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CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-44

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Burundi Rural Roads I (Route 84) and Rural Roads II (Route 86)	698-0108 698-0112	OAR/Burundi

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY)

☒ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent	B. Final Obligation Expected	C. Final Input Delivery	see No.8	From (month/yr.) July 1982
FY 81 FY 83	FY 83 FY 85	FY 85 FY 86	A. Total $	To (month/yr.) June 1985
			B. U.S. $	Date of Evaluation Review

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
No. 6: Estimated Project Funding RR I — RR II Total: $ 2.6m — $ 1.4m U.S.: $ 2.0m* — $ 0.8 *Including Food for Work See a) Recommendations, p. x b) Lessons learned p. xi, and c) Annex C, suggested Project Implementation Actions		

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

- ☐ Project Paper
- ☒ Financial Plan
- ☐ Logical Framework
- ☒ Project Agreement
- ☐ Implementation Plan e.g., CPI Network
- ☐ PIO/T
- ☐ PIO/C
- ☐ PIO/P
- ☐ Other (Specify) _____
- ☐ Other (Specify) _____

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

- A. ☐ Continue Project Without Change
- B. ☐ Change Project Design and/or ☐ Change Implementation Plan
- C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

Linda Bernstein, PDO, REDSO/ESA
Edward Robins, HRDO, OAR/Rwanda
Carpophore Ntagungira, Univ of Burundi
Michael Gould, Engineer, USAID/Niger
John Gaudet, Regional Environmental Ofcr, REDSO/ESA
Michael Sullivan, GDO, OAR/Burundi
Dennis Baker, AGDO, OAR/Burundi
François Nahigombeye, Directeur Général des Routes, GRB

12. Mission/AID/W Office Director Approval

Signature: Michael Sullivan for
Typed Name: George T. Bliss
Date: July 1985

AID 1330-16 (3-78)

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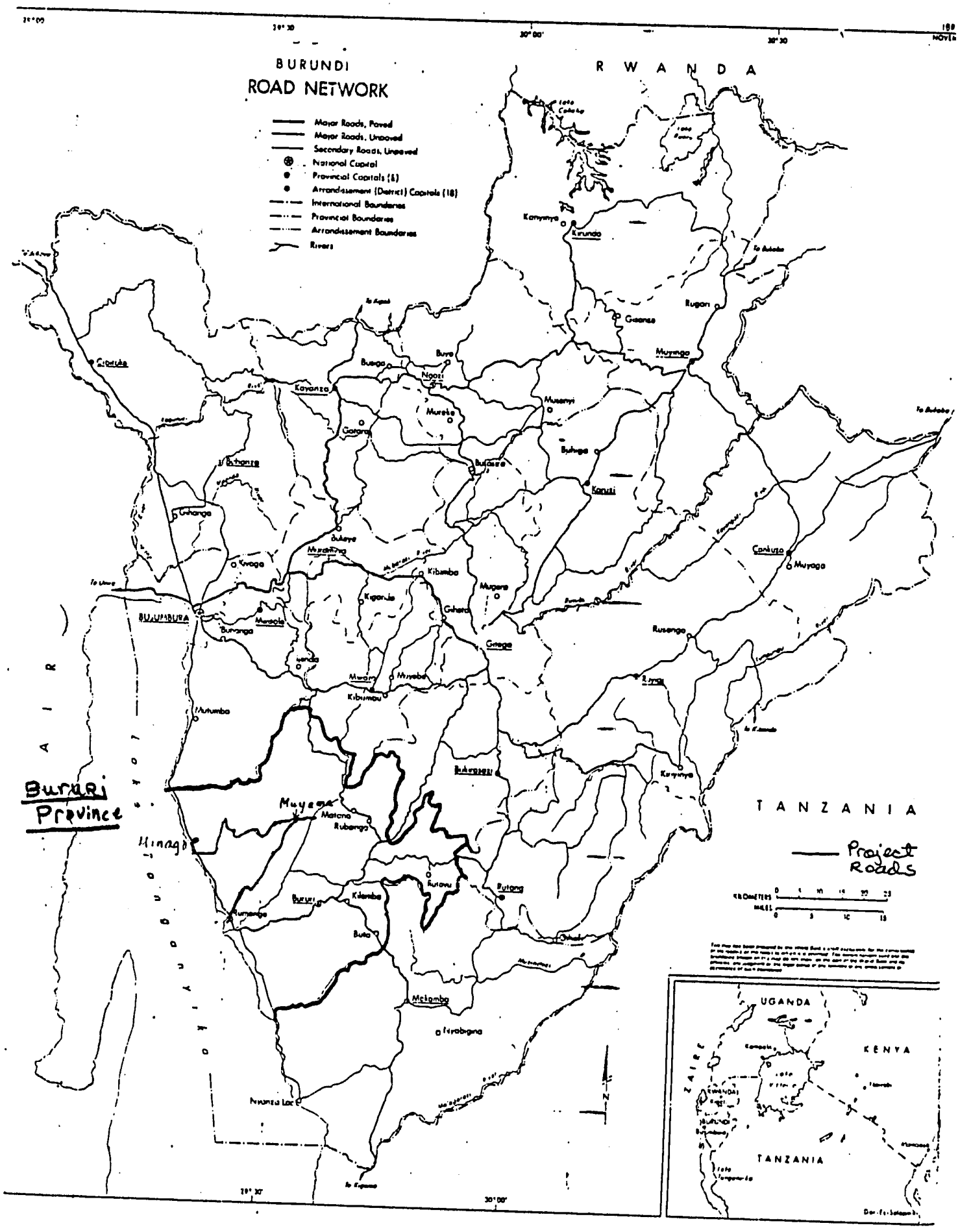
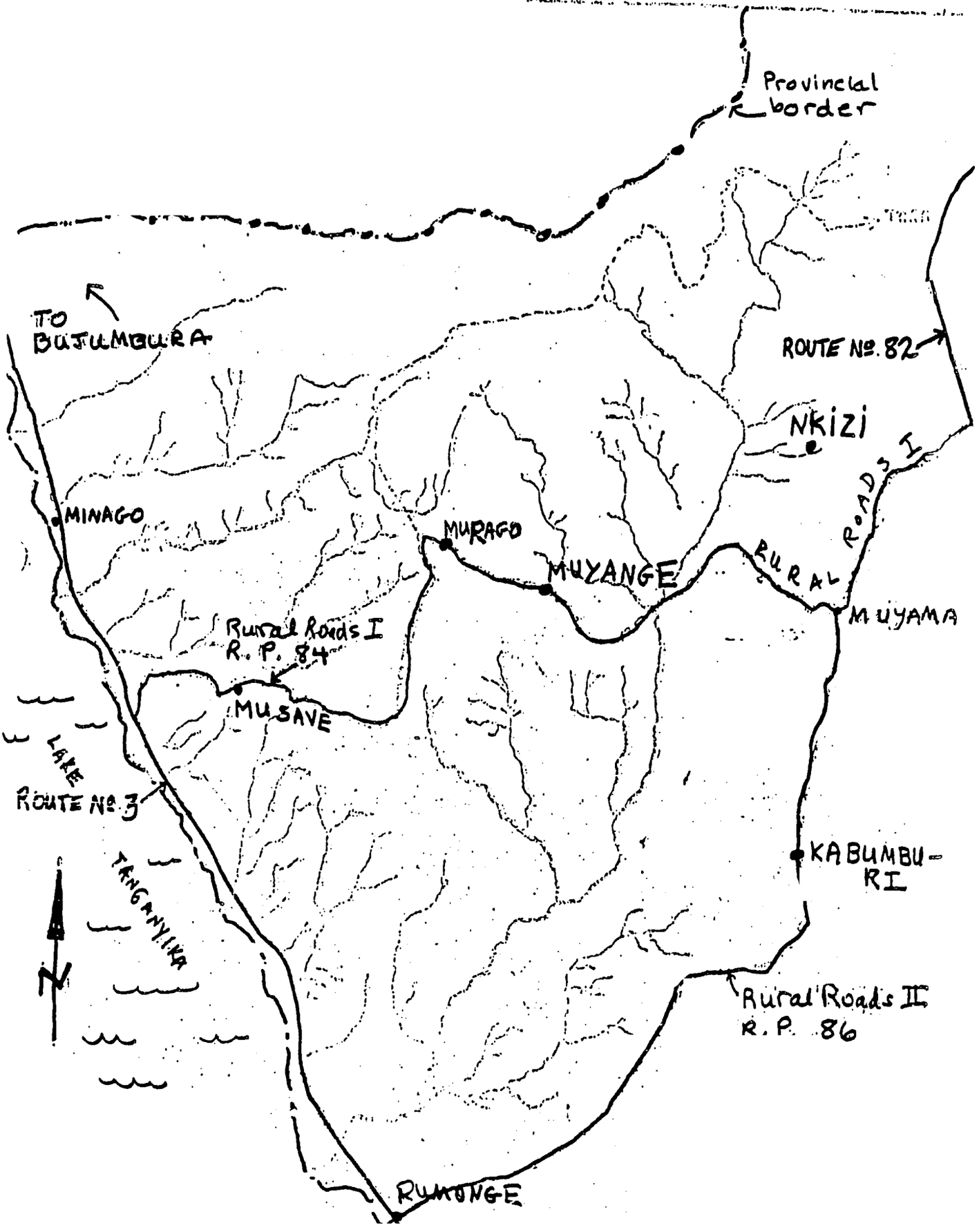
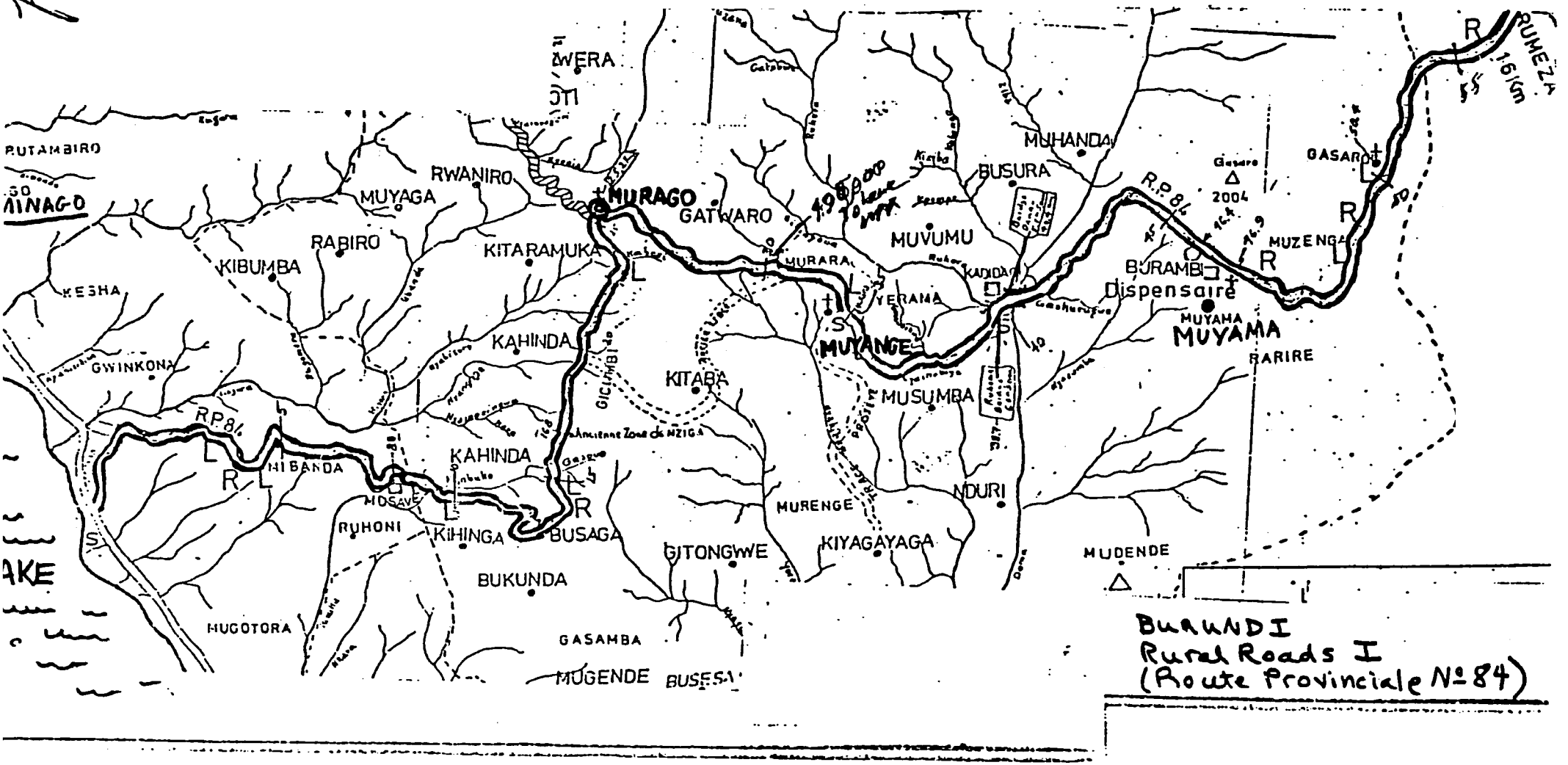

BURUNDI
ROAD NETWORK
Major Roads, Paved
Major Roads, Unpaved
Secondary Roads, Unpaved
National Capital
Provincial Capitals (6)
Arrondissement (District) Capitals (18)
International Boundaries
Provincial Boundaries
Arrondissement Boundaries
Rivers
R W A N D A
T A N Z A N I A
Burari Province
Project Roads
Kirundo
Muyinga
Ngozi
Kayanza
Muramvya
Kibumbo
Gitega
Rutana
Bujumbura
Bururi
Makamba
Muyanza
Matana
Rumonge
Kibumbu
Mwaro
Bubanza
Cankuzo
Ruyigi
Rugari
Gisanze
Musenyi
Buhiga
Kanyinya
Mugera
Rusengo
Bukeye
Kiganda
Gihama
Kivoga
Mutaho
Bujumbura
Muyaga
Mwaba
Rutovu
Buta
Nyanza Lac
UGANDA
KENYA
ZAIRE
TANZANIA

GENERAL AREA OF RURAL ROADS I and II
BURURI Province

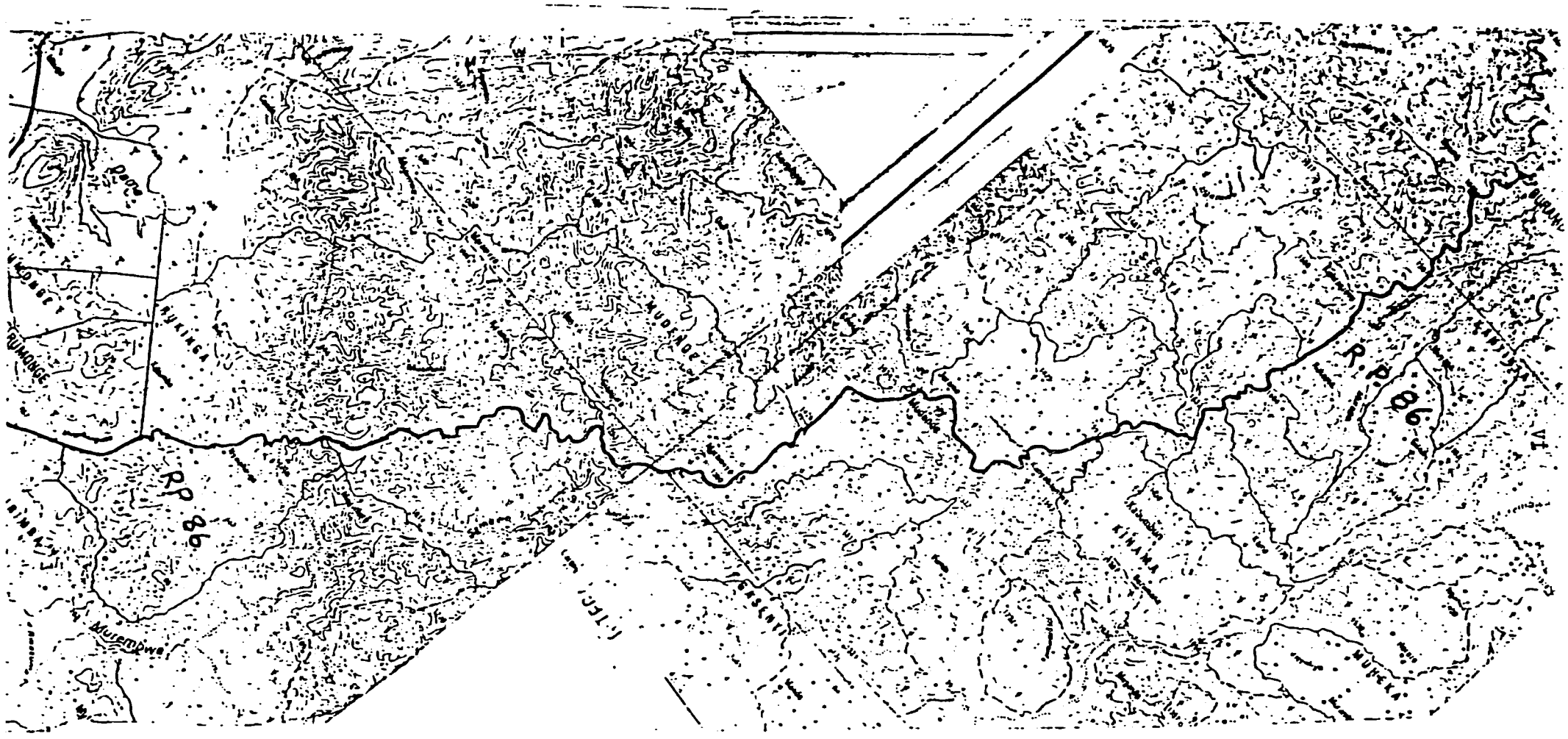


File Highway #84



BURUNDI
Rural Roads I
(Route Provinciale No 84)

"BURUNDI : Rural Roads II, R. P. 86"



ACRONYMS

GRB	:	Government of the Republic of Burundi
LOP	:	Life of Project
OAR/B	:	Office of the AID Representative/Burundi
OTRABU	:	Office des Transports du Burundi
PCV	:	Peace Corps Volunteer
PFIR	:	Project Financial Implementations Report
PID	:	Project Identification Document
PP	:	Project Paper
REDSO/ESA	:	A.I.D. Regional Economic Development Services Organization for East and Southern Africa, Nairobi
RP	:	Route Provinciale
SEMS	:	Semences Selectionnees
SRD	:	Societe Regionale de Developpment (a parastatal company)
SOMEBU	:	Societe Mixte des Etudes au Burundi, Bujumbura

SUMMARY

In the last five years AID has financed the upgrading to all-weather status of two adjoining earth roads in a mountainous area of southwest Burundi, in Bururi Province. The first project (Route Provinciale No. 84 - 58km) was completed in December 1984; AID's contribution was $1,971,000. The second project (RP 86 - 30km) should be completed late in calendar year 1985; AID's contribution to date has been $841,000. This part of Bururi province has been transformed from an isolated, interior area to one which is now accessible to the national capital of Bujumbura within about a three hour drive.

The purposes of the two projects were: physical completion of the road works; creation of a trained cadre of roadworkers; institutionalization of labor intensive road construction techniques in the GRB; improving the socio-economic level of roadworkers; and increasing agricultural production in the roads' zone of influence.

From an engineering perspective, the evaluation team found that work on the first road has been completed satisfactorily and the maintenance is adequate. Work on the second road is progressing well, and at a faster rate. To date it is estimated that some 90% of the earthworks, 60% of the drainage ditches, and half of the gravelling have been completed on the second road.

About 100 individuals received formal and informal training in vehicle maintenance, masonry, workshop and road maintenance supervision, and driving of heavy machinery, providing them with marketable skills. Sixty-eight local individuals (one per kilometer plus supervisors) have been permanently hired by the Ministry of Public Works for maintenance of Route 84. Overall some 2,000 individuals received on-the-job training/experience, as construction workers, foremen, and supervisors. In this sense the purpose of creating a trained cadre was achieved. However, "cadre" is somewhat of a misnomer as it is unlikely that the semi-skilled and unskilled roadworkers have the mobility to move around the country to other projects.

Regarding the project purpose of developing the institutional capability within the GRB to plan and manage labor intensive road works, the evaluation found that the Ministry of Public Works/Direction of Roads has relied exclusively on expatriate technical assistance, and has created no special organ, nor appointed host-country individuals charged with this responsibility, with the exception of one accountant.

Evidence of improved socio-economic welfare could be observed in the form of a large number of corrugated metal roofs replacing thatch; increased availability of manufactured goods and staples such as salt, sugar, beer, soda, and blankets; and taxi-mini-bus service on weekends, market days, and holidays, available at reduced fares. More open, positive attitudes toward schooling, extension work, and events outside the region were observed. Improvements in the nutritional status of area inhabitants, including roadworkers, however, could not be determined due to lack of baseline data.

It was difficult to determine the agricultural-economic impact of the project due to lack of consistent baseline and current data. It appears however that significant quantities of coffee will be transported out of the zone of influence in the current harvest (June 1985). The evaluation was conducted during the first two weeks of June 1985, just prior to the harvest of coffee, Burundi's main export crop. The roads have facilitated introduction of new varieties of bananas, beans, maize, and palm oil; greater access to agricultural extension services and agricultural education; and involvement with on-going nearby seed selection, reforestation, palm oil, and tea development projects. Surveys indicated, however, that relatively little agricultural produce, other than coffee, has begun moving out of the region by vehicle.

Negative environmental impacts of the road projects were minimized due to successful incorporation of key design features: manual rather than mechanical road widening operations; general conservation of original tract alignments, preserving mature trees along road edges; and good drainage including well-maintained ditches on the cut slope, and well planned culverts.

RECOMMENDATIONS

1. Maintenance - Side drains should be cleared and maintained to prevent any significant negative environmental effects. Stone or cement "checks" or "stop logs" should be placed in side drains in steep segments of the roads. During maintenance of the older road section and remaining construction on the new road sections certain design features should be carefully adhered to, such as the inward slope of the road surface (from fill to cut slope) and adequate clearance to allow for free-drainage of culverts and cut-off drains. The GRB should be requested to submit its maintenance plan as stipulated in section 5.3 of the grant agreement.

2. Dynamiting contract - The dynamiting contract for kilometers 10.3 - 11.5 of RP 86 should be entered into, so that the work can be performed promptly, and not delay completion of the road. .The assistant construction supervisor should closely monitor the dynamiting contractor and estimate work accomplished on a daily basis. The construction supervisor can then certify work progress and quantities. This will be needed if payment is to be made on unit amounts. New quantity estimates for the total job should be developed based on the amount of work already accomplished and an esimate of remaining work.

Equipment and Tools

a) The project should realistically take into acccunt the ability of the GRB to provide and maintain heavy machinery. Emphasis needs to be placed on keeping the necessary mechanized equipment operating and available to the project, as this controls the rate of progress on the road. The GRB should provide a grader to surface the roadway prior to compaction. A mechanic is necessary to keep the equipment functioning and should continue to be funded by the project.

b) Routine as well as emergency spare parts and tools should be funded by the project. Any residual funds should be used to equip maintenance workers with adequate handtools for maintenance.

LESSONS LEARNED

1. The mix of labor and heavy equipment needed for the construction of rural roads requires coordination between the agency supervising the labor and the one allocating the machinery. Where machinery is limited and in poor working condition the implementation of the project will be delayed and the relations between project and Ministry (machinery) personnel strained. AID should consider financing some heavy construction machinery in such projects.

2. Training in marketable skills, such as masonry, mechanics, and driving is a sound investment insofar as individuals trained become highly employable and are in demand. The training element of a labor intensive construction project should be expanded.

3. Design of road projects should include a provision for periodic major maintenance to be done every three to five years. Such maintenance needs to be accomplished using certain heavy equipment (scrapers, compactors) and therefore cannot be done properly by the local maintenance person who may have been assigned to maintain, through labor-intensive methods, a given short length of road. During this activity the road is resurfaced where required, earthworks and structures are repaired, and bridges inspected and repaired if necessary.

4. Negative environmental impacts will be minimized when road project designs include such features as side drains; inward sloping of the road surface; free-draining culverts and cut-off drains; and planting trees along road edges to prevent slippage of the fill slope. Also, tree plantations, good agroforestry practices, soil conservation, and more efficient, extensive wood production should be encouraged, to counteract the anticipated increased demand for wood and charcoal as the zone of influence develops.

5. The failure of a host country agency, such as the Direction of Roads, to understand AID's concept of institution building, or its unwillingness to operationalize it, will result in little or no development of the host country's institutional capability to plan and manage similar projects. Project designs should include some mechanism insuring this aspect of institution building.

6. Supervision - The construction supervisor should continue to have an assistant to provide additional roadwork supervision. The PCV serving in this capacity at present should be continued throughout the LOP. Otherwise another person with appropriate skills/background/interest should be hired.

7. Conservation

a) Tree planting on the face of the cut slope should be discouraged as this could lead to road hazard (when these trees mature they may fall across the road during storms).

b) Conservation of trees along the road edge is of vital importance. In some cases these trees are the principal factor preventing slippage of road on the fill slope. These trees are mostly eucalyptus and should be top-trimmed where possible in order to encourage branching; tall, straight trunks are to be discouraged. Seedlings (usually eucalyptus) and grass (usually Pennisetum) should be planted. Maintenance workers should be educated on how to prepare specific small sites for planting, and how and where to obtain material from nurseries.

c) More demonstration sites should be set up following the example of the demonstration farm at KM 37 (RP 84). These sites emphasize grass planting for green manure and forage along terraces, and tree planting in general as part of good agroforestry practice.

8. Surveys - Market/production/price surveys should be undertaken periodically during the remaining life of the Rural Roads II Project in order to document better the dynamics of development. Such studies/surveys should include the areas of education and health as well as agriculture.

Burundi Rural Roads Evaluation

I Project Setting

The terrain of Burundi is dominated by a hilly central plateau, marshy valleys in the north and east, and a low-lying plain in the west along Lake Tanganyika. The generally rugged terrain, the scattered settlement patterns, as well as its landlocked position, have contributed to shaping Burundi's transport infrastructure. In the last five years, AID has financed two labor-intensive projects to reconstruct two rural roads in a mountainous area of Bururi Province in southwest Burundi. The first project, 695-0108, Rural Roads I, upgraded a 58 kilometer earth road known as Route Provinciale 84 (RP 84) to all-weather status, and was completed in December, 1984. The road runs from its intersection with the asphalt National Highway 3 on Lake Tanganyika just south of Minago at 770 meters, ascends to an elevation of more than 2,000 meters in the interior where, just beyond Muyama, it intersects with another provincial road, RP 82.

The second project, Rural Roads II, scheduled to conclude in late 1985, also upgrades an existing 30 kilometer earth road to all-weather status. Known as RP 86, it extends from the intersection with Highway 3 on Lake Tanganyika at Rumonge up to Muyama. The layout of the two roads is shown in a simplified schematic, Figure 1. Both lie within Bururi Province and intersect at a point known as Muyama. The improved roads, while not asphalt, are a vast improvement over the previously existing earth roads. The new roads have level, compacted earth surfaces spread lightly with gravel, and have drainage ditches and culverts at all necessary spots. Much of the equipment, tools, and labor utilized in the first project was transferred to the second.

Burundi's classified and unclassified road network totals about 5,400 kilometers, of which provincial roads including the combined 88 kilometers (Table 1). The AID projects account for about 1,113 kilometers (Table 1). The AID projects have taken place during a time when Burundi's road network has been undergoing an intensive road construction/ improvement program. Between 1979 and 1984 the paved road network increased by 2.6 times while the gravel road network expanded more than five-fold. Road density is about 0.2 km/km^2 or 1.3 km per 1,000 inhabitants; the latter is somewhat below the average for East African countries.

The World Bank is currently considering approval of its Fourth Highway Project since 1974 in Burundi. The four Bank Projects combined represent $62.1 million, paving or improving some 550 kilometers, technical assistance, maintenance, road studies, and training, including emphasis on labor-intensive maintenance techniques. The Chinese improved and paved a road approximately 100 kilometers long during 1980-84.

Figure 1

Schematic of Rural Roads I and II

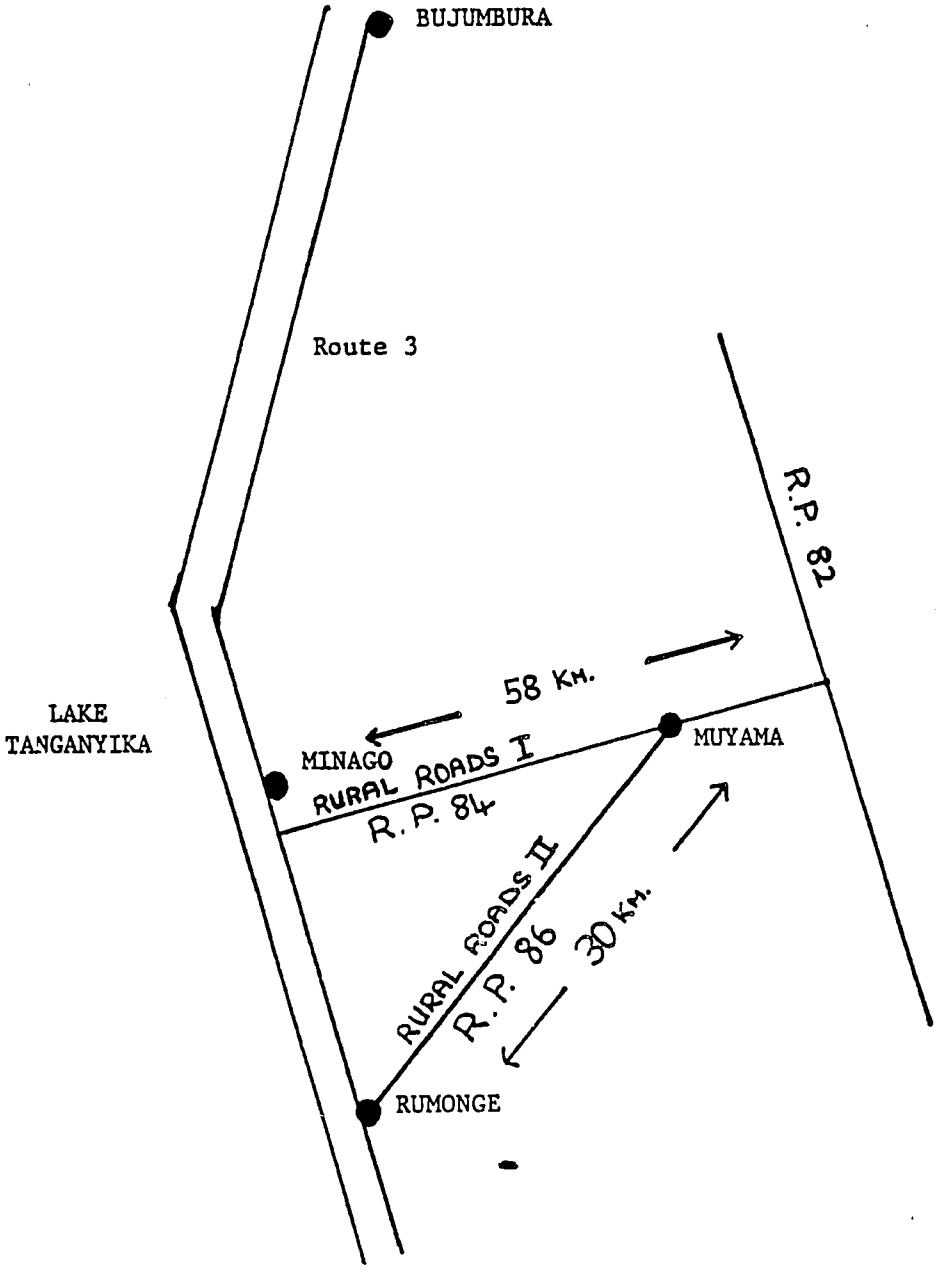


Table 1

Burundi: Development of Road Network

	1979	1984
A. Classified Roads	- Kilometers -	
National Roads	545	778
Secondary Roads	1,165	1,009
Provincial Roads	1,200	1,113
Total	2,910	2,900
B. Non-Classified Roads		
Rural Roads	2,500	2,500
Grand Total	5,410	5,400
Classified Road Network by Surface Type		
Bitumen	280	744
Gravel	90	486
Earth	2,540	1,670
	2,910	2,900

Source: Ministry of Public Works, Bujumbura, May 1984

The goals of Rural Roads I and II were the same : to improve the social and economic welfare of the rural poor in the project areas in Bururi Province. The estimated population of the two areas was 60,000 along Rural Roads I (RP 84) and 26,000 along Rural Roads II (RP 86), totalling 86,000, although this may include some overlap at the conversion point at Muyama.

The purposes of the two projects were also nearly identical:

-- to provide all-weather access to agricultural markets in the project area by upgrading the roads;

-- to first establish, under Rural Roads I, a tested prototype system for labor-intensive road construction, and then to utilize these labor-intensive construction methods on Rural Roads II; and furthermore

-- under Rural Roads II, through the reconstruction/ upgrading process, to reinforce GRB institutional capacity to implement labor-intensive road construction projects.

Rural Roads I was authorized on March 6, 1980. The Grant Agreement, signed July 19, 1980, stated that the project would be funded incrementally, and obligated the first AID contribution of $370,000 out of the originally planned total AID LOP of $926,000 from the Development Assistance account. In addition, AID provided a Food-for-Work (FFW) component funded separately under the PL 480 Title II account, valued at $625,000. The GRB contribution to the project was initially $567,000 including costs borne in-kind. The Project Assistance Completion Date (PACD) was initially established as July 31, 1983. In one notable provision, the GRB agreed to provide on a timely basis all necessary equipment for road construction. The GRB also agreed to provide the necessary training, equipment and budget to ensure adequate maintenance of the road after its construction.

The Rural Roads I project was amended three times :

-- Amendment 1, dated December 30, 1980, added the second tranche of AID funding, $556,000 and reduced the GRB contribution to $60,000.

-- Amendment 2 was conveyed to the GRB as an attachment to Project Implementation Letter No. 7 dated May 22, 1981. Amendment 2 cancelled the apparent mistake in Amendment 1 to reduce the GRB's contribution. Thus, the GRB's contribution was reinstated as originally stipulated on the Grant Agreement at $567,000. As the PIL was countersigned on June 25, 1981, that is taken as the date of Amendment 2.

Amendment 3, dated August 23, 1983, added a further AID contribution of $420,000, pursuant to an authorization amendment approved on August 18, 1983. No Project Paper Amendment was required. Amendment 3 also raised the GRB contribution to $612,000. Thus the combined AID and GRB project funding final level was $2,582,000 (Table 2).

It should be noted that the project also included a crucial component: a portion of the services of two expatriate engineers (one full time and one half time) financed under the World Bank's Third Highway Project who were serving as technical advisors in the GRB Ministry of Public Works. The value of these IBRD funded services was not monetized in Rural Roads I budget documents (but are estimated elsewhere as $577,500). However, as will be seen below, they were monetized and considered in the total project costs in Rural Roads II.

The PACD was first extended by two months to September 30, 1983 (PIL No. 8); thence by one year to September 30, 1984 (Amendment No. 3); and finally by another three months (PIL No. 11) to the actual PACD of December 31, 1984. Cumulative extensions were 17 months.

A baseline study was conducted by a Burundi firm, SOMEBU, in March, 1981. A mid-term evaluation was conducted in May 1982.

Rural Roads II (RP 86) was authorized at $841,000 in mid-August 1983. The Grant Agreement, obligating AID's full contribution, was signed August 23, 1983. This second road project eliminated the Food-for-Work component due to logistics difficulties in implementing this aspect under the first project. The GRB agreed to contribute the equivalent of $360,000. The World Bank contributed $247,500 for part-time services seconded from its construction engineers working in the GRB Ministry of Public Works. The combined total project from all sources is $1,448,500 to date (Table 3). However, an additional AID contribution of $246,000 is being considered. The PACD is October 31, 1985.

In addition to the standard conditions precedent regarding specimen signatures and a separate project bank account, the Agreement stipulated that the GRB would furnish to AID "evidence that sufficient funds, in addition to those to be provided by Grantee for construction operations (were) budgeted and (were) available to meet the costs of transferring the workshop, storage, and office facilities currently in Murago to Muyama." Project records and observations show that this transfer took place satisfactorily.

The standard CP's to first disbursement were fulfilled per PIL No. 3 dated December 12, 1983. Another CP to subsequent disbursements regarding another transfer of operations to Rumonge was met per PIL No. 7 dated May 11, 1984.

Table 2

Burundi : Rural Roads I Project
Final Funding Levels by Source
---- $1000 ----

AID		
	Development Assistance Grant	$ 1,346
	U.S. PL 480 Title II Food-for-Work	625
	Sub-Total	1,971
GRB		612
IBRD		1/
	Total	2,583

1/ Value of supervisory construction engineer services was not monetized in budget documents for Rural Roads I.

Table 3

Burundi : Rural Roads II Project
Funding Levels by Source
---- $1000 ----

AID		
	Development Assistance Grant 1/	841.0
GRB		360.0
IBRD		247.5
		1,448.5

1/ Excludes proposed Amendment No. 1 which would add an additional $246,000.

The Grant Agreement also provided that the GRB would submit to AID a list of all Grantee management and technical personnel supervising the reconstruction (Section 5.2). Also, the GRB agreed to provide AID, no later than six months prior to the end of the project, a detailed plan for maintenance of the project road after completion of its reconstruction (Sec. 5.3). This has not been done. As the PACD is October 31, 1985, this plan is overdue and should be solicited from the GRB.

The GRB also agreed to take steps (and did in fact take such steps) to ensure continuation of the two expatriate highway technicians financed by IBRD and seconded part-time (Sec. 5.4); and to "expeditiously provide all spare parts necessary to keep equipment required for road construction in operating condition." (Sec. 5.5). While the GRB for the most part kept the machinery operating through provision of spares, there were many delays and problems. These are discussed below.

The project funded a baseline study by SOMEBU which was completed in April 1984; services of a locally hired expatriate mechanic/contruction technician (Franco Puggia) (in addition to IBRD engineers) which was not envisioned in the original design; and a study of other future road projects (known as the Five Roads Study conducted by PRC Corporation) which has just been submitted to OAR/B.

Under consideration during the evaluation visit was the first Grant Agreement Amendment to add another AID contribution of $246,000 to the Project for a contract for dynamiting and additional road construction services that were not foreseen in the original design. REDSO/ESA concurred in the Action Memo regarding the addition o/a June 4, 1985. The Amendment has not yet been executed as of this writing.

II. Purpose of Evaluation

The evaluation team was requested to consider, to the extent data was available, the following: the socio-economic impact of road improvement on the area's inhabitants; the quality of the road construction; the economic feasibility of using labor intensive methods; the extent to which the labor intensive method of road construction is being institutionalized in the Department of Public Works; the economic impact of laborers' wages; changes in agricultural production within the two roads' zone of influence; changes in costs of farm inputs and transport; the impact of new commercial activity and new, additional availability of goods in the market; and finally the overall achievements and management of the projects. The above were to be considered in the context of the first road, RP 84, which has been fully completed and open for 6 months; and the second road, RP 86' which is passable but will not be fully completed for at least four more months.

III Evaluation Team Composition, Methodology

The evaluation took place during June 4 - 18, 1985. Team members were:

Linda Bernstein	Project Development Officer	REDSO/ESA
Edward Robins	Sociologist	OAR/Rwanda
Carpophore Ntagungira	Economist	University of Burundi
Michael Gould	Engineer	USAID/Niger
John Gaudet	Environmentalist	REDSO/ESA

The team very much appreciated the great deal of time, involvement, and dedication contributed by all the members of the professional and support staff of OAR/Burundi.

The methodology of the evaluation consisted of a review of project documents and files including the baseline studies conducted in 1981 and 1984 by the Societe Mixte d'Etudes au Burundi (SOMEBU); the 1982 mid-term evaluation of the first road; data on traffic counts which had been gathered in previous years as well as in February and May 1985; and data on local market prices collected, for but not reproduced in, the mid-term evaluation. Also, survey teams of university students collected social, economic and agricultural information in the zones of influence over the course of about four days during the evaluation. Discussions and interviews were held with 48 local farmers, merchants, produce-sellers, vehicle operator-owners, local officials, road workers and supervisors, prospect personnel in the field, at field headquarters, and at the Ministry of Public Works Direction of Roads. Surveys of prices of agricultural products were conducted at three rural markets plus markets at Rumonge and Bujumbura. Other documents consulted included the AID Program Evaluation Report No. 5 (Rural Roads Evaluation Summary Report), and documents on the socio-economic evaluations of Kenya Rural Roads projects.

IV Review of Project Activities in Terms of Major Desired Outcomes

The following three sections of this evaluation address and asses each of the major desired outcomes (outputs) of Rural Roads I and II.

A.	Engineering Analysis	- Physical reconstruction of RP 84 and RP 86 to all-weather status.
B.	Social Soundess Analysis	- Creation of trained cadre of road construction workers, pipe layers, masons, and drivers available for maintenance and for other jobs.
C.	Economic Analysis	- Increase of agriculatural production and marketing.

An additional output under Rural Roads II is a feasibility study of five other roads to be constructed/improved in other parts of Burundi. This 8-volume sutdy conducted by PRC Corporation has just been submitted in draft to OAR/B. The evaluation team engineer briefly reviewed the technical analysis report and the reconnaisance plans for each of the five roads and found that they contain sufficient detail for project design purposes. The cost estimates are complete and should be considered conservative. It is recommended that OAR/B's contract engineer review the reports in more detail and check some of the information through personal inspection of the roads.

The economic analysis portion of the PRC Corporation sutdy is also extremely comprehensive and appears to provide all possible social and economic data which might be used in a PID and Project Paper.

A. Engineering Analysis : Physical Completion/Status

1. General

Generally, the roadwork has been satisfactorily executed. Relative to the rate of progress made on R.P. 84 it is apparent that R.P. 86 is being implemented at a faster rate. This is not surprising taking into account the continuity of project staff and the familiarization which has occured during the first project.

2. Rural Roads I (RP 84)

The road is generally well constructed. With some exceptions as noted below, maintenance appears adequate. The compacting of the surfacing* material has been completed. In some areas, however, insufficient and/or inappropriate paving material was used. This is particularly so between KM 35 and 50. This portion of the road will require greater than normal maintenance to counter rutting which will occur due to normal use and rainfall.

A number of uncleared earth slumps were noted. Between KM 35 and 37 there were 4 and between KM 40 and 44 there were 6, some of which were major. No effort appears to have been made to clear them. They interfere with drainage and should be removed, otherwise damage will occur to the road surface.

The engineer during his field trip encountered one maintenance crew of five people working at KM 59 removing an earth slump. Except for one other person, they were the only people observed doing maintenance work. They reported that they have not been paid for three months. The tools they were using were worn out and should be replaced. The maintenance plan as described in the project papers (one man per kilometer with a foreman for every ten kilometers) should be adequate if the individuals can be paid without great delay and the Ministry of Public Works periodically inspects the roads to assess the effectiveness of the foremen.

Several culverts were also inspected which used steel barrels, and it was concluded that this was done in poor judgment. If it was necessary to use them due to the unavailability of galvanized, corrugated culvert pipe or concrete pipe, then as a minimum, the barrels should have been coated with tar to prevent corrosion. The evaluation team engineer concurred in the REDSO/ESA engineer's memo of 11 February 1985 that AID should be on record that the barrels are not acceptable.

3. Rural Roads II (RP 86)

Work on this road appears to be progressing well. About 250 people were observed working on the road. Over the first 7.5 kilometers of the road (starting from Rumonge) most of the earthwork, culvert construction, ditch construction and placement of surfacing material has been completed. Compaction is still required.

* NOTE - Surfacing does not refer to asphalting. None of the road will be asphalt. "Surfacing" refers to spreading a layer of crushed rock on the prepared roadbed and compacting.

Four trucks were observed and two compressors with three jack-hammers were in operation. A front-end loader was also observed along the route but was not operating. It may not be serviceable in view of the fact that four kilometers away laborers were loading rocks onto a truck by hand. Two Poclain power shovels were also observed. They are in very bad mechanical shape and one is missing tires. The bulldozer (CAT D-7) was observed at the maintenance yard in Rumonge. It is serviceable and has been available to the project (per PCV Gordon Steffensmeier).

Specific observations follow :

KM	OBSERVATION
0.0	Rumonge - Start of road
0.3	27 people spreading surfacing material
2.7	38 " " " "
4.0	Truck operating
4.1	8 people constructing culvert
4.9	Truck operating
6.6	Borrow pit - people appeared to be picking aggregate for concrete by hand. While this is a labor intensive project, a manual screen should be used for this activity.
7.0	Truck operating
7.5	Front-end loader - not in operation
General -	From KM 0.0 to 7.5 most of the earthwork and ditches are completed and surfacing material is in-place. It still requires compaction with a Dynapac type roller. A grader should prepare the surface before compaction. At about KM 1.0 there is a power pole which must be relocated and a house which interfers with the road.
7.6	10 people constructing culvert
7.8	8 " " "

7.9	12 people using two compressors and three jack-hammers widening road and constructing drainage ditch
8.1	8 people widening road, also a bridge under construction requiring slabs
8.3	Culvert installed and partially covered on realigned road
8.6, 8.7	Two culverts installed but not backfilled on realigned road
9.0	8 people working on culvert on realigned road
9.3	4 people starting work on a culvert
9.6	16 people widening road with hand shovels
General -	From KM 7.5 to 10.3 is an area of road widening and culvert construction activity. Drainage ditch completion is sporadic. Some surfacing material has been placed.
10.3 - 11.5	This portion of road awaits dynamiting and widening. Road path has been marginally improved using bulldozer so that project vehicles can traverse this section.
12.5	10 people loading rock onto a truck which appeared to be in poor mechanical state
12.8	9 people widening road
13.5 - 13.8	Another portion of road which requires rock removal, possible dynamiting
14.7 - 14.9	Road being realigned
General -	From KM 10.3 to 15.8 much work remains including rock removal. Ditching and placement of surfacing material await road widening.
16.5	7 people widening road
17.6	13 people filling in ruts and smoothing road in preparation of surfacing
17.7	Pile of earth (80 meters long) in roadway requires removal
18.4	13 people smoothing ruts
19.6	14 people widening the road

20.7	16 people working on road bed edges in preparation for surfacing
23.0	Trees have been removed in preparation of road realignment
24.2	Surfaced portion starts
General -	From KM 15.8 to 24.2 much of the road widening and earthwork are finished and most of the ditches are in-place.
General -	From KM 24.2 to 30.0 the road is complete except for the need for additional surfacing material in places and compaction. The road has developed some ruts due to rain-induced erosion (diagonal ruts across sloped road surfaces). The ditches in some places require placement of rocks for energy dissipation.

Maintenance

The system of maintenance used by the GRB for rural roads is adequate if effectively implemented. The present system is to assign one man per kilometer supervised by one forman for every 10 kilometers. These individuals are paid based on the number of days actually worked. In this manner there is some incentive to maintain the road, however, the fiscal integrity depends on the honesty of the foreman and his superiors. Unless it is obvious that this system is grossly abused it probably is more cost-effective than a tighter system which requires more supervision and control.

An issue which appears to be ignored in the project design is the need for periodic major maintenance. This is done every three to five years depending on need and should be accomplished by public works crews rather than the everyday maintenance individuals. During this activity the road is resurfaced where required, earthworks and structures are repaired and bridges inspected.

Information is not readily available during the time to accomplish this evaluation to assess whether the government has sufficient budgetery resources to maintain the project roads including periodic maintenance. Project paper 695-0108 (Rural Road I) indicates that the government had established a maintenance budget line item equivalent to $400 per year per kilometer. If in fact this money is available, it should be sufficient to carry-out routine maintenance.

The project may wish to use residual project funds to purchase maintenance handtools for the upkeep of routes 84 and 86. Handtools in poor condition should be replaced.

Assessment of Work Progress for RP 86

Table IV - A - 1 has been prepared based on estimates in the project papaer and most recent (31 May 1985) summary of work accomplished prepared by the GRB. It is apparent based on visual inspection of the road that the quantity estimates for the total work should be revised. For example, under the earthwork item it appears that only 63% of the work has been accomplished, however, inspection of the road indicates about 85-90% of this work has been accomplished. Likewise, the amount of rock removal already exceeds the original estimate. The total quantity estimates should be revised based on the work accomplished and a field assessment of remaining work.

The esimated persent completions based on the evaluation team engineer's inspections is:

Earthwork	85-90%
Rock Removal	40-45%
Ditching	60%
Placement of Gravel	50%
Culverts	40%
Compaction	10%

These are rough estimates and should be replaced with more accurate esimates done by project management.

The efficient completion of the road depends on the implementation of the dynamiting contract and the future availability of trucks and a compactor. A critical path analysis of the project is not available, however, it is judged that unless the rock removal to be accomplished under the dynamiting contract is finished by 30 September that the completion o the project date past the PACD (31 October 1985) will be pushed back accordingly. Likewise, the compaction work should start no later than 1 September if the road is to be completed by the PACD.

The GRB should provide a grader to regrade the roadway surface prior to compaction. Much of the stone already spread has been distributed. Although it could be redistributed by hand a grader would be more efficient and be able to avoid delaying the work with the compactor.

There is a section of RP 86 at a realignment where the grade slope will exceed 8%. Although it was planned to provide asphalt paving in this situation it is reported that this will not be done. In that case it is imperative that this section be provided with excellent drainage and be properly covered with well compacted stone.

Table IV - A - 1

Physical Completion of Rural Roads II (RP 86)
1 June 1985

Item	Estimated Quantity per Project Paper	Work Accomplished as of 31 May 1985
Earthwork (CBM)	186,000	117,860
Rock Removal (CBM)	8,000	12,409
Ditches in Soil (LM)	28,000	15,704
Ditches in Rock (LM)	1,500	3,993
Roadway Compaction (SQM)	206,500	30,000
Paving Material (CBM)	18,500	10,034
Shoulder Drains (CBM)	750	122
Pipe Culverts (EA)	62	26
Box Culverts (EA)	5	-0-
Filter Drains (EA)	50	-0-

Note : CBM - cubic meters; LM - linear meters; SQM - square meters; EA - each

Source : Field Reports prepared by IBRD-financed construction engineer

Note Regarding Proposed Dynamiting Contract

The contractor is to complete the road between KM 10.30 to KM 11.55. The contract calls for him to dynamite and clear the roadway, and construct culverts (5 of them) furnishing the necessary materials. The contract does not require him to grade the road surface, construct drainage ditches, place paving material, nor compact it.

The force account crew can do what is needed to complete the road in this section but in that case, it is necessary to provide some explicit language in the contract specifying the final product (blasted rock cleared, profile should be respected, etc.)

Because of the uncertainty of the amount of rock to be dynamited and earth to be cleared, Article 9 (surveillance et controls des travaux) could be expanded to provide for Hubert (fonctionnaire-dirigeant) to certify the volume of earth and rock which is affected. Then it would be possible to adjust lump sum amount based on quantities actually removed.

B Social Soundness Analysis

The evaluation of the social soundness of this project will be based upon an examination of project goals as they are established in project documents, particularly the project paper, and the extent to which they have been fulfilled and/or addressed by project activities. Three fundamental objectives have been identified.

1. Creation of a Trained Cadre*: trained skills development appropos to labor intensive road construction.

2. Institutionalization, in the form of management units and implementation capabilities for labor intensive road construction projects, in the Ministry of Public Works, Direction of Roads.

3. Increased incomes and well-being in the form of improvements in the social and economic welfare of the population in the target zones.

Each of these issues will be examined in turn. A conclusion will follow the discussion and recommendations for improved social soundness will be presented.

* While extensive training took place, the term "cadre" remains a misnomer, since the majority of the persons trained represent unskilled roadworkers living near the construction site who do not have the mobility to move on to similar work further afield.

1. TRAINING and EMPLOYMENT : Creation of Trained Cadre

Close to 2000 people have been involved directly with the construction of rural roads 84 and 86 in Bururi Province. In one form or another all of them have undergone training in skills development. Training has taken place both in formal settings at Gitega and Rushubi, and on-the-job at the work sites themselves. Programs have been developed for skilled, semi-skilled, and unskilled participants. It is the basic goal of these programs to furnish individuals with marketable skills for future employment.

1.1 Training

1.1.1 Formal Training

The project provided opportunities for 52 individuals to undergo classroom and field training to meet the project's needs in the following areas.

1 Vehicle maintenance: 1 person at Gitega.
2 Masonry: 32 individuals at Gitega.
3 Workshop supervision: 8 individuals at Gitega (certificate program).
4 Road maintenance supervision: 5 individuals at Gitega.
5 Driving (heavy equipment): 6 individuals at Rushubi.

1.1.2 On-The-Job Training

On-the-job training taking place at the work site itself is a form of apprenticeship. Apprentices or aides assisted mechanics and masons.

1 Vehicle maintenance: 5 persons.
2 Masonry: 30-40 persons.

3 The largest number of individuals received training/experience in semi-skilled or unskilled tasks. These included rock-crushing, drainage- ditch digging, hillside cutting, and road sloping. It is reported that at the start of the project the great majority of laborers had little experience with implements other than the hoe, the principal agricultural tool used in Burundi. The project reports that 1050 persons worked on rural road 84, and 785 on rural road 86. Although there is a small percentage of laborers who have worked on both projects, generally labor has been recruited locally.

1.2 Employment Experience

1.2.1 Length of Work

No figures have been kept on the average length of employment for skilled and unskilled workers. The project chief of personnel provides the following estimates.

1. Skilled workers: the majority of these individuals are still with the project, save for the masons. About one-half of the masons have found work elsewhere.

2. Semi-skilled and unskilled workers: many of these individuals have worked for the project for 2-3 years, although the tendency has been for workers to leave the project as the distance between the construction site and their home increases. The majority of these workers are young, single males; they have been inclined to remain with the project relatively longer than have married men. Young men are more mobile and more willing to work for the wages paid by the project.

1.2.2 Recruitment

The project announced its needs for labor on radio broadcasts, in markets, and through zone (sub-commune) chiefs. Unskilled laborers were selected and retained unless they proved to be incompetent or unwilling to work. Individuals too often absent were dismissed. Chiefs of road crews of 20 men each were selected on the basis of their ability to read and write. Skilled workers were chosen on the basis of some prior (although usually minimal) experience, to be trained further. Masons were given practical tests to determine competency.

Masons generally were responsible for assembling their own crews. Three masons moved from road 84 to road 86 with their teams. Occasionally a road crew chief assembled his team, although more commonly he was appointed to lead a group of individuals engaged directly by the project.

Work crews consist of 20 men plus a chief, except for masonry teams of 10 men each. Teams do not present bids for jobs, but rather are engaged on a day-labor or task basis (see discussion below). The great majority of the work is completed by task on road 86. Under this arrangement, work crews and crew chiefs are developing the ability to make work load-time frame assessments as these pertain to the tasks the crews undertake.

1.2.3 Turnover

No figures were kept on the rate of turnover. Individuals absent more than 5 days/month were likely to be dismissed. The chief of personnel for the project estimated that 60% of the unskilled labor force remained with the project for at least two years. Higher salaried persons tended to remain longer with the project.

1.2.4 Wage Structure

With the elimination of the Food-For-Work component, the basic salary paid to unskilled workers was raised from 50 FBu/day at the start of construction on road 84 to the present rate of 140 FBu/day. Listed below is the current wage structure (daily wage).

1. Unskilled labor: 140 FBu.
2. Road crew chief: 240 FBu for new chiefs; 270 FBu for former chiefs.
3. Tree cutter: 150 FBu.
4. Rock crusher: 220 FBu.
5. Mechanic and mason aide: 160 FBu for new aides; 200 FBu for former aides.
6. Mason, driver, mechanic: 240 FBu.

It should be noted that the majority of project work is now being done by task and not on a day-wage basis. The project estimates the number of days needed for the completion of a task and engages a crew for a fixed fee. Whether the work is completed sooner or later than the estimated deadline is of no consequence with regard to the fee already established. It is reported that teams work better under this arrangement, as there is incentive to finish quickly and move on to the next task. A bonus is provided to the team chief for work done on time (3000 FBu for a 60,000 FBu job, for example).

7. Competing wages: the national minimum wage is 98 FBu. Unskilled workers earn more with the project than they might elsewhere. Skilled workers, such as masons and drivers, can earn from 400 to 1000 FBu/day in the private sector. Four masons have left the project for other work. At present the project is providing opportunities for individuals to refine their skills.

1.2.5 Future Employment

Opportunities for skilled labor are said to exist in Burundi. Masons reportedly expect to work for the project or the Ministry of Public Works in the future. The private sector is cited as well as a potential source of future employment. Unskilled laborers are less optimistic about future employment possibilities. They do not know what they will do. USAID is considering supporting other road projects in Burundi; it is expected that unskilled labor will be hired locally. Those individuals already having experience will be welcome on other projects, but as they are not highly mobile they do not constitute a cadre from which a future project can draw. Rural road 86, constructed in the same region as road 84, was able to take advantage of the proximity of the 2 roads and engage individuals having already worked on road construction.

2. Institutionalization of Labor Intensive Approach

The labor-intensive approach to road construction was promoted in the project paper as appropriate for the Burundi context. Rural population density is relatively high, approximately 103 persons per square kilometer in the project zone, and the supply of labor greater than the demand. The Ministry of Public Works, Direction of Roads supports labor-intensive projects as a means of generating rural employment and saving foreign exchange. Although capital-intensive road construction projects have operated in Burundi, principally with regard to national routes, the labor-intensive method is favored for rural road construction. The institutionalization within the Ministry of Public Works for labor-intensive road construction is measured by its capacity to plan and manage such projects (as evidenced by units and individuals permanently charged with this responsibility) and to maintain roads after construction is completed.

2.1 Management

2.1.1 Office Management

The Direction of Roads does not have a unit expressly for labor-intensive construction. There is no generalized operations and management system, as is called for in the project paper. The Direction appears to assign individuals management responsibilities according to its own agenda. One individual, an accountant, is charged with the management of roads 84 and 86 for the Ministry. He is employed in the sub-Direction of Finance and Management in the Direction of Roads. The demand for labor-intensive projects did not exist before the start of construction on road 84, and although other labor-intensive road projects are previewed for the future, particularly ones supported by AID, the Director General of Roads expresses little interest in forming a unit specifically to oversee such projects. The maintenance of rural roads is, by contrast, managed locally by individuals permenently employed by the Ministry of Public Works (see discussion below).

2.1.2 Field Management

Two expatriate advisors head the field unit, assisted by an expatriate technical/machinery advisor and a Peace Corps Volunteer. A Burundi chief of personnel and his assistant complete the team at field headquarters.

The institutionalization of a labor-intensive approach requires a decentralized system capable of managing local operations. It is the project itself which has put such a system into place; as a result, it will cease to operate for this project or any other after construction on road 86 is completed (save for road maintenance, discussed below).

Field operations are directed by the expatriate project manager, who supervises 3 field chiefs. Each of these in turn manages road crew chiefs, the heads of the construction teams. These vary in number at any one time; thirty exist at present. There is a chief mason who manages the 8 masonry crews.

Laborers, recruited locally, are supervised by the road chiefs. They are responsible for beginning work at 7 a.m. Some laborers seek local lodging in order to remain with the project as construction moves away from their home area. Housing is provided for the trained crews of skilled workers for whom the project has made a greater investment. Accommodations are rented, either from local residents or landlords in Rumonge. Monthly rent ranges from 2,500 FBu for a simple dwelling to 50,000 FBu for a house accommodating 15 workers. Since most members of the construction team reside in the area of construction, transportation to the work site generally is not needed. Drivers and workshop supervisors are transported to their respective headquarters when necessary.

The equipment used by the project is stored locally, in locked sheds or at workshop sites. Arrangements can be made with local residents for storage of equipment. Theft is not reported to be a serious problem, although thefts occur. When the guilty individual is identified he is asked to reimburse the project for the item taken (generally a pick or shovel). The supply of tools used by the work crews is reported to be sufficient for the work they undertake.

The need for heavy machinery - graders, caterpillars, trucks, compressors, compactors - presents problems of a different sort. The project is dependent upon the Ministry of Public Works, Direction of Roads for this equipment. As a result, work on the project has been held-up at times until the Direction is able to release machinery and personnel to the project. These delays in project implementation have been unavoidable under present circumstances. The frequent unavailability of needed equipment is an issue which should be carefully reviewed if AID is to continue supporting rural road construction in Burundi.

2.2 Maintenance

The policy of the Direction of Roads is to engage one maintenance worker for every 2 kilometers of road in the country. At present, road 84 is maintained by one worker per kilometer (totalling 58 workers); maintenance is full-time,

daily work. These workers are organized into groups of 10 individuals, supervised by a maintenance chief. The chiefs are answerable to the workshop chiefs on road 86. The maintenance crews are permanent employees of the Ministry of Public Works. No decision has been made yet on the nature of the maintenance system to be used on road 86.

Depending on the condition of the road and its environs, heavy equipment is needed for repair generally every 3-5 years. Road 84 fared well in the most recent rainy season. Where sections had been eroded and soil washed down from hillsides, maintenance crews were making the appropriate repairs. Twenty-eight maintenance workers were observed by a member of the evaluation team one weekday morning along the 58 kilometer stretch of road 84.

Whether or not the extent and nature of maintenance provided road 84 will be sufficient to keep the road in good condition is an unknown at this time. The present ratio of one person per kilometer is twice the number usually used, and can be understood as a Ministry of Public Works attempt to sustain the present good condition of the road. It is not yet known how road 86 will be maintained. AID may need to consider recommending a revenue-generating activity, such as a road-user tax, specifically tied to these roads as a means of supporting road maintenance crews and programs.

3. Socio-Economic Impact

The presence of all weather roads in a region where none had existed before will have profound, lasting, and irreversible effects on regional social and economic development. Prior to the construction of road 84, one commercial vehicle per month visited the rural centers at Murago and Muyama. During the rainy season the road was impassable. Traffic at present is at a low level (see discussion below), but is regular and increasing. The full socio-economic impact of roads 84 and 86 has yet to occur. At present we are witnessing an early stage in the evolution of the contemporary socio-economic development of the region. Along these lines it is advisable to consider factors not easily quantified as a measure of project impact. In particular, it is more revealing to evaluate the perceptions of local residents - farmers, merchants, functionaries - as to the nature and extent of impact, than it is to make calculations based on statistics of dubious reliability. This is especially the case in the project zones, where farmers are uncertain about how this year's revenue compares to last year's, and some baseline data are not usable.

This section of the evaluation will be presented in three parts: traffic counts, agricultural/economic impact, and social impact.

3.1 Traffic Counts

The mid-term evaluation for Rural Road Project 1 reported that during a one week period in March, 1982, 4.7 vehicles per day passed the check-point at the 3.2 kilometer mark on road 84. The ratio of people to products being transported was 2:1. In the month of April, 1982, an average of 3.8 vehicles per day passed an unspecified checkpoint on RP 84. A traffic count taken at Musave, at the 8.8 kilometer mark, reported 5.3 vehicles per day on the average for the month of May, 1985. The ratio of people to products being transported was 4:1. Other counts taken in 1985 report 3.9 vehicles per day between Kagongo and Muyama along road 84 (February), and 2.3 vehicles per day along the not yet completed road 86 between Muyama and Rumonge (May). Approximately 50% of the traffic on these roads is by auto, moving people. Toyota pick-up trucks account for 25%-40% of the traffic; heavy trucks, 5%-20%. Minibus traffic at present is limited to market days and weekends, and accounts for 1%-2% of the total traffic on these roads.

It is the movement of people which is most noticeable along the roads at present. They constitute the bulk of what is being transported by vehicles; pedestrian traffic is considerable as well. Pedestrian traffic counts taken in 1985 reveal the following:

Kagongo - Muyama (February): 14,279 (11,067 men; 3,212 women);
Muyama - Rumonge (May): 18,280 (12,613 men; 7,667 women);
Muyama (May) (intersection of roads 84 and 86): 23,539 (12,326 men; 11,213 women);
Musave (May): 19,238 (11,172 men; 8,066 women).

Average pedestrian traffic varies from 476 to 785 persons per day. Men are traveling the roads more often than are women, on the average. This is understandable. Women are more heavily involved in agricultural and domestic activities than are men, and thus spend more time on the farm. This is especially apparent in the February count; February is a particularly busy agricultural month. The May count reveals post-harvest market activity; pedestrian traffic is noticeably higher in May.

Interestingly, on market days the number of women on the road is greater than the number of men. At the Muyama market, 1,203 women passed the check-point, as did 1,048 men. The figures for the Musave market are 1,138 women and 965 men. At this time it would be inappropriate to conclude that either women or men are benefiting disproportionately from the presence of the road. Nor is it expected that the impact of the road will benefit either women or men to the exclusion of the other in the future.

Taxi/minibus service is restricted to weekends, market days, and holidays. Fares from the rural centers along the roads to the highway towns of Minago, Rumonge, and Bujumbura are still relatively high. The average fare reported between Murago and Minago is 200 FBu, 100 FBu less than before road 84 was built; the fare between Muyama and Rumonge is 300 FBu, also down 100 FBu. A trip from Murago to Bujumbura now costs 400 FBu - the same as in 1982, suggesting that, given the inflation which has occured since then, the real cost has declined.

In addition to passenger traffic, Primus beer and Fanta are transported most often. An average of one truck per day carries these products to the centers along road 84. At present, one Primus-Fanta truck every other day is reported on road 86. Once to twice per month manufactured products, such as salt, sugar, matches, cigarettes, blankets, and construction materials (corrugated roofing, cement) are brought into the area by truck. People as well as products were carried in 14% of the vehicles observed in the count. Agricultural products were rarely observed in vehicle transport (see discussion below). Reports from area residents emphasize the unfamiliarity of merchants/transporters with the region; claims are made that traffic will increase as people become more habituated to the presence of the roads. With an increase in economic activity as well, it is likely that residents will begin to travel by minibus and taxi more than they are at present. The Burundi Office of Transport, OTRABU, has been petitioned to commence transport service in the area; it is expected that fares will be reduced when this takes place.

3.2 Social Impact

The impact of rural roads 84 and 86 upon residents of the area is more real than apparent at this time. There are no figures to indicate that a greater percentage of people have been able to find vehicles for emergency transportation to the hospitals at Rumonge and Bujumbura, or to the dispensary at Murago, than was the case before. No one has documented that more students and more military personnel return to the area on weekends than did so previously. Yet the area residents are experiencing a change in mentality, a change in perspective as a result of the opening of the region to outside influences. This process will profoundly effect the way they live in the future.

3.2.1 Education

Access to the area's secondary schools in Bujumbura and Gitega is better. This does not mean that more students attend these schools, but rather that those who do so find it easier to return home on weekends and holidays. The majority of primary schools in the area are not located along roads 84

and 86, and so access to them is not a direct function of the presence of the roads. Yet the roads have had a more subtle influence upon the residents of the region. They are more aware of people and events outside the region; they are more drawn to the life of the cities and towns; they are more a part of the nation. An official in Murago claimed that more people will want to send their children to school now as they come to appreciate the importance of education for the development of their children. This opening of the area reflects a broadening of horizons and is already observable in the number of new buildings being constructed along roads 84 and 86. People are being drawn to the roads, building houses and stores alongside them for easy access. School attendance in the Murago area is estimated to be 4200 at present, up 24% from the figure presented in the 1980 study by SOMEBU. School attendance figures for the coming years should reveal a continued rate of increase in primary school attendance greater than that for the nation as a whole. It has been reported that school inspectors are making more regular visits to the schools, take more of an interest in programs, and are more helpful in addressing the needs of the staff and students.

3.2.2 Health

There are a number of health facilities in the area of the project: at Minago, Murago, Muyama, and Rumonge. In principle, area residents will benefit from easier access to them. Nurses at the Murago facility spoke of the possibility of rushing people to the hospitals at Rumonge or Bujumbura in case of emergency. It cannot be said at this time, however, that health care has improved significantly for the people of the region. Medicine is in short supply, facilities are understaffed, there are no vehicles at the disposal of the health centers. There is an obvious health benefit to a population which has all-weather road access to medical centers; ultimately, with the improvement of rural health facilities, the value of roads 84 and 86 will be greater yet in this regard.

3.2.3 Nutrition

Baseline nutritional data was not collected prior to the start of construction on road 84, and it is not possible therefore to determine whether or not the nutritional level of the family's diet has improved since the road has been completed. The Food-For-Work component of Rural Road Project 1 was very well-received by the area's inhabitants. Bulgar wheat was well-liked. The role of bulgur and soya oil in the diet was, in all likelihood, positive. Yet we do not know if they replaced foods also highly nutritious. Food-For-Work is not a feature of Rural Road Project 2. It is equally as difficult to know at this time if diets have been improved. Fish is sold in rural markets; the population can benefit from the additional

protein. Kwashiorkor, a condition of protein deficiency, was reported at the Murago clinic to be "commonplace" in the region. The presence of fish in the market does not mean that individuals who need protein most are obtaining it. Equally, the nutritional benefit of increased amounts of sugar and salt in the diet, now that these items are regularly available, is open to question. Statements about the improved nutritional status of the population will have to be documented before they can be made with conviction. It is interesting to note that when asked about nutritious foods they are consuming, Rwandans regularly responded that they have increased their consumption of beer.

3.4 Women and Men

The Burundi living in the project area will be influenced by the presence of roads 84 and 86 as outlined in this analysis. There is nothing at present to indicate that the benefits of the road will be disproportionately distributed among members of the family. Men have been drawn from the farm to work on the construction of the roads; they report hiring agricultural labor to help on the farm in their absence. Men report sharing their salaries with their wives. The mid-term evaluation, in which women were interviewed on the farm, confirmed this. The Burundi family, functioning as a nuclear unit in an independent homestead, is based upon the interdependency of its members. Failures to promote this interdependency are usually not tolerated by family members themselves. If differential impact is anticipated in the future, and it is not foreseen in this analysis, AID can engage a team to design a study of it.

4. Conclusions and Recommendations

Rural Roads Projects 1 and 2 were designed to be of benefit in the Burundi context in three fundamental ways: by providing rural inhabitants with skills based on their experience with the technology and management of labor-intensive rural road construction; by promoting the institutionalization, that is, the operation and management, of the labor intensive road construction method, in the Ministry of Public Works, Direction of Roads; and by promoting the socio-economic development of the region in which the roads were constructed. To varying degrees these objectives were attained. They are discussed in order below.

4.1 Training

It was foreseen that the project would, through experience and training, create a cadre of road construction teams capable of working on these and other labor intensive road construction projects. In a sense Rural Roads 2 made this goal a reality, since many of the skilled laborers from the Rural Roads 1 project continued to work on the second road. There is little doubt too that both skilled and unskilled workers would be capable of competent work elsewhere. In fact,

about one-half of the masons who worked for the project at one time or another have left for other jobs. As a rule, they can make more money elsewhere. Unskilled laborers are not as likely to apply their experience to other road construction projects. These workers are locally recruited, and it is commonplace for them to leave the project when the work takes them too far from their homes. In a sense, this is as it should be: the project is to benefit local residents. In the case of Rural Road 1 (road 84), the majority of unskilled laborers were young and single, and many of them remained with the project for 3 years. Some of them continue to work on the second road (road 86). They should not be understood to constitute a "cadre" of rural road workers, however. The majority of them are not likely to move around the country following rural road projects and competing with local residents for jobs.

Some 2,000 area residents directly participated in the road construction component of the project. Sixty-eight local individuals (58 workers and 10 chiefs) have been permanently engaged by the Ministry of Public Works for maintenance of road 84. Individuals working as skilled laborers should be capable of finding work elsewhere after the project ends. Unskilled laborers will likely fend for themselves as before.

Recommendation 1: The most effective training component of the project provided marketable skills to close to 100 individuals, in masonry, mechanics, and driving, either formally in training programs or informally through on-the-job experience. An increased number of programs of this type would benefit a greater number of people in the future and would be a relatively sound investment (given the apparent lack of these skills in Burundi at the present time).

4.2 Institutionalization

Institution-building is a fundamental component of the AID development strategy. It is based on the philosophy of transferring skills to host country personnel to enable them better to plan and manage their own affairs. In this instance, it appears that the Ministry of Public Works, Direction of Roads, does not share AID's concept of what constitutes institutional capability. There is no unit in the Direction of Roads charged with managing labor intensive road construction projects. Neither are there host-country individuals with responsibility for overseeing projects of this type. The Direction of Roads has appointed a full-time accountant to handle the administration of the project. At present the Direction is following a practice of using expatriate techincal assistance in place of developing further its own ability to plan and manage labor intensive road construction projects.

The management of the project in the field is undertaken exclusively by project personnel. There will be no institutional infrastructure left behind when road 86 is

completed. Save for a maintenance crew permanently engaged by the Ministry, there is no evidence of an organizational capability to replicate these projects elsewhere.

Recommendation 2: It is advisable for future projects of this type that the Ministry of Public Works develop a program for putting into place the organizational capability to plan and manage labor intensive road projects. A revenue-generating component, such as a road-user tax, should be contemplated as a means of supporting the permanent staff needed to sustain the program.

4.3 Socio-Economic Development

The presence of all-weather roads in rural areas where, previously, traffic had been limited to one or two vehicles per month, will bring profound and irreversible changes to the region. Some of these will be reflected in increased agricultural production of those crops sought in the markets of major cities and towns, and in the higher price obtained for them. Others are less apparent, reflecting more a change in mentality and perspective as outside influences penetrate the formerly isolated area. These changes are beginning to take place in the project zones; they represent the early phase of a socio-economic evolution which will permanently change the lives of the area's residents.

To date there are some indications that the demand for agricultural products produced in the region is increasing. Vehicular traffic is increasing, and merchants/transporters are making regular visits to rural centers on market days. The availability of manufactured products has increased; shortages of staples, such as salt and sugar, no longer occur. Prices of agricultural products have been influenced by the demand: on days when transporters are present, prices are raised. At this time it is not possible to know how much of the price increase is attributed to the presence of roads 84 and 86; some transporters still move merchandise on foot. A complete market survey would be revealing in this regard.

The opening of the region is exhibited in the construction taking place along roads 84 and 86, in more frequent road traffic, and in the increased awareness area residents have of life in the cities and towns nearby. More people reportedly are interested in sending their children to school now; medical facilities in Rumonge and Bujumbura are more accessible. The pace of social and agricultural development in the region is quickening: a number of development projects have benefited from the improved access the road has afforded, and are bringing materials and extension counsel to area residents. In these and other ways the population of the region is influenced by the presence of the roads.

Recommendation 3: A market survey would be useful in monitoring the agro-economic evolution of the project zone. Other surveys/studies also would help in clarifying the dynamics of development: in this instance, of the educational process and of the expansion of medical services provided rural dwellers.

4.4 Future AID Road Projects

The impact of Rural Roads 1 and 2 on the Burundi population has been largely positive; save for the failure to institutionalize the labor intensive methodology, the project has achieved, in one form or another, most of the goals outlined at the start. If additional rural road projects are to be supported, AID should attempt to resolve the difference in perspective between the Agency and the Ministry of Public Works, Direction of Roads with regard to what constitutes institutionalization (see Recommendation 2). Additionally, the reasons for the delays in project implementation caused by the inability of the Ministry of Public Works to furnish needed equipment on time and in working order should be examined before another project is funded

Recommendation 4: The particular mix of labor intensity and heavy equipment needed to construct rural roads in the Burundi context seems to have been established by the project. AID should closely evaluate the extent to which it should include a heavy machinery item in the budget for additional rural road projects in Burundi. This would be one way of leveraging the development of the institutional capabilities of the Ministry of Works.

C Agricultural-Economic Impact

The zone of influence of RP 84 and 86 encompasses three communes in Bururi Province - Rumonge, Buyengero, and Burambi and traverses all of Burundi's ecological zones from Ruzizi Plains (0-1,000m) up to the High Altitude and Central Plateau (1500-1900m). The bulk of the area in both of Rural Roads I and II lies in the Central Plateau where bananas, beans, maize, sweet pototes, cassava, and arabica coffee are grown. Another significant portion lies in the High Altitude area (1900-2500m) where wheat, sorghum/millet, Irish potatoes, maize, peas, sweet potatoes, and tea are grown. A smaller portion of the zone of influence encompasses the plains along Lake Tanganyika up through 1500m where oil palm and rice as well as a similar range of crops are grown. Fish from the Lake is an important product traded. Oil palm is the most important economic crop in the lower altitudes, and coffee at the higher altitudes.

With the exception of palm oil and coffee, roughly 85-90% of output is consumed on-farm. While the government regulates prices of coffee and palm oil, prices of other commodities fluctuate freely.

This isolated area is considered a surplus producer of agricultural commodities, following traditional practices.

Little consistent data on area, yield, production, marketed surplus, and prices were available from baseline dtudies or project files, and could not be collected from other sources within the time frame of this evaluation. The observations that follow are therefore largely impressionistic.

It is reported that in 1983, approximately 600 tons of coffee was moved out of the region along road 84. In 1984, after a poor coffee harvest, 600 tons again were transported along the yet further improved road 84.

District officals of the affected roads, expect heavier traffic attracted by the improved roads during the coffee season, since the completion and opening of RP 84. Transporters will have the opportunity of discovering the ease with which they move along the newly build RP 84.

New Varieties

The zone of influence has always been isolated and has had little to do with other areas undoubtedly due to lack of roads. When talking to farmers, one gathers that they have not been open to any new agricultural innovations continuing to cultivate traditional crops and varieties. However, surveys revealed that there now exists a new variety of banana which was introduced in 1983, the initial results of which are significant. Farmers felt that introduction of this new variety was made possible with the reconstruction of RP 84. The dissemination of other new varieties - "Karima" species of beans and the "Bambou" (maize species) and "Igarama" (potatoes) may have also been greatly helped by the RP 84. The agricultural extension workers from Nikizi are said to now make more frequent visits to the area during the rainy season. Farmers said that they had known abut the existence of these species, but did not feel inclined to try them until encouraged to do so by the frequent visits of an agricultural extension team from Bujumbura.

Despite new crop species that are starting to be introduced there appears to have been no changes in the methods of cultivation. The hoe is still the main, often the only, implement used in agriculture. Road laborers indicated that their wages have made it possible for them to buy replacement hoes more frequently. The use of fertilizer is unknown. Agricultural credit banks are not available. One promising sign observed by the evaluation team, however, was the variety of agricultural implements found in primary schools. At the MURAGO Primary School, pupils learn to use pick-axes, pruning scissors, forks, sprays, etc. These date back to the road construction. One teacher interviewed said that the B.E.R. (The Rural Education Office) promised them these tools when lorries could easily use the road.

Other Projects

Local residents and officials cited the following other agricultural project activities in the region as having benefited most from the presence of the improved roads: reforestation, tea production, high-yielding seed development, vally (marais) development, and the development of extension service. Prior to the completion of RP 84, the reforestation and tea projects were more active in other adjacent areas. One can now see project officials going by regularly on motorcycles.

Another project which was discussed at length in the project in conjunction with road 86 was the Societe Regionale de Developpment (SRD) project which supports re-planting of oil plams in the Rumonge area. Between 1983 and 1990, 4,700 hectares of land are to be replanted with high-yielding varieties. A factory is to be built at Rumonge for processing the fruit into oil. The benefit to local farmers envisaged in the project paper was to be financial - farmers would earn more from transporting fruit to the factory and selling it there directly than they could from on-farm processing. The road was to facilitate the transport of oil palm fruit. No mention was made in the project paper of the loss of revenue which would be suffered by practitioners of artisanal processing of palm oil.

In fact, the SRD program will have a much more ambiguous impact than was predicted. Farmers who re-plant parcels with new varieties are complelled to sell the fruit to the company. Prices will be set by the company. Whether farmers will earn more than they do now is not known. Transporting of oil palm fruit along road 86 will be handled by the SRD. It is possible that farmers along road 86 who want to participate in the SRD project will benefit from this improved access to the region.

The demand for labor at the factory will benefit those area residents who will be able to find transportation to Rumonge. The final cost/benefit of conversion to new varieties and participation in the project will have to await further analysis some years from now once the palms are producing.

Markets

Surveys of local markets were made at Muyanze, Kabumburi, Muyama, Murago, Minago, Nkizi, and Rumonge. The evaluation team found little indication that the number or size of rural markets had expanded since the road projects, little indication of agricultural produce moving in vehicles in the area and little indication that external demand was penetrating to rural markets via the new roads. However, since RP 84 has only been thoroughly completed for six months, and RP 86 is not yet finished, this may not be surprising.

The dramatic change in markets was the increase in the availability of manufactured goods brought into the area by vehicle. Truckers from Minagao and Rumonge are regularly seen at Kabumburi and Muyama on market days. Salt, sugar, used clothing, beer, soda and staples are said to be consistently available at present; shortages in these and other products reportedly were commonplace in the past. Fish, too, was observed in the Kabumburi market along road 86, having been brought from the coast (Rumonge). Prices for products brought from outside the region were said not to be lower than before, despite the relative ease of reaching the rural centers now. It is the availability of these items and not their price which has impressed the residents of the area. Several new items have begun to appear as well: watches at the Kabumburi market, and corrugated roofing material at all the market centers.

Movement of vehicles on RP 84 is now regular throughout the year. Prior to the improvement of the road, movement was virtually impossible during the rainy season. The road is currently in good condition. Transporters acknowledge the time gained and the ease in which they travel. However, they say that the bends of RP 86 are very sharp and would no doubt be the cause of accidents if traffic were heavier. Interviews reported two commercial vehicles making regular runs on RP 84 from Minagao to Muyama four days a week. On RP 86, three commercial vehicles make runs on Mondays and Fridays.

It appears from the survey that farmers are not themselves travelling to the markets along national route 3 - Rumonge, Minago, Bujumbura - any more frequently than before to sell their products. Rather, they continue to frequent the same market as last year, but raise their prices if intermediaries (transporters/merchants) are present. 32 of 40 reponsdents claim not to have changed the market they have frequented most during the past year.

Standard of Living

Since the improvement of the roads it is reported that there are many more wayside shops and food stands. Shopkeepers reported profits which have made it possible for them to make improvements in their businesses. The roofs of most shops are now corrugated iron, whereas before they were thatched. Competition between traders was also reported.

D Environmental Impacts

In both road projects the roads concerned followed existing tracks with only limited realignment. Because of this and because of several design features both projects received negative determinations, with the proviso (p. 35 PPII) that these design features would be evaluated at the end of the projects. In addition to an evaluation of these design features, this evaluation will consider several land use factors which generally are considered to have environmental impacts where roads are concerned.

Design Features

Several features were incorporated in the design of both raods (RP 84 and RP 86) as they were believed to be important in minimizing environmental degradation. The features are as follows:

1) Road widening will be carried out by hand labor, not mechanically.

2) Extensive widening on side slopes will be confined to a few specific locations (four in the case of RP 86).

3) Both roads will follow existing alignment, except at a few specific locations where right angle bends must be straightened (only one instance in RP 86).

4) Total embankment fill will occur at only a few specific locations, e.g. between hills (only two cases in RP 86).

5) Drainage discharge will occur with not substantial addition of culverts. These design features were considered necessary in both road projects as the local terrain is rather steep (the roads traverse areas going from 770m at the lake edge up to 1900m altitude inland); and rainfall is appreciable (1400mm annual average, with 110mm or more in 8 out of 12 months). During the field trip we were able to compare the effect of these features on a completed road (RP 84) and the road in progress (RP 86).

Widening

In both roads the use of hand labor rather than mechanical was an advantage. It resulted in more careful and more selective earth movements. In both roads the widening activities have not appeared to have had any significant environmental impact. Considering the fact that earth movement was started in June 1981 on RP 84, the cut and fill surfaces have stabilized for the most part. Along these roads slope stabilization is hastened on the inner, cut slopes, by either growth of vegetation (especially grasses) or oxidation of exposed laterite soil which tends to bind exposed soil surfaces. On the outer, fill slopes, stablilization occurs because of compaction as well as growth of vegetative cover. On RP 86 earth movement began in autumn of 1984 and here the cut and fill surfaces are still mostly bare. However, some vegetation is beginning to appear and further stabilization would be expected with time.

Alignment

In many cases on both roads advantage was taken of the existence of large treees along the road edge. The trees made for a more stable fill slope and prevented large slippage

during road widening. This definitely proves the advantage of tree conservation and new plantings along the road edge. The newly aligned sections on both roads presented no unusual environmental effects.

Embankment Fill and Borrow Pits

On both roads embankment fill appears to have gone successfully even in areas where bad gullying existed prior to filling (e.g. Km 42 PR84) several gabions were seen at KM 44 RP 84 and these will definitely be of help slowing down any large-scale erosion. All borrow pits seen were being suface mined with no standing water. They therefore present no health hazard from water borne disease vectors.

Drainage

By far the most important feature of the road design, drainage was considered to be adequate on both roads. Mostly this was due to : 1) the reverse slope of the road bed which slopes from fill slope to cut slope; 2) well maintained ditches on the cut slope side; 3) presence of cut-off ditches; and 4) well-planned culvert outletting. The existing culverts on RP 84 were improved using a variety of culvert methods. (The problem with the "steel drum" culverts will be discussed in the engineering evaluation) including the pre-fab concrete culverts being used on RP 86.

Summary-Design

The design features are adequate in terms of controlling general erosion on and along the road beds. These features should be incorporated in future roads.

Land-Use and Natural Resources

Over the long term we would expect to see changes in natural resource utilization along the roads due to changes in population and land use patterns. The Project Papers and baseline studies do not provide enough detailed information on the exact population or its distribution along the roads (from 1981 to the present) to allow us to judge land-use pattern changes or differences in natural resource utilization. These factors must be monitored in the future and will certainly be an important factor in future road projects.

Of particular concern here is the question asked in regard to the statutory checklist (p.4 PPI project amendment) and FAA 118 (c) and (d) : "Does the project take into consideration the problem of destruction of tropical forests?". In this regard we must first clear up a false impression created by PPII. There it was stated on several occasions that the palm oil industry in the Rumonge region depends on charcoal for the extraction of oil from palm nuts. This is incorrect. According to the SRD, oil extraction from

the nuts is carried out using the husk waste from the fruits. This waste contains abundant fiber and some oil and provides a good fuel for this process.

There is still a demand for wood and charcoal in the region through which the roads pass, but the large reforestation effort on RP 84 funded by a Belgian project will go a long way toward providing a local supply of wood. At present, however, there were only small pockets of locally planted eucalyptus seen and very few older stands of planted trees or natural vegetation. There is a replanting scheme being carried out by the SRD above Rumonge to replant oil palms on small holdings: 370 ha in 1983-84; 460 ha in 1984-85, and 2,000 ha expected in 1985-86. All of this is or will be on existing small holdings where older poor-yielding trees will be replaced with new, high-yielding varieties. Of the 2,000 hectares to be planted in 1985-86, 200 hectares will be "new" plantation (i.e. on land previously farmed, but not in oil palm). The value of trees planted along the fill slope has been pointed out above, and should be strongly recommended as a major part of road design and maintenance in Burundi. Agroforestry practices (e.g. Pennisetum grass on terraces and embankments above and below the road bed) were seen in several places. These should be encouraged. In some instances, however, a section of the cut slope had been cut back as a terrace, and a single line of eucalyptus saplings had been set out. This practice should be discouraged as trees planted on the side of the cut slope will inevitably present a hazard to road use as they are quite liable to fall across the road during rainstorm.

Summary - Land Use and Natural Resources

1. Not enough information has been gathered or analysed in either project to state what changes have or will occur as a result of these roads.

2. Good agroforestry practice such as grass, shrub and tree planting in the vicinity of the road and nearby terraces should be encouraged.

3. In the region traversed by both roads wood and charcoal will become more difficult to obtain and/or will cost more with time. There should be more active programs locally to provide wood through village and grass-roots activities in social forestry.

V Review of Project Inputs

A. Rural Roads I

1 AID Contribution

Figures on AID contribution are summarized in Table V-1. The RFMC report of 5/13/85 does not take into account the last budget revision per PIL No. 12, nor the last PFIR dated 6/10/85 which covers approximately $45,000 of allowable expenditures prior to the PACD. The apparent residual amount to be de-obligated is about $79,000. OAR/B and RFMC should clarify any outstanding balance for an orderly closeout of finance records. An especially large discrepency exists regarding actual expenditures for POL.

2 GRB Contribution

The GRB provided personnel (Central Office Overhead); job supervision; engineering; and use of the following equipment Roller, dump truck (2), air compressor, and power shovel.

Comments on the GRB's contribution of machinery are made in the section below for Rural Roads II.

Table V - 1

Burundi Rural Roads 1
Budget Status after close of PACD
-- AID Contribution --

	1/ Amount Budgeted	2/ Amount Disbursed
	--- $1,000	---
1. Technical Assistance	67.8	29.8
2. Commodities	282.9	56.8
3. Labor	850.0	804.5
4. POL	56.2	312.55
5. Emergency Spare Parts	62.3	18.8
6. Compactor	40.0	-
7. Peace Corps Vehicle	10.0	-
TOTAL	1,346.0	1,222.3

Source : 1/ PIL No. 12 dtd 10/29/84

2. Per RFMC, MACS, P06B report of 5/13/85

B. Rural Roads II

1. AID Contribution

The status of the $841,000 worth of AID-financed inputs is shown in Table V - 2.

Disbursements and accuruals to date are estimated at slightly more than half of obligations. The remaining available balance is $370,000. Based on discussions with project officials, the evaluation team proposed a revised budget (Columm E). This programming does not take into consideration the proposed $246,000 increase to the Grant which is being contemplated to cover a dynamiting contract and project support unit line items which do not appear in the Table V - 2.

2. GRB Contribution

According to the agreement the GRB contribution is supposed to be as follows :

	$
Personnel, Administration	64,000
Equipment	187,000
Materials, incl. handtools	62,000
Contingency/Inflation	47,000
Total	360,000

Personnel, Administration - Contributions of manpower have been made as agreed.

TABLE V - 2

Burundi : Rural Roads II

Budget Status as of June 1, 1985

AID Contribution

	A Amount Budgeted in PP	B Revised Budget per PIL No. 6 dtd 5/14/84	C Disbursements and Accruals1/	D Balance available	E Propose revisec Budget
		$000			
Labour	300	300	196	104	300
Material, Cement Steel	160	160	37	123	90
Handtools, Misc.	59	59	15	44	35
Emergency spare Parts	30	30	26	4	70
POL	80	80	56	24	110
Roads Study (PRC Corp.)	70	70	70	-	70
Baseline Study (SOMEBU)	15	15	14	1	14
Evaluation	15	15	0	15	15
Housing Renov. for PCV	10	17	1	16	1
Utility vehicle for PCV	12	15	13	2	13
Contingency inflation (15% of A-E)	90	60	0	60	53
Technical Assist. (Franco Puggia, mechanic)	-	20	44	-24	70
TOTAL	841	841	472	369	841

1/ Based on expenditures reported in Field Report of 31 May 1986 submitted by IRBD construction engineer; discussions with OAR/B.

Accruals include funds committed per purchase orders, etc. but which have not yeat been paid out.

GRB Equipment

The GRB was to provide necessary mechanized equipment to construct the roads. This included a compactor (roller), two dump trucks, an air-compressor and a power shovel under the first project; and under the second project : five trucks (one held in reserve), compactor (roller) , power shovel, rock crusher and compressors with jackhammers. It is apparent from reviews of the trip report files that, while technically complying with the Agreement, the government had not been able to effectively provide this equipment as required.

The trucks were in poor mechanical condition and this is one of the reasons for the delay in surfacing of RP 84. The GRB was not in a position to keep these trucks operating and available to the project. The reponse under the Rural Roads I was to budget $62,307 for spare parts (PIL No. 12) and to hire a mechanic. Taking into account the situation, including the GRB's limited resources, this was an appropriate response. The Rural Road II project has continued this assistance, budgeted $30,000 for spare parts (proposed to be increased to $55,000) and continues to employ the mechanic (who is now budgeted at a proposed revised total of $70,000).

An appropriate compactor was not provided when needed by the GRB and delayed the surfacing operations on RP 84. A rubber-tired (SAKAI) compactor was occassionally made available but it was not appropriate for compaction of the material used to surface the road. Finally, a steel drum compactor was rented from a private company with much difficulty. The cost of rental incurred by RP 84 was approximately $13,000 and was paid by USAID funds, but this arrangement lasted only about one month. Compacting was completed with a new GRB compactor which was imported for a UN-funded project that was not yet ready for it.

The jackhammers used by the project were also purchased with project funds using local currency (741,600 FBu.). It appears that when the compressors for the pneumatic equipment were available they were provided by the government.

The power shovels were in poor mechanical condition and were not always available when needed. However, the GRB did occassionally provide a front-end loader as a substitute. Also provided by the GRB, but not identified as an input specifically to be contributed by the GRB in the Grant Agreement, was a Caterpiller D-6 bulldozer. It has been very useful and has been available when required on the Rural Road II project.

The rock crusher to process surfacing stone has never been provided and the project has had to use whatever stone was available. The problem with this is that a steel drum compactor is critical to proper surfacing when uncrushed (unsized) stone is used. The situation is the same

for the Rural Road II project and therefore, the project should concentrate on ensuring that an appropriate compactor be available for surfacing completion.

In summary, the GRB only partially provided the mechanized equipment required for road construction. Project management has responded appropriately to the situation with some delay. The equipment problems were identified early in project implementation. It would have been useful to accept the limited capability of the GRB to provide these inputs as soon as possible and take appropriate action. It appears that the delay in responding has not had a major negative impact on the project expenditures although completion was delayed.

Materials and Handtools

Materials and handtools funded by the project are appropriate. The major concern is the steel barrels used for culvert construction on RP 84. They are not acceptable as substitutes for concrete pipe or galvanized, corrugated pipe. These barrels are not being used on RP 86. There are substantial funds remaining in Rural Roads II for handtools on the AID contribution side. The project may wish to use this money upon project completion to properly equip the maintenance workers on RP 84 and RP 86

3 IBRD Contribution

Technical Assistance

The World Bank has provided through the GRB two technicians to the projects - one full time and one half time. They have been highly effective in guiding both projects. Per an agreement reached in May 1985, only one of these individuals is presently working on Rural Road II (Hubert Verhulst). However, he is assisted by a Peace Corps volunteer (PCV). They provide adequate day-to-day supervision and inspection. The mission PSC engineer visits the project every 3 or 4 weeks, and a REDSO/ESA engineer visits every two months. This has obviously been beneficial to project implementation and should be continued. The PCV is needed considering that the World Bank technician must spend a substantial amount of time away from the road taking care of administrative tasks in Bujumbura.

The dynamiting required on RP 86 will result in a need for close supervision of the contractor to certify the quantities of rock and earth removed. The certification should be done by the World Bank construction supervisor based on his daily monitoring and quantity estimates provided by his assistant.

LOGICAL FRAMEWORK

ANNEX A

B U R U N D I R O U T E 84 R U R A L R O A D

Narrative Summary	Indicators	Verification	Assumptions
GOAL To increase incomes and social welfare of the rural poor in project area.	Increased farmer income in regi. Increase. agricultural production in region Improved access to social services	Socio-Economic baseline study Project Evaluations	Continued GRB interest in development of Burundi area (This project is a direct result of a specific GRB request).
PURPOSE 1. To provide all weather access to agricultural marketing facilities in Burambi area. 2. To establish a tested prototype system for labor-intensive road construction	EOPS Construction of road completed Availability of pool of experienced road construction crews and supervisors in project area Methodology for organizing and administering labor-intensive construction programs established for ready adaptation and use elsewhere in Burundi	Min PW technical reports REDSO engineering visits Project evaluations	Lack of all-weather transport is major inhibiting factor to economic growth of project region This road is very well suited to labor intensive construction techniques because of limited earthwork and emphasis on ditches and structures
OUTPUTS 1. Reconstruction of Rte 84 to all-weather status 2. Trained cadre of road construction workers available in project area for maintenance and further rural road construction 3. Increased incomes and nutritional levels among families of construction workers.	58 km of improved earth road and drainage structures 800 construction workers trained by 3rd year of project 80 construction supervisors (unit chiefs) trained 818 MT of bulgar wheat and 90 MT of soya cooking oil distributed to construction workers and families over 3 years under Food for Work Program	Commune statistics Mission Cooperative sales records Health dispensary records CRS records and reports on Food for Work disbursements	GRB Dept PW will provide an expatriate construction engineer (UNDP financed) on at least a half-time basis. GRB will continue to train construction supervisors at 11 week ORT or similar program Labor can readily be recruited from the project region CRS can effectively administer the Food-for-work component with the aid of the Murago Catholic Mission's storage facilities.

Narrative Summary	Indicators	Verification	Assumptions
OUTPUTS cont'd			Storage can also be arranged on temporary basis at Minago mission on Lake Tanganyika. Wheat and oil distributed under project will be largely consumed by workers and their immediate families.
INPUTS			
USAID			
Support of Construction	$393,000	PL 480 Title and CRS records Project documents PIO/Cs	The present dearth of agricultural and statistical data on the Burundi commune and its immediate environs can be redressed by a socio-economic baseline study of the area early in the project possibly by a local firm.
Labor	120,000		
Handtools	130,000		
Steel, Cement, asphalt	89,000		
Misc supplies & POL	15,000		
Socio-economic study	25,000		
Evaluations			
PL 480 Title II	$625,000		
Food for Work	154,000		
Contingency			
TOTAL	$926,000		
GRB			
Personnel	$222,000	GRB Dept PW's records and technical reports	Necessary equipment (dump trucks, roller, compressor, etc.) already in country will be made available by GRB Dept PW on a timely basis as planned.
Equipment	235,000		
Material	36,000		
Contingency	74,000		
TOTAL	$567,000		

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX B

Title & Number: Ru[illegible]ad II (695-0112)

Life of Project:
From FY [illegible]
Total U.S. $ [illegible]

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
[illegible]er Sector Goal: The broader objective to [illegible]this project contributes: [illegible]ncrease incomes and social [illegible]re of the rural poor in [illegible]ct area.	Measures of Goal Achievement: Increased farmer income in region. Increased agricultural production in region. Improved access to social services.	Socio-economic baseline study. Project Evaluations	Assumptions for achieving goal in [illegible]: Continued GRB interest in development of the existing internal road network.

Project Title & Number: Rural Road II (695-0112)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	Conditions that will indicate purpose has been achieved: End of project status.		Assumptions for achieving purpose:
1. To reconstruct the Rumonge-Muyama road using labor intensive construction methods, which through the reconstruction process reinforces GRB institutional capacity to implement labor intensive road construction projects;	1. Construction of road completed.	Project evaluations. REDSO engineering visits. Ministry of Public Works technical reports.	The road is suited to labor intensive construction techniques. The cadre of private businessmen with the ability to perform as sub-contractors will be interested in working on similar road project. Other donors/GRB willing to use the trained cadre of road construction workers.
2. To provide all weather access to markets for agricultural products in the project area, including a connection to markets on Lake Tanganyika, the interior, and in Bujumbura.	2. Institutionalization of labor intensive system within the Public Works Ministry.		
	3. Trained cadre of road construction workers, pipe layers, masons, drivers made available for projects and private sector through on the job training.		
	4. Studies of new roads completed.		

Annex A.2.2.

[illegible] rural road will be [illegible] to improve the Ramonge-[illegible] to all-weather status.	30 km of improved earth road and drainage structures. Improvement shown in comparison to baseline socio-economic study.	Ministry of Public [illegible] personnel records. Health dispensary record. Commune statistics.	GRE 12 will provide [illegible] construction engineers (IBRD financed) one on a full time and one on a half time basis.
[illegible] increase among families [illegible] workers.	Number of trained GRE staff (supervision and planners).	Comparison of baseline data on prices with data gathered during project.	Labor can readily be recruited from the project [illegible].
[illegible] utilization of labor [illegible] within the Public [illegible].	Number of workers trained.		GRE will continue to train cadre of workers.
[illegible] road [illegible], pipe layers, [illegible] available [illegible] private sector [illegible] job training.	Studies done.		
[illegible] agricultural [illegible] at less [illegible].			
[illegible] for additional			

Best Available Document

	Implementation Target (Type and Quantity)		
... steel ... spare parts			
... Studies			
		GRB Dept. PW's records and tech... records.	Necessary equipment (dump trucks, rollers, jackhammers, etc.) will be made available by ... Dept. PW on a timely basis.
... attribution ... assistance: 1.5 persons			

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Annex A.2.4.

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ANNEX B

List of Persons Interviewed

2 Road maintenance workers
Administrator, Murago Commune
Peace Corps Volunteer, Gordon Steffenmeier
Workshop chief, Muyama
Work crew chief, Road 86
Hubert Verhulst, Juvenal Burubona, Gilbert Ndayihacuje
Mr. Francois Nahigombeye, Director General of Highways
Mr. Boniface Nizigama, Technical Director of Road Exploitation
Mr. Antoine, Deputy Director of the National Network of Roads
Mr. Lonhienn, Consultant, Direction of Roads
Mr. Dirk Rasch, Consultant, Direction of Roads
Gaspard Sinzinkay, Official, Murago Parish
Hermes Ndayisaba, President, Murago Cooperative
Frederic Niyomzigiye, Primary School teacher, Murago
Mathias Murishi, Nurse, Murago Dispensary
Patrice Nibaruta, Nurse, Murago Dispensary
Gaspard Indaystiwaycho, Employee of SRD
Charles Misigaro, Administrator, Buyengero Commune
Mason, Road 86
Maintenance workers, (2) Road 84
Anastase Rutabayiro, SRD Administrative Assistant
Epitace Nobera, Director General, SRD
Mr. Audace Kabayanda, Director General National Institute for the Conservation of Nature (INCN)
Mr. Salvator Sahingovu, Director General, Agricultural Planning
Zone Chief, Kabumburi
Zone Chief, Nkizi
Agricultural monitor at Kabumburi and Nkizi
Commune agronomist, Burambi
2 Forestry agronomists, Mugamba - Bututsi
Manager of the Cooperative at Murago

Transporter, Kabumburi
Transporter, Muyama
Transporter, Rumonge
Personnel Officer of Road project at Rumonge
Farmer in the zone of influence
Foremen of the worksites
Shopkeepers at Kabumbura and Muyama
Retailers from Nkizi, Muyange, Kabumburi and Rumonge
Mr. Carpophore Ntagungira, CURDES/Burundi
Mr. Julien Denakpo, USAID
Samson Ntugunka, USAID

ANNEX C

Suggested Project Implementation Actions

Issue PIL with revised budget as recommended in Table V - 2.

Send letter to GRB requesting its maintenance plan per Section 5.3 of the Agreement.

Execute Amendment 1 re-addition of funds for dynamiting contract.

Issue PIL pursuant to Amendment 1.

Approve dynamiting contract.

Request GRB to provide grader to RP 86 for final grading

Request GRB to provide vibratory roller compactor.

ANNEX D

Africa Bureau Guidelines*

Project	:Rural Roads I (RP 84) (695-0108) Rural Roads II (RP 86) (695-0112)
Country	:Burundi
Cost of Aid	:RRI: $1,346,000 plus $625,000 for PL480 commodities
	:RRII: $841,000
Period of Project	:1980 to 1984

1. What constraint did these projects attempt to relieve?

The goal of increasing agricultural productivity sufficiently to feed Burundi's growing population is the top development priority of the GRB. Lack of ready access between agricultural producer and consumer is a major obstacle to meeting this goal. These projects represent the GRB's effort to address this constraint in one important rural area. These projects are assisting a rural population of 86,000 in Bururi Province south of Bujumbura by providing all-weather access to agricultural marketing facilities in the area, as well as links with routes to outside markets.

2. What technology (knowledge, skills or practices) did the projects promote to relieve this constraint?

Labor intensive methodology has been developed under the projects and the use of labor intensive construction methods is being utilized to establish a generalized operations and managment system which can apply to other appropriate development activities in Burundi (i.e. other rural roads of type similar to Routes 84 and 86, conservation work, integrated rural development projects, etc.).

3. What technology did the projects attempt to replace?

Internal transport in Burundi depends almost exclusively on roadways. Although the existing road network of 5,400 km reaches most parts of the country, its condition is not totally suited to Burundi's needs and much of it is in unsatisfactory

* This section is included hereby notwithstanding State 80801 dated 16 March 1985, Subject: Africa Bureau FY 1985. Evaluation Plan, para 3-B, which indicates that it is no longer required in evaluations.

condition owing mainly to poor construction standards and inadequate maintenance. These projects, using labor-intensive construction methods and training of unskilled or semi-skilled laborers, replaces a work force that was insufficient to perform the minimal functions on road and drainage upkeep.

4. Why did the Project planners believe that intended beneficiaries would adopt the proposed technology?

Workers have acquired skills, training, etc. and hence greater interest by the area inhabitants in ensuring that the roads will later be properly maintained by crews comprising many of the same workers rather than personnel brought in from another area.

5. What characteristics did the intended beneficiaries exhibit that had relevance to their adopting the proposed technology?

The area has a relatively dense population with scare cash income. Although the roads had technical construction problems, the type of work required such as side hill cutting, ditching and drainage, lent itself to labor intensive methods It was apparent that the major block to economic development in the area was lack of transport.

6. What adoption rate has this project achieved in transferring the proposed technology?

A cadre of workmen and supervisors in earch earthwork operations, pipe laying, stone masonry, and ditch cutters have been trained and/or are being trained as workers drop out with subsequent replacement. Masons have been given special apprentice training. Schooled engineers have received field experience. This cadre will be invaluable for completion of the second road, maintenance work and construction of future roads.

Labor for the projects averaged 500 to 600 men each. Labor varies daily with home agricultural activities, weather, labor activity location and the need for sizeable work teams.

7. Have the projects set forces into motion that will induce further exploration of the constraint and improvements to the technical package?

Yes. It is expected that the construction of Routes 84 and 86 will serve as a model for other prospective labor intensive projects in Burundi, drawing on the experience and procedures developed under this project. It has become recognized, however, that certain capital equipment in addition to labor intensive techniques, is required in the technical package.

8. Do private input suppliers have an incentive to examine the constraint addressed by the projects and to come up with solutions?

The availablilty of access to a reliable market is creating greater private initiative and competition among farmers with increased opportunities for sale and purchase of agricultural and other goods. Improved access to markets will likely stimulate and expand the five Catholic mission-sponsored production cooperatives already located in the area. At present there are no credit unions and savings and loans institutions in the project area. However, we expect that governmental and non-governmental organizations could be encouraged to expand their activities in the project area, because of the economic gains resulting from increased productivity and the multiplier effects of income flow into the area. A further economic stimulant is that there are now substantial numbers of people living in the area with training in technical skills. An example of this are the people who were trained under these projects who became small construction contractors.

9. What delivery system did the projects employ to transfer technology to intended beneficiaries?

Paid employment (supplemented with Food-for-Work under Rural Roads I) to road construction workers and supervisors.

10. What training techniques did the projects use to develop the delivery system?

On the job training and beneficiaries attended classes covering topics on highways, heavy machinery, construction, etc.

11. What effect did the transferred technology have upon those impacted by it?

This evaluation has demonstrated that the Rural Roads are beginning to make favorable changes in accessibility for social, economic and development activities, and that the degree of change is dependent to a major extent upon the degree of road completion and village accessibility to market. Workers interviewed expressed satisfaction with their increased incomes, increased nutritional levels, and the skills they have acquired. The GRB is benefitting from the creation of a tested prototype for rural road construction which may be used on other projects supported by AID, other donors, or from investment funds of the GRB.

ANNEX E

Terms of Reference for Social Science Analyst
Burundi Rural Roads Evaluation

The social science analyst should analyze the social impact of the projects giving special attention to the creation of a trained road construction cadre; the institutionalization of labor intensive road construction systems by the Ministry of Public Works; and the social welfare impact in zones of influence; all of which represent major desired outcomes in the original design of the projects:

I. In considering the issue of the trained road construction cadre, the following issues, in addition to others, should be addressed:

1. Wherever possible, develop available information on the number of workers/supervisors trained under the projects; explain the nature of the training that was provided (on-the-job; formal classroom; certificate program, etc.).

2. Describe the nature of the employment experience, including average length, factors influencing the rate of labor turnover, recruitment methods, and wage structures (compared to alternative employment opportunities) including food-for-work and housing benefits. Are there peculiarities to construction work in Burundi that influence these?

3. To the extent data is available, develop in tabular form a comparison of the availability of trained road construction workers/supervisors before the projects (such as those who may have been employed in the World Bank Highway Projects) and those available after the projects, delineated if possible by age, sex, and specialization (pipe layers, masons,drivers, etc.). Consider the supply versus the demand for such skilled labor in Burundi before and after the project and future employment prospects of this skilled pool.

II. In assessing the institutionalization of labor intensive and road construction systems, the following issues, in addition to others, should be considered:

1. Describe the characteristics of the labor intensive road construction method under the projects as opposed to a capital intensive approach, including organization of management/supervisory/reporting lines, availability of appropriate handtools

rakes, shovels, etc.) and expatriate involvement. Discuss the socio-economic cost/benefits of labor v.s. capital approach in the Burundi context.

2. Develop in schematic form the management units or systems in the Ministry of Public Works or other relevant agencies, which may have arisen under the projects (compared to those which may have existed before the projects) specifically related to a labor intensive road construction approach.

3. Assess future prospects for the continuation of such structures in terms of staffing, funding, anticipated workload, and linkages to the cadre of skilled construction workers.

4. Determine progress achieved under the projects in the technical, financial and administrative ability of the government to maintain the new roads in general, and by utilizing labor intensive maintenance techniques in particular.

III. In considering the issue of social welfare impact, the following issues, in addition to others, should be addressed:

1. Determine the number of direct and indirect beneficiaries of the projects.

2. Explain the effects of changes in access to medical, educational, employment, or other facilities/services that were associated with the new roads.

3. Describe changes in beneficiaries' incomes and nutritional levels which may be attributed to the projects. Discuss equity issues.

Terms of Reference Agricultural Economist
Burundi Rural Roads Evaluation

The Agricultural Economist should analyze the effectiveness of the projects in terms of their impact on the agricultural micro-economy within the zones of influence, giving special consideration to effects resulting from anticipated reduced transport costs, including changes in agricultural production, marketing, and farm inputs.

I. In considering the impact of the projects on agricultural output and marketing, the following issues, in addition to others, should be addressed.

1. Determine the major agricultural commodities produced in the zones of influence of the two roads, and to the extent possible, develop in tabular form information on quantities produced before and after the projects.

2. Determine, if possible, the producer prices of major commodities in zones of influence, pre-project and after project, and present statistical information as available showing changes in constant producer prices of major agricultural commodities. Provide also an indication of the rate of inflation.

3. Explain the nature of producer prices in zones of influence (fixed by government, market forces, seasonal effects).

4. Describe how marketing of agricultural commodities may have changed between the pre-project period and now in the zones of influence in terms of location, size, and frequency of major markets; and changes in the quantity marketed. Discuss relevant changes at the termainal market (Bujumbura, Rumonge, other), as well as any regulations, customs, cooperative arrangements, etc. affecting marketing practices.

II. In assessing project effects on farm inputs, the following in addition to other issues, should be examined:

1. Determine the major agricultural inputs brought in from outside the zones, and discuss, in tabular form if possible, changes in prices of these inputs, after considering inflation, as well as other factors.

2. Discuss how the advent of the new roads may have affected availability and prices of major consumer goods and construction materials brought into the zones of influence - soap, matches, sugar, cloth, corrugated iron, etc.

3. Determine factors other than road improvements that may have had major impacts on agriculture in the zones of influence between the pre-project and post-project period, such as extension projects, the USAID Basic Food Crops Project, other donor activities, drought, etc.

4. Analyze the impact of the new roads on the dissemination of agricultural extension services, in coordination with the Social Science Analyst.

III. Regarding effects of the projects on transport, the following issues, as well as others, should be considered:

1. Determine the current annual value of the goods that move on motorized vehicles on the roads in each direction compared with the pre-project situation.

2. Determine whether transport charges have changed between the pre-project period and now, developing to the extent possible in tabular form, adjusted for estimated inflation, costs per kilometer of various kinds of transport for various kinds of goods, comparing pre-project and post-project charges.

3. To extent that data can be developed, assess the cost of constructing the roads relative to the stream of benefits, in an effort to determine the Internal Rate of Return. If possible, compare the IRR to the prevailing interest rate.

TERMS OF REFERENCE FOR ENVIRONMENTALIST

1. Assess environmental effects that now completed Rural Roads I Project has had. Consider a "wrap-up" to the statement on environmental concerns made in the RR I PP. (The mid-term evaluation apparently was silent with respect to environmental issues).

2. Assess environmental effects evident from Rural Roads II. It is said that a tree nursery and a reafforestation project are underway in the zone of influence. Consider whether RR II has facilitated, or is likely to facilitate, reafforestation.

TERMS OF REFERENCE FOR ENGINEER

1. Rural Road II maintenance plan, per sec. 5.3 of Grant Agreement - discuss status of this plan which was to be submitted by the Government of the Republic of Burundi to AID in April 1985.

2. Assess the road building machinery and trucks that are being utilized under Rural Road II, and which were utilized under Rural Road I. It is said that these were barely adequate and barely functional. The "Project Elements" Section of Annex 1 (Project description) to the Grant Agreement stipulated that such equipment would be supplied to the project by the Government of the Republic of Burundi; assess what the status of that equipment is/was. Consider your recommendations regarding the provision, mechanical maintenance, and operation of such equipment in future projects.

3. Sec. 5.4 of the Grant Agreement stipulates that "the Grantee would expeditiously provide all spare parts necessary to keep all equipment required for road construction in operating condition". Assess to what extent this clause has been complied with in your opinion.

4. Project Implementation Letter No. 5 agreed to financing the services of a mechanic/construction technician Franco Puggia. You may wish to interview him (based in Rumonge). Discuss how these services which were not foreseen in the project design, are being utilized and whether in your opinion the contract should be extended.

5. Consider the latest available and most detailed revised budget of Rural Road II. The latest officially conveyed budget is Project Implementation Letter No. 6 dated May 14, 1984. However, the proposed Amendment No. 1 adding another $246,000 the Grant also contains another revised budget. Assess whether funds are appropriately programmed for remaining roadworks activities.

6. Briefly assess the physical completion of Rural Road I, including the issue of oil drums substituted for concrete pipe in culverts.

7. Assess in more detail the physical status of Rural Road II.

[illegible]

Annex E 2.3

I. IDENTITE.

Nom	:	NTAGUNDIRA
Prénom	:	Carpophore
Date de naissance	:	27 novembre [illegible]
Lieu de naissance	:	Bujumbura
Nationalité	:	Rwandaise
Etat-Civil	:	Célibataire
Sexe	:	Masculin

II. FORMATION.

1973 - 1981	:	Candidat en Sciences Economiques et Administratives : Université du Burundi.
1981 - 1983	:	Licence en Economie Rurale : Université du Burundi.

III. ACTIVITES DEJA EXERCEES.

1983 :- Employé par le CRGI (Centre de Recherche en Gestion Internationale: Belgique) pour l'étude sur le transport interurbain et extra-urbain à Bujumbura.

1983-1985 : Chercheur au C.U.R.D.E.S. (Centre Universitaire de Recherche pour le Développement Economique et Social).

IV. PUBLICATIONS.

1982	:	Rapport de stage	: Etude [illegible] bovin [illegible] Rusizi.	[illegible]roption des bovins [illegible] dans la plaine de la [illegible]
1983	:	Mémoire de Licence	: Expérimentation [illegible] étude [illegible] sucre.	[illegible]ion agricole au [illegible] : Patate douce et [illegible]
1984	:	Etude commanditée par la Banque Mondiale	: Les [illegible]	[illegible]ries de Bujumbura. [illegible]
1985	:	Etude commanditée par l'UNICEF.	: Mémoire pour l'[illegible] de l'U[illegible] ± 200 p.	[illegible]Equipe de chercheurs du C.U.R.D.E.S. : Evaluation du Programme [illegible] BURUNDI pour la période [illegible]

Fait à Bujumbura, le 21 mai 1991.

Carpophore NTAGUNDIRA.

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