -	1½	10 bags 6 bags 6 bags	0 1/3 bag 0	10 bags 6 bags 3 1/4 bags	0 0 0
2nd	1	Maize Beans L/cat- tle	6 bags 1 bag 60 botls. per	0 0 30 botls. per month	5 bgs. 1½ bgs. -	0 1/6 bg. -	1	8 bgs 3 bgs 60 btls. pm (six months)	1/3 bag 1/3 bag 30 btls. per month	7 1/4 bgs 5 bgs -	0 1 bag -
3rd	3 1/4	Maize Beans F/Mil- let L/cat. Sorghum	6 bags 4 ½/bgs 2 bags 60 btls. pm -	3 bags 1 bag 1/6 bag 30 btls. per month -	14 bgs. 6 bgs. - - -	4 0 - - -	3	12 bgs. 3½ bgs 1 bg. - 3 bgs.	4 bgs. 2 bgs 0 - 1 bag	8 bgs. 3½ bgs. 1½ bgs. 120 btls. per mon. 1½ bags	0 2 bags 1 bg. 60 btls. per mon. 0
4th	1	Maize Beans L/cat.	2 bags 1/3 bag 15 bot. per mon.	0 0 0	2 bags 1/3 bag -	0 0 -	1	1 bag 2/3 bag -	0 0 -	1 bag 1/3 bag -	0 0 -
5th	2	Maize Beans	3½ bags 2 bags	0 0	3 bags 1 bag	0 0	2	3 bags -	0 -	2 bgs. 1 bag	0 0
6th	1½	Maize Beans L/cat.	10 bags 5 bgs. 60 btls. per m.	0 0 0	13 bgs. 5 bgs. -	0 0 -	1½	3 bags. - -	0 - -	3½ bgs. - 60 btls. per m.	0 - 0
7th	1½	Maize Beans Potats.	10 bgs 3 bgs -	0 0 -	11 bgs 6 bgs -	0 0 -	2	5 bgs 3½ bags 3 bags	1/6 bag 1/3 bag 0	4 bgs 1 1/6 bags -	0 0 -

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Table 4

Selected Traffic Counts on Vihiga SRDP Roads

Location Completed	Mbale - Magada Sept - Dec 1975				Vihiga - Mbihi Sept - Dec 1975				Tigoi - Wangoya July 1974			
	Prior Status passable dry season no bridge in middle				impassable track no bridge				passable dry season no bridge at end only			
	Bic.	L.V.	H.V.	T.V.	Bic.	L.V.	H.V.	TV.	Bic.	L.V.	L.V.	T.V.
<u>1974</u>												
mkt. day 1	NA	NA	NA	NA	0	0	0	0	0	3	2	5
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
non mkt 1	NA	NA	NA	NA	0	0	0	0	1	4	1	5
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<hr/>												
Average					0	0	0	0	1.5	3.5	1.5	5
<u>1975</u>												
mkt. day 1	4	16	4	20	28	2	0	2	22	15	10	25
2	27	21	6	27	1	0	0	0	21	13	8	21
non mkt 1	29	8	0	8	10	0	0	0	18	12	9	21
2	20	5	1	6	4	0	0	0	21	13	11	24
<hr/>												
Average	20	12	3	15	11	$\frac{1}{2}$	0	$\frac{1}{2}$	20	13	10	23
<u>1976</u>												
mkt. day 1	79	12	0	12	11	7	0	7	(14)	(4)	(26)	(30)
2	(104)	(8)	0	(8)	11	0	0	0	28	7	15	22
non mkt 1	37	4	0	4	(14)	0	0	0	23	8	28	34
2	20	7	0	7	37	0	0	0	19	9	17	26
<hr/>												
Average	60	8	0	8	18	2	0	2	21	7	21	29

<p>Comments</p>	<p>1. Road but no bridge in 1975. 2. many personal cars going home after duty and to visit Kakamega and Kisumu. 3. lorries to sell charcoal and deliver sand and pickup beans for Nairobi. 4. Some EAPL cars in 1975 5. Pedestrian traffic much greater on market day.</p>	<p>1. road but no bridge in 1975. 2. 1975 car-sick to take person to hospital 3. Some bicycle carry goods 4. Also students going to school on bicycles</p>	<p>1. Most lorries collect sand in area and bring goods + beer to shops away. 2. bread van every day 3. shift in position of count in 1976 reduced light traffic because schools traffic excluded.</p>
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A-6
Table 4

Selected Traffic Counts on Vihiga SRDP Roads

	Mbale - Magada				Vihiga - Mbihi				Tigoi - Wangoya			
	Completed	Sept - Dec 1975			Completed	Sept - Dec 1975			Completed	July 1974		
Prior Status	passable dry season no bridge in middle				impassable track no bridge				passable dry season no bridge at end only			
	Bic.	L.V.	H.V.	T.V.	Bic.	L.V.	H.V.	TV.	Bic.	L.V.	L.V.	T.V.
<u>1974</u>												
mkt. day 1	NA	NA	NA	NA	0	0	0	0	0	3	2	5
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
non mkt 1	NA	NA	NA	NA	0	0	0	0	1	4	1	5
2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Average					0	0	0	0	1.5	3.5	1.5	5
<u>1975</u>												
mkt. day 1	4	16	4	20	28	2	0	2	22	15	10	25
2	27	21	6	27	1	0	0	0	21	13	8	21
non mkt 1	29	8	0	8	10	0	0	0	18	12	9	21
2	20	5	1	6	4	0	0	0	21	13	11	24
Average	20	12	3	15	11	$\frac{1}{2}$	0	$\frac{1}{2}$	20	13	10	23
<u>1976</u>												
mkt. day 1	79	12	0	12	11	7	0	7	(14)	(4)	(26)	(30)
2	(104)	(8)	0	(8)	11	0	0	0	28	7	15	22
non mkt 1	37	4	0	4	(14)	0	0	0	23	8	28	34
2	20	7	0	7	37	0	0	0	19	9	17	26
Average	60	8	0	8	18	2	0	2	21	7	21	29

Comments

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1. Road but no bridge in 1975. 2. many personal cars going home after duty and to visit Kakamega and Kisumu. 3. lorries to sell charcoal and deliver sand and pickup beans for Nairobi. 4. Some EAPL cars in 1975 5. Pedestrian traffic much greater on market day. | <ol style="list-style-type: none"> 1. road but no bridge in 1975. 2. 1975 car-sick to take person to hospital 3. Some bicycle carry goods 4. Also students going to school on bicycles | <ol style="list-style-type: none"> 1. Most lorries collect sand in area and bring goods + beer to shops away. 2. bread van every day 3. shift in position of count in 1976 reduced light traffic because schools traffic excluded. |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

ANNEX BTraffic Threshold Analysis Calculations

The following tables give the details of traffic threshold calculations for three alternative levels of improvement proposed for the GBC program. The basis for the calculation is that the economic rate of return must equal 10%. The discount benefits of an average kilometer of road improvement are set equal to the discounted costs in order to determine the traffic threshold in the opening year that will provide a 10% ERR. In mathematical terms:

$$\sum_{i=1}^{20} \frac{B_i}{(1+r)^i} = \sum_{i=1}^{20} \frac{C_i}{(1+r)^i}$$

In practice, the benefits considered are user cost savings and the costs are the construction costs, annual maintenance increment and regravelling costs. Therefore:

$$\sum_{i=1}^{20} \frac{365 T_i S}{(1+r)^i} = C + \sum_{i=1}^{20} \frac{\Delta M_i}{(1+r)^i} + \sum_{i=1}^{20} \frac{R_i}{(1+r)^i}$$

where T_i is the daily traffic in year i

S is the weighted average user cost savings per vehicle per Km.

r is the discount rate

C is the construction cost per Km

M_i is the incremental maintenance costs in year i

R_i is the regravelling cost in year i

In application of these thresholds, allowance can be made for additional bene due to induced agriculture production, etc., by reducing the computed traffic threshold in proportion to the additional benefits.

Traffic Threshold Analysis - D & E Roads

a) MOW gravel standard, from good earth road (5.5 m. surface, 7.9 m. platform)

1. Construction Cost per km.	(\$7,700)	65,000 shs.
2. Maintenance Cost	before:	2,000 shs.
a) annual cost	after:	<u>4,000 shs</u>
	difference:	2,000 shs/km
b) regravelling (year 6, 11, 16)		30,000 shs/km
3. User Cost Savings (G1 to G3)		

Vehicle Type	Operating Costs per Km G1	Costs per Km G3	Savings	Percent Traffic ^{1/}	Weighted Savings
Car	0.61	0.48	0.13	.31	.0403
Lt. Veh.	0.64	0.52	0.12	.43	.0516
Med. Veh.	1.35	1.07	0.28	.20	.0560
Heavy Veh.	2.44	1.98	0.46	.01	.0046
Bus	1.47	1.19	0.28	.05	.0140

weighted average savings .1665 or
.167 sh
1976 price update ^{3/} x 1.5
.250 sh/km.

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth/yr

$$\sum_{i=1}^{20} \frac{365 TS (1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{\Delta M i}{(1.1)^i} + R \left[\frac{1}{(1.1)^6} + \frac{1}{(1.1)^{11}} + \frac{1}{(1.1)^{16}} \right]$$

$$365 TS (16.8) = C + \Delta M (8.51) + R (1.13)$$

$$T = \frac{C + \Delta M (8.51) + R (1.13)}{365 S (16.8)}$$

$$= \frac{65,000 + 2000(8.51) + 30,000 (1.13)}{365 (.250) (15.8)} = \frac{115,920}{1533}$$

$$\underline{\underline{T = 76 ADT}}$$

1/ from the average of D and E roads page 35 of PP

2/ from Annex V page 2 of PP

3/ same as that used implicitly in Table 3 page 36 of PP

Traffic Threshold Analysis - D & E Roads

b) Spot improvements (20% of length)

1. Construction Cost per Km.	(\$3,900)	32,500 shs.
2. Maintenance Cost	before	2,000
a) annual cost	after	<u>4,000</u>
	difference	2,000 shs./Km.

3. User Cost Savings (G1 to G2-G3)

vehicle type	operating cost per km. ^{1/}		savings	percent traffic ^{2/}	weighted savings
	G1	G2-G3			
Car	0.61	0.51	0.10	.31	.0310
lt. veh.	0.64	0.55	0.09	.43	.0387
med. veh.	1.35	1.14	0.21	.20	.0420
hvy. veh.	2.44	2.09	0.35	.01	.0035
Bus	1.47	1.26	0.21	.05	.0105

weighted average savings

$$.1257 \text{ or } 126 \text{ sh/km} \\ 1976 \text{ price update } \frac{3/}{x 1.5} \\ \underline{\hspace{1.5cm}} \\ .189 \text{ sh/km}$$

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth

$$\sum_{i=1}^{20} \frac{365TS(1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{\Delta M_i}{(1.1)^i}$$

$$365TS (16.8) = C + \Delta M (8.51)$$

$$T = \frac{C + \Delta M (8.51)}{365 S (16.8)}$$

$$= \frac{32,500 + 2000 (8.51)}{365 (.089)(16.8)} = \frac{49,520}{1159}$$

$$\underline{\underline{T = 43 \text{ ADT}}}$$

1/ from Annex V page 2 of PP, average of G2 and G32/ from average of D and E roads page 35 of PP3/ same as that used implicitly in Table 3 page 36 of PP

Traffic Threshold Analysis - D & E Roads

c) gravel with sealed grades (20%)

1. Construction Costs per km.	(\$10,200)	86,000 shs.
2. Maintenance Cost	before	2,000
a) annual	after	4,000
	difference	2,000 shs/km
b) regravelling and resealing (45%) (years 6, 11 and 16)		43,000 shs/km
3 User cost savings (G1 to G3 + Bit.)		

vehicle	operating costs per km ^{1/}		savings	percent ^{2/}	weighted savings
	G1	G3+Bit (20%)		traffic	
car	0.73	0.54	0.19	.31	.589
lt. veh.	0.77	0.59	0.18	.43	.774
med. veh.	1.89	1.41	0.48	.20	.0960
hvy. veh.	3.90	3.01	0.89	.01	.0089
Bus	2.35	1.80	0.55	.05	.0275

Weighted average savings

1976 price update ^{3/}

$$\begin{aligned}
 &.2697 \text{ or} \\
 &.270 \text{ sh/km} \\
 &\times 1.5 \\
 \hline
 &.405 \text{ shs/km}
 \end{aligned}$$

4. Traffic Threshold (ADT) at 10% discount rate and 8% growth/yr.

$$\sum_{i=1}^{20} \frac{365TS(1.08)^i}{(1.1)^i} = C + \sum_{i=1}^{20} \frac{\Delta Mi}{(1.1)^i} + R \left[\frac{1}{(1.1)^6} + \frac{1}{(1.1)^{11}} + \frac{1}{(1.1)^{16}} \right]$$

$$365TS (16.8) = C + \Delta M(8.51) = R(1.13)$$

$$T = \frac{C + M(8.51) + R(1.13)}{365 S (16.8)}$$

$$= \frac{86,000 + 2000 (8.51) + 43,000 (1.13)}{365(.4)5 (16.8)} = \frac{151,610}{2483}$$

T=61 ADT

^{1/} from annex V page 2 of P.P cost increased 60% for heavy vehicles, 40% med. veh. and 20% light vehicles due to grades.

^{2/} from average of D and E roads, page 35 of P.P.

^{3/} same as that use implicitly in table 3, page 36 of P.P.

