

MID-TERM EVALUATION

RURAL ROAD 84 (695-0108)

PROJECT EVALUATION STATEMENT

BUJUMBURA, Burundi.

May 1982

MID-TERM EVALUATION
Rural Road 84 (695-0108)
Burundi

<u>Section</u>	<u>Title</u>	<u>Page</u>
PES	Summary	i & ii
13	Summary	1
14	Evaluation Methodology	6
15	External Factors	7
16	Inputs	7
17	Outputs	9
18	Purpose	14
19	Goal	14
20	Beneficiaries	15
21	Unplanned Effects	15
22	Lessons Learned	15
23	Technical Analysis	16
24	Food for Work Program	32
25	Financial Program	33
26	Economic/social analysis	42

FIGURES

1	Summary of events	23-25
2	Proposed Training Program for July	26

TABLES

1	Progress Schedule	27
2	Percentage Work Completed	28
3	Work Remaining to be done by Kilometer	29
4	Labor Figures	31
5	Estimate of Costs as Backup for PP	33
6	Revised Cost Estimate	34
7	Monthly Disbursements	39
8	Cumulative Disbursements versus Budget	40
9	GKB Disbursements versus Budget	41

CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) - PART I

Report Symbol (e.g.,)

PROJECT TITLE

RURAL ROAD (R.P. 84)

2. PROJECT NUMBER

695-0108

3. MISSION/AID/W OFFICE

AAO/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) 695-02

REGULAR EVALUATION SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES

A. First PRO-AG or Equivalent FY 1980 B. Final Obligation Expected FY 1981 C. Final Input Delivery FY 1984

6. ESTIMATED PROJECT FUNDING

A. Total \$ 2,118,000 B. L.S. \$ 926,000

7. PERIOD COVERED BY EVALUATION

From (month/yr.) July 1980 To (month/yr.) July 1982

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 requiring further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SPAR, PIC, with a will present detailed request.)

3. NAME OF OFFICER RESPONSIBLE FOR ACTION

C. DATE ACTION TO BE COMPLETED

- 1. Project costs and financing should be reviewed to determine whether request should be made for additional funds (after settlement of minimum wage question).
2. CRS should be allowed to maintain 40 percent stocks of PL-480 Title II goods because of transport problems.
3. Continue full PL-480 ration.
4. In future labor intensive rural works project REDSO supervisory engineer should visit site once every two months during first year.
5. GRB (Military) should proceed with dynamiting rocks and training personnel.
6. All box culverts should have 4.8 meter concrete planks.
7. Culverting should continue to be done ahead of earth-work operations.
8. Excavated side hill material should be used to form widened road as well as widening the fill slope.
9. Paving will consist of 6 meter wide stone gravel 8 cm thick on 7 meter formation plus cut ditch with slope generally toward ditch. Where established trees line

AAO/REDSO/GRB

10/31/82

CRS/AID/W

8/31/82

CRS/AID/W

Continuous

REDSO

Indefinite

GRB

6/30/82

GRB/Project

Continuous

GRB/Project

Continuous

GRB/Project

Continuous

GRB/Project

Continuous

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) Budget, Other (Specify)

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

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

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

GRB: Director General of Routes
AID: AAO/Burundi: W.Egan/M.Sullivan
REDSO: D. Light
Contract: J. Bryson

12. Mission/AID/W Office Director Approval

Signature

Typed Name George T. Bliss

Date 7 December 1982

the fill, slope formation will be limited to 6 m.

- | | | |
|---|------------------------------|--------------------|
| 10. Two additional trucks should be provided to project for reasonably efficient gravelling. | GRB/Ministry of Public Works | 7/31/82 |
| 11. Drivers should be provided with the heavy equipment. | GRB/Ministry of Public Works | 7/31/82 |
| 12. Acceptance should be done in sections approximately as follows: km 0-8; 8-12; 13-18; 18-24 (Murago); 29-34 (Mugenye); 34-39 (Kedigagi); 39-44; 44-50 (Burambi/Muyama); 50-55 and 55-60. | GRB/REDSO | 8/31/82 and onward |
| 13. Expand the lump sum mini contract system. | GRB/Project | Continuous |
| 14. Engineering monitoring should be done by the same engineer as much as possible. | REDSO | Continuous |
| 15. Continue IBRD financed project engineers for life of project. | GRB/IBRD | Continuous |
| 16. Conduct a limited survey using single measurements of roadworkers' children and local residents regarding nutritional stakes/kwashiorkor | AAO/CRA/Murago Hospital | Periodic |
| 17. Hire a part-time independent bookkeeper to prepare monthly reports, financial disbursements, checking of labor and food distribution. | GRB/Project | 7/31/82 |
| 18. Conduct limited random sample of coffee trees owned by workers as indication of whether project is benefitting the poor majority. | GRB/Project | 9/31/82 |
| 19. Conduct periodic one week road user surveys - early May, mid-July, late January throughout life of project. | GRB/Project AAO Assistance | 7/15/82 and onward |
| 20. Conduct periodic market price surveys for each market along road in early May, mid-July, late October and late January. | GRB/Project AAO Assistance | 7/15/82 and onward |
| 21. Analyse labor supply situation at top of road. | GRB/Project | 3/31/83 |
| 22. An evaluation should be done about 3 or 4 years after project completion to determine full socio-economic impact. | AAO/REDSO/AID/W | 1986 or 1987 |
| 23. Extend PACD by one year. | AAO/REDSO/AID/W | 31 Dec. 1982 |

EXECUTIVE SUMMARY

Prepared by: AAO/Burundi
Date: 19 August 1982
Project: Rural Road (RP 84) (595-0108)
Country: Burundi
Cost: \$926,000 plus \$625,000 or PL 480
commodities
Period of Project: 1980 to 1984.

I. What constraint did this project 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. This project represents the GRB's effort to address this constraint in one important rural area. This project will assist the rural population of 60,000 in the Burambi area south of Bujumbura by providing all-weather access to agricultural marketing facilities in the area, as well as links with routes to outside markets.

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

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

III. What technology did the project attempt to replace

Internal transport in Burundi depends almost exclusively on roadways. Although the existing network of 5,500 km of road reaches most parts of the country, its condition is not totally suited to Burundi's needs and much of it is in unsatisfactory condition owing mainly to poor construction standards and inadequate maintenance. This project, using labor-intensive construction methods and training of unskilled or semi-skilled

laborers, will replace a work force that was insufficient to perform the minimal functions on road and drainage upkeep.

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

The Food for Work Program designed to supplement minimum wages by food supplements provides incentive for this project. The workers, when asked why they accept Fbu 50 (\$.55) per day which is below the minimum wage, say the food plus wages gives them food in their stomachs and money in their pockets. Additionally, the workers are acquiring skills, training, etc. and hence greater interest by the area inhabitants in ensuring that the road will later be properly maintained by crews comprising many of the same workers rather than personnel brought in from another area.

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

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

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

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

Labor for the project has averaged 500 to 600 men. Labor varies daily with home agricultural activities, weather, labor activity location and the need for sizeable work teams. The fact that road construction is estimated to be completed in June 1984 (6 months late) shows that the adoption rate of this project has

been successful.

VIII. Has the project 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 Route 84 will serve as a model for other prospective labor intensive projects in Burundi, drawing on the experience and procedures developed under this project.

VIII. Do private input supplies have an incentive to examine the constraint addressed by the project and to come up with solutions?

It is expected that the availability of access to a reliable market will create greater private initiative and competition among farmers as it will increase his opportunities for sale and purchase of agricultural and other goods. Improved access to markets will 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 this project who became small construction contractors.

IX. What delivery system did the project employ to transfer technology to intended beneficiaries?

Because of its labor intensive nature, the project lends itself to the Food for Work concept, a program under PL 480 title II designed to supplement cash wages on a given project by a regular distribution of food to the labor force. The food program has the advantage of raising nutritional levels in the project area and also permits a saving in the portion of workers' incomes normally devoted to food purchase of this type.

X. What training techniques did the project use to develop the delivery system?

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

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

It is clear that the Rural Road is 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 have been interviewed and are happy 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.

PROJECT EVALUATION SUMMARY (PES) PART I

13 SUMMARY

This evaluation is of a project to reconstruct 60 kilometers of Route 84 in Burundi, a multi-purpose rural road, beginning at its intersection with RN3 (Lake Tanganyika highway) with the priority objective of providing farm to market access. The Project is utilizing labor intensive construction methods and a variety of sources for funding and equipment. Labor, tools and commodities have been provided from USAID funds. Food for Work has been supplied by PL 480 Title II, and staff for administration, general engineering and supervision, plus capital intensive plant for pavement laying and other supplies by the GRB. Half time of the senior engineer and full time of another engineer are financed by the IBRD third highway loan. In addition, the GRB has built two small river bridges in the Dama Valley at kilometer 38 which provide the vital link between the project segments of the road.

The project will upgrade 60 km of rural road in Burambi region from Mitano on RN3 to the intersection of RN 82 up to an all weather road standard. This is a first of its kind in Burundi, involving close cooperation and understanding between the bureaucracies of GRB and AID.

The GRB is represented through the Highway Department; AID through AID/Bujumbura supported by REDSO/EA, and Food for Work PL 480 Title II by CRS.

All construction units are in place including some 400 active earthwork workers (500 less 20 percent absenteeism) in teams of 10 to 15 persons, masonry pipe laying teams and capital/labor intensive gravel paving operations. Teams are supported by one supply truck which also brings food supplies from Bujumbura to Murago, the center of operations. Work has concentrated on road operations between RN3 and Murago (Km. 24).

Earthwork operations are limited by the presence of hard rock; pavement operations by lack of drivers, and serviceable trucks.

Food operations are carried out by Catholic Relief Services at Bujumbura with outlet at Murago. Field construction operational services and storage are also at Murago.

Problems of lack of skilled workers have been obviated through on the job training and trained supervisors. Drivers are trained through schools in Gitega.

Progress is behind schedule which is understandable due to initial set up of buildings, need to give access to Murango, on the job training, and wet season following start up operations.

With correction prior to mid point of construction period, work may be completed by December 1983, but might overrun by six months. Project Assistance Completion Date is July 31, 1983 which should be extended by one year.

The summary conclusions of the mid term evaluation are:

A. COSTS

(1) During the evaluation, the engineer reexamined the quantities of normal earthwork and rock excavation needed for the entire length of the road since initial quantities were underestimated.

(2) Unit prices have been reexamined in light of actual costs and progress rates so as to be used for final period of project and similar roads. (An initial mobilization period for building up production rates on Route 84 has been allowed for).

(3) The revision of costs due to additional quantities, revised rates and method of operation could result in present funds being exhausted before completion of road gravelling but this will be divided between GRB funding for gravelling equipment (approximately \$80,000) and AID \$80,000 funding for labor. The method of completing culverting and earthwork throughout the road without completion of gravelling is acceptable from an access point of view but is not desirable.

Assuming no increase in minimum wages and no additional funding, construction should be completed to Muyama. Assuming increase in minimum wages to 88 Fbu but no increase in funding, earthworks and culverts should be completed to Muyama but paving incomplete.

Raising of minimum wage from Fbu 50 to Fbu 140 would result in complete work stopping at Kadidagi (kilometer 39) Dama valley with some culverting beyond the valley.

(4) Request for additional funding from GRB and AID to complete the road may be required, depending on resolution of the minimum wage question.

B. PL 480 Title II

The Food for Work Program is a mainstay of the Project and substantial quantities of food must be kept on hand including a high percentage of foodstuffs in storage due to transport irregularities. Original ration levels are justified.

C. Engineering Review of Physical Progress

(1) Rock in earthwork is delaying road completion due to lack of and major delays in obtaining jack hammers. These commodities should be expedited. Dynamiting of hard rock by the military has also been promised for some months. This again should be expedited through GRB.

(2) Realignment of the existing road has shortened the road by some 2 kilometers.

(3) Box culverts should have 4.8 meter long concrete planks top because of their location at bends and truck traffic usage.

(4) Culverting should continue ahead of earthwork's operation in order to open up the road.

(5) Excavated side hill material should be used to form the widened road as well as widening the fill slope. Eyeing in of approximate new road formation is a necessity to prevent major transportation of fill material.

D. Surfacing the Road and Heavy Equipment Requirements

(1) Paving will be 6 meter stone gravel 6 cm thick on 7 meter formation plus cut ditch with slope generally toward the ditch at curves. Sloping toward the ditch will prevent vehicles sliding toward an unstable fill slope. Where established trees line the road, the fill slope formation will be limited to 6 meters plus ditch and trees thinned for drying out of road.

(2) Lack of gravel or murrum/laterite throughout the site has negated labor intensive operations on this portion of road construction. A power shovel, roller and 2 to 3 trucks with handspreading of gravel should provide semi-efficient operations within 12 km travel distance of a gravel pit. This is not being obtained and should be corrected. 2 trucks and power shovel are presently additional to PP requirements.

(3) A proposal has been made to GRB to increase the number of project trucks to six, one for general supplies, one for masons supplies, three for gravelling operations, and one for general accessibility to project while other trucks are being serviced or repaired. Ministry of Public Works should obtain the additional 2 trucks. A proposal has been made to AID to pay for equipment for vehicle repairwork at Murago at a cost of \$5,000 together with full time mechanic. Operational efficiencies depend on drivers and vehicles being available for construction.

(4) GRB does not supply drivers/operators with plant/equipment. These drivers/operators have to be obtained or trained and kept on the project. Difficulties of maintaining good efficient people on the project seem to be continuous. Operational efficiencies depend on drivers and vehicles being available. This is a major problem which must be solved.

E. Project Administration, Organization and Monitoring

(1) Contracting out to skilled and unskilled laborers at a fixed rate per job or unit quantity is an effective method of organizing construction work now that workers are trained and supervised by experienced team leaders. It provides an incentive for timely work completion as well as quality work.

(2) Hand tools were initially procured locally by GRB; U.S. tools arrival late (March 1982).

(3) Administration, engineering, and supervision appears adequate; labor especially unskilled, has an absentee rate of 20 to 25 percent mainly due to agricultural priorities.

(4) Training has been provided through on the job training of masons, pipe layers, foremen, school training of drivers and operators, field experience for educated engineers and supervisors.

(5) Monitoring is adequate except that REDSO monitoring and assistance in problem solving would have been better every 2 months for the first year and quarterly thereafter. (PP recommended every 4 months.)

F. Acceptance

(1) Sections of completed road will be handed over in approximately kilometers 0-8 (Musave), 8-12, 13-18, 18-24 (Murago), 24-29, 29-34 (Mugenge), 34-39 (Kedigagi), 39-44, 44-50 (Muyama), 50-55, 55-60 (end of road).

(2) Time needed to complete the project is estimated at 42 months from January 1, 1981 or 6 months beyond the completion date of December 31, 1983.

(3). Maintenance will be at the rate of 1 person per kilometer with 1 foreman for every group of 10.

G. Economic and Social Analysis

(1) Economic Analysis taking into account revised costs indicates that the initial expected project IRR of 17.06 percent will most likely be surpassed. The new income stream coming into the area via the salaries of the manual laborers on the project is resulting in an improved standard of living for the workers and their families and is generating substantial multiplier effects (e.g. hiring of agricultural labor to replace labor of road worker on the farm, house construction, additional purchases of food including fish, purchase of bananas to make beer, etc.). As a result, the initial analysis which accepted only 40 percent of worker's salaries as a benefit of the project (the net benefit after subtracting the normal value of a days labor in the agricultural sector) was too conservative. Raising the benefit to the full value of the salaries (derived totally from sources outside the Burundian economy) is probably still conservative considering the high propensity to consume in a subsistence economy (probably on the order of 95 percent in the project area) but does go some way to capturing the value of the multiplier effect.

(2) The effect of this change on the project IRR is substantial as the benefit occurs at the same time expenditures take place, and before the effect of discounting results in a sharp decrease in value. Further, approximately 30 percent of the 8.3 percent cost overrun required for project completion to the originally contemplated standard is salaries for laborers and as such will be netted out of the analysis as they appear on both the cost and benefit side of the analysis. The same is true for the question of increased costs which may arise due to recent increases in the minimum wage. If the new increases do apply to the project workers, it will create problems from a financial point of view, but will not have an adverse effect on the project IRR.

Finally, other benefit streams not included in the original analysis: road user savings with respect to movement of the coffee crop and other types of road users (e.g. pedestrians and

bicycles as well as private vehicles), the producer surplus on crops other than bananas (sales of cassava and cassava products in particular), and the consumer surplus resulting from the increased availability of necessities and agricultural inputs and services are substantial, and will further increase the actual project IRR. From an economic and social point of view, the decision to undertake the project using labor intensive methods, and the location chosen for the project are proving to be justified.

14. EVALUATION METHODOLOGY

There are four elements of evaluation for the project:

(a) Baseline Study, (b) Monitoring, (c) Mid-term Evaluation, and (d) Final Evaluation.

(a) Baseline Study

The socio-economic conditions in the project area were assessed at the time the PP was prepared in late 1979 and described in the PP and its annexes. In addition, SOMEBU, a local research organization carried out a detailed socio-economic baseline study of the project area in January-March 1981, just prior to the commencement of full project activity.

(b) Monitoring and Inspections

This is done for GRB by Pierre Rucquoy (construction engineer) on a halftime basis and Hubert Verhulst on a full time basis (both seconded to GRB highway department by World Bank); AID/Bujumbura on a monthly basis; and REDSO engineering on a quarterly and emergency basis.

(c) Mid-term (present) Evaluation

This present mid-term evaluation is conducted by Denis Light, REDSO/EA Engineer, and Judy C. Bryson, PSC Economist/Sociologist (she prepared the economic analysis for the PP October 1979). Sources of information used for the evaluation have been office files, site visits, GRB Highway Department, Pierre Rucquoy and AID/Bujumbura.

(d) Final Evaluation Provisionally Scheduled for January 1984

15. EXTERNAL FACTORS

The assumptions made in the development of the Route 84 Rural Road Project remain valid. During site and discussions with residents within the project area, it is clear that the rural road is 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. However, roads by themselves cannot guarantee increases in agricultural production, only access to markets. Improved roads also tend to facilitate agricultural extension and social services. The extent of the impact of the road will be clearer at the time of the final evaluation. GRB continues to be interested in developing rural roads through similar types of construction activities and is generally meeting its obligations to supply personnel/equipment and material inputs to this project.

16. INPUTS

A. GRB

1. Monitoring and Inspection Personnel

Pierre Rucquoy has been monitoring the project on a half time basis from project inception. Hubert Verhulst has been full time on the project.

2. Equipment

Equipment supplied for the project has been one truck initially and the second truck beginning in October 1981. In addition, in March 1982 two additional trucks, one rubber tired compactor and one power shovel were placed on the project. These have been used on the gravelling operation. However, some project equipment have been on the site in an unoperable condition awaiting replacement parts. Examples are compressor and one truck. GRB is being requested to supply 2 more trucks for gravelling operations and supplies to masons.

3. Materials

Handtools were initially supplied by GRB together with cement, steel beams, POL and aggregates.

4. Special

The two bridges over the Dama river and the Ruhora river were completely built by the military. Project personnel constructed the access embankments.

B. USAID:

1. Monitoring

REDSO engineering is supplied on a quarterly and emergency basis.

2. Skilled and unskilled labor

Skilled and unskilled workers are funded by USAID. Operators for equipment and drivers of trucks are also paid from USAID funds. The principle of GRB supplying equipment without operators is not proving workable and it is recommended that it be modified.

3. Materials

Cement, reinforcing steel, POL is supplied mainly from Kenya. Two boxes of U.S. handtools arrived late (March, 1982).

C. USAID Food for Work:

Bulgur wheat and oil are supplied under PL 480 Title II Food for Work Program and administered by the Catholic Relief Services (CRS) at Bujumbura. The commodities are distributed to workers at Murago. Costs involved are food cost plus transportation from the USA to Mombasa, Kenya and transshipment from Mombasa to Bujumbura where it is then taken over by CRS. The project was initially affected by the U.S. world cutback in Food for Work programs in February 1982, but the amount of food supplies has now been restored to its original level on this project. Levels of stock have to be maintained at a high percentage due to irregularities of transportation which fluctuate with the coffee season.

17. OUTPUTS

A. Road Construction

1. Earthwork:

Earthwork is a major element of construction. Excavation is in side hill requiring wheel barrowing the excavated material to the steep embankment and using it for extension of fill slopes. The excavated material is also used for rough road formation. This work is done by unskilled laborers in teams of ten to fifteen with team leader using picks, shovels and wheel barrows. Where soft rock is encountered, crowbars, hammers and wedges are used. Hard rock awaits military use of explosives. Jackhammers have not been a success because of procurement delays and down time. There is approximately 20 percent absentee in unskilled labor due to home agricultural priorities. Three major realignment operations have occurred at kilometers 7, 12 and 25 which resulted in shortening the existing road by 1.8 km. Excavation through April 1982 is 83,400 cubic meters, and is now generally paid for on a mini contract basis.

2. Filling

Minor filling has been used only between kilometer 0 and 1 and at access embankments to the river bridges.

3. Ditches

Ditches are only required at the cut slope of the road in side hill cut and 15 kms have been completed.

4. Drainage

Culverts with entrance chambers are required. Pipe crews which include masons working under a lump sum mini-contract have extended 27 drainage pipe culverts of 600 mm dia. and are now working ahead of excavation crews.

5. New Drainage Culverts

Pipe crews with masons working under lump sum minicontracts have completed 24 pipe culverts of 600 mm diameter and are now ahead of excavation crews.

6. Filter Drains

Stone filter drains have been placed across the road where rock springs result in soft spots in the road.

7. Concrete planks

These have been placed on box culverts but now require longer concrete planks to allow for sharp road curves. Five box culverts have been installed through April 1982.

8. Preparing Road Subgrade

For gravelling operations this has been done at kms 0-2 where paving is in progress. Road fill has been transported and put into place in the first kilometer.

9. Gravel Paving

This has been completed at kms 0-2. This operation consists of roller compaction of earth subgrade filled and shaped by road laborers, followed by gravel quarry excavation off km 1, truck transportation of gravel to the road, where it is loosely spread, then levelled by a field crew. Paving operations have been and are still subject to delays caused by mechanical breakdown of roller, power shovel, and trucks as well as a lack of qualified trusted operators.

10. General

The operation is proceeding satisfactorily with mixed capital/labor intensive gravelling operation and labor intensive for all other operations.

B. On-the-job training

A cadre of workmen and supervisors in earthwork operations, pipe laying, stone mason, ditch cutters have been trained and/or are being trained as workers drop out with consequent replacement. Masons are given special apprentice training. Schooled engineers are receiving field experience. Drivers and operators are trained in Gitema prior to operating on site. This cadre will be invaluable for completion of project road, maintenance work and construction of future roads. See figure 2.

C. Increased Income

(1) Workers and their families

Interviews with road workers indicate that they have a strong desire to earn a cash income which is the principal motivation for seeking employment on the road. Despite the low salary, which is currently causing much controversy due to the Government's recent announcement of a large increase in the minimum wage to the private sector (increased to FBU 140 as compared to current minimum rate of FBU 50 on the project), five out of the 11 men interviewed said they would continue to work even without the PL 480 food because they needed the cash. For the other six workers, the value they gave to the food resulted in an acceptable wage though almost all the workers wanted more money.

The interview data provided indications that road workers come from households with less access to cash incomes than the average in the area. For example, although all workers from the Murago area reported having coffee trees, the average number of mature trees owned by a worker was 180 as compared to an average of 518 mature trees per planter in the area found in the SOMEBU baseline study. None of the houses of road workers had tin roofs though more are apparent in the road area after last year's record coffee crop. Accordingly, the incomes from work on the road appear to be reaching a group in the area with relatively more need for them. The 600 or so men working on the project (attendance rate per day 75-80 percent) and their households represent about 11 percent of the population in the area where work is currently under way, (i.e. leaving out the population of 20,000 persons living in the area between the Dama river and the top of the road). Approximately 1,200 individuals have worked on the project to date so at least some income has been channelled directly to approximately 20 percent of the population.

Interviews with families indicated that more than half the wives knew the amounts of money that their husbands were earning from road work and the same wives indicated they received cash from their husbands to spend on household needs (wives were receiving upwards of 50 percent of cash earnings). This is in contrast to the usual practice with respect to coffee money which the husband himself spends on large purchases, i.e. roofs, clothes, and personal consumption, and where the wives has only a limited idea of the amount the man earned. None of the wives interviewed could provide information on numbers of coffee trees or details of last year's crop, in contrast to the workers who

gave prompt, precise answers on all aspects of coffee production. Thus it appears that the salaried income is available for use on other family needs to a much greater extent than money from commercial crops.

Workers are also building houses, planting coffee trees, and buying beer, bananas to make beer for sale thereby increasing the cash amount they have available from road work. One worker had chartered a "friend's" vehicle and took 20 large sacks of dried cassava directly to the Bujumbura market for sale. Generally, the impression received is one of greater participation by these individuals in the money economy than was possible for them previously. As the effects of increasing commercialisation and rapid change on the lower income sections of a community are often negative, it is possible that the income stream coming to these workers prior to road completion, and the longer time required for construction with labor intensive methods may permit them to create the resources necessary to participate in increased farm incomes arising from road user savings, thus cushioning them from some of the negative effects of development.

(2) The wider community

Road workers and their families are spending a substantial portion of the incomes they earn on food items (palm oil, fish and beans in particular), thus providing a source of demand for farm products. Most wives also reported that their husbands were paying other men to help them on the farm as the husband was now occupied most of the time on the road (average attendance is 18 day out of each 25 work period). Accordingly, there is already a spread effect from the cash incomes earned.

Incomes are also projected to increase due to increased marketing of food (and cash) crops and the higher prices which will be received for these when the area has better access to markets. The household data provides some indications of increased marketing and higher prices received in the Musava and Murago areas. A much longer time period will be required before these effects can be verified, and a much larger random sample would be needed. The present situation may result from a number of external factors, for example food shortages prior to the harvest, the effects of last year's coffee income, and possibly the additional income in the area resulting from employment on the road project. The situation in the lower section of the road should be clearer by the time of the final project evaluation, particularly if prices in the project area are monitored regularly to provide an idea of trends. Evaluation

some years after project completion, will probably be required for a definitive answer to these questions.

D. Increased Nutrition Levels

This project output was expected to result from the provision of FFW commodities to road workers and their families. Analysis of the household interview data indicates that families are receiving the food supplement and that there is a general belief in the area that the bulgur wheat is particularly good for children. Although the families said the food was strange to them, they indicated that they liked it and enjoyed eating it (an exception was one family and some of the workers). The women provided recipes for cooking the bulgur which indicated that they were treating it in a manner similar to other carbohydrate foods.

Another source of improved nutrition is the food consumption items purchased with the salaries of the road workers, and most families reported regular purchases of fish and other high value foods. However, it is difficult to determine to what extent the FFW and food purchases are contributing to improve nutrition. The sisters at the Murago hospital said it was their impression they were seeing fewer cases of kwashiorkor than formerly but the connection between this situation and the project would be difficult to establish in the absence of concrete data.

Given the interest in the effect of FFW it is suggested that a limited survey by the sisters of a sample of road workers children (using some rapid form of nutritional assessment such as weight for age) and a sample on the children of local residents who are not working on the road project be organized. The sisters would most likely be willing to assist in this effort, but a minor amount of funding for logistical support would probably be required.

E. Road Maintenance

This is presently proceeding through ditch cutting and trimming teams. Details of the maintenance program will be one man per kilometer in teams of 10 with one foreman. Expected road turnover is August 1982 of kilometer 0-8 followed by 5 kilometer sections every two and a half months. Expected road completion date is June 1984.

18. PURPOSE

A. "To provide all weather access to agricultural marketing facilities in Burambi region." Unless each section of the road is constructed with graveling and drainage, the road cannot fulfill the project purpose. The present evaluation has confirmed that the project budget is not sufficient to construct the entire road to the necessary standard. A decision will have to be taken either to increase the budget as required to fulfill the project purpose, or to construct a major portion of the road to all weather standard, and to construct culverts and widen the remainder of the road so as to permit improved access on that section particularly in the dry season. Further, if the new minimum wage, being considered by the Government, of FBu 140 as opposed to the present figure of FBu 50 is applied to the project, it may be better to limit the length of the road, and to construct that portion to all weather standard.

B. "To establish a tested prototype system for labor intensive road construction." The methodology, logistics and administration used by the GRB have now been tested in the field and will be in a form which can be used anywhere in Burundi by the EOP. Using this approach to rural roads on roads close to Route 84 would have the added advantage of utilizing trained workers. It should, however, be noted that labor intensive as defined on Route 84 includes trucks for transportation of supplies, a power shovel with 2 to 3 trucks for initial gravel paving operations and a roller for earth fill and pavement compaction.

19. GOAL

"To increase incomes and social welfare of the rural poor in the project area." The economic analysis indicates that this project goal is already being reached with respect to road workers and their families, and that the benefits are spreading to others in the area as a result of purchases and wage payments made by the workers and their families. Increased farmer income, increased agricultural production, and increased access to social services are benefits which are expected to arise but which cannot be verified until the project nears completion, and will be most apparent in the years following completion.

20. BENEFICIARIES

The beneficiaries at present are primarily workers but farmers and all people of the region benefit after each section is connected by the road system to markets, hospitals, schools and

Government facilities. (Note: Barundi live in separate homesteads rather than villages, and the population density can be quite high). GRB is benefitting from the creation of a tested prototype for rural road construction which may be used on other projects to be supported by AID, other donors, or from investment funds of the GRB.

21. UNPLANNED EFFECTS

A. The strong need for a stable Food for Work component in labor intensive works.

B. The relative promptness of GRB provision of equipment plant and tools supplied by GRB as against lengthy AID procurement procedures.

22. LESSONS LEARNED

A. Labor intensive road programs if set up with a Food for Work component should have it firmly established for the life of the project.

B. Government supplies equipment should also include the operator or driver provided that the project has the right to dismiss an incompetent operator.

C. Good working relations with Government departments make a project more efficient and long lasting.

D. Prototype projects require more frequent monitoring in the early stages.

E. Logistics and detail discussion of project should be worked out by participants in the beginning stages of the project, not as the job progresses.

F. Monitoring should generally be made by the same competent person throughout the life of the project in order to provide consistent answers and smooth progress toward an end result.

G. Thinking out of labor sub operations have to be made in terms of total operations.

H. A mix of capital/labor intensive components of one operation have to be throughout in terms of timing, numbers, output and coordination.

I. On the job training has important benefits for future and other operations. Experience in the field broadens school learning.

23. TEGHNICAL ANALYSIS

In the PP the road project (upgrading of 7 meter track to all weather gravel pavement) is designated as labor intensive because most of the work is suitable for hand labor (side hill construction with excavation in hillside and disposal of surplus material on the fill slopes, construction of drainage culverts and laying of pipe by manual labor, easy accessibility to sand and gravel for masonry and pavement.) Road section is to consist of 5 meter gravel pavement and 2 shoulders each of 1.5 meters. The GRB is to administer, engineer and supervise the project and supplies plant (estimated at 2 trucks and 1 roller). AID is to pay for the labor force, reinforcing steel, cement, POL, handtools and plant operators. AID through Food for Work programs were to supply food for the workers including transportation of the food from Bujumbura to Murago.

In reality the existing track is some 6 meters wide not 7, concrete sand for concrete is available only at the lake and the major gravel site is at kilometer 1 with other limited gravel at locations approximately 10 kilometers apart. The soils are mainly clay standing at very steep side slopes both in cut and fill. In addition, there are areas of soft and hard rock, requiring jackhammers and/or dynamite.

The project has therefore been adjusted to the realities of the situation and, in fact this is a first time project of this type for GRB and AID in Burundi. As shown in Figure 1 (Summary of Events) and Table 1 (Progress Schedule), work began in January 1981 with the construction of storage sheds at Murago together with minimum work to make the road passable to Murago (km 24). It was only in late February and March that the unskilled labor force began to be assembled and to begin on the job training. This was followed by the rainy season in April/May. The project from the construction evaluation viewpoint should therefore be considered as beginning June 1981 with problem solving up to the present day (May 1982) a period of 10 months. Work was complicated by the GRB providing only one truck for supply of sand, masonry, stone, food supply, transportation of laborers with no backup for vehicles deadlining, maintenance and illness of driver. It was only in October 1981 that a second vehicle was given to the Project. A second complication, unusual to AID, is that vehicles and plant are handed over without drivers

or operators and the project has to supply them by training or hiring them (a difficult task with inherent problems). Drivers and operators are in scarce supply with continuous demand.

Initially earthwork laborers in teams were spread out creating a supervisory problem, but with greater efficiencies of work, stricter supervision by team leaders, this problem tended to solve itself. However, the effects of the earlier stages are still shown by the limited rough road formation in earth and the mounding of earth on the fill slopes (much more than that needed for shrinkage and stabilizing of slopes). The breakdown of the pneumatic hammers (broken in 1981 after use, then ordered in February and promised for July 1982) has prevented efficient breaking out of soft rock with the resultant crowbar, hammer and wedge method by earthwork crews. The military has promised repeatedly to do the dynamiting of the hard rock but it has not done any blasting yet.

Ditch crews cut out trapezoidal ditches at the base of the nearly vertical slope in order to contain and outlet rain especially the heavy rains. REDSO monitoring emphasized that ditches and culverts must advance with the earthwork in order to protect the construction work at the times of the heavy rains. Some ditch slopes were reduced by concrete stair stepping in order to control erosion. However, protection of the steps must be made to prevent undermining.

Work on box culverts began in 1981 with concrete planks spanning the walls. These box culverts have now been modified to take 4.80 m. planks because of their position on sharp bends. Masonry/pipe laying teams have been trained and built up in number in order to increase the number of completed culverts, protect the construction and get ahead of the earthwork and ditching teams. The completion of the culverts also enables the road to become more all weather accessible. Soft spots in the road due to clay and rock springs, have been remedied by the provision of rock or filter drains across the road. The extension of pipe culverts or provision of new culverts has been made difficult, except in the dry seasons, by the need to keep existing drains open as well as constructing masonry entrance chambers in cramped situations. The change over from direct labor payment for the masonry to a reliable sub contract situation is resulting in an efficient, quick, quality product with minimum required supervision. The number of trained teams has also increased, and is needed because of the large number of culverts required (Project road is on the side of the hills, not at the crest). One truck is needed fulltime to bring supplies to the mason crews.

The presence of soft and hard rock and non utilization of jack hammers and dynamite has necessitated leaving sections of road in an unwidened state and made it difficult for the gravel paving and ditching operations.

On the paving operation, a decision was made to totally eliminate the 1.5 meter shoulders, and use 1 meter or in particular circumstances 0.5 meters. This was a practical decision based on the fact that side slopes were very steep which would entail excavating some 5 cubic meters per meter length for every meter of widening, and whereas in theory the excavated material could give an extra meter of roadway on the widened fill slope, the additional fill widening is unstable for purposes of vehicle usage and should be considered only for use by people. In addition certain sections of the road are contained between steep cut slopes and lines of trees on the fill side. Cutting down these trees would have made a very unstable fill slope with large slippage. It is in these sections that a minimum width of 6 meters of pavement plus ditch is recommended. Rock contained gabions are being constructed in existing narrow road slippage areas, especially at bends. Due to the need for ditches to be constructed at the foot of the cut slopes (earth and especially rock) which may not line up with the best road alignment due to curves, rock and approaches to sharp curves, the gravel pavement construction has been set at 6 meters wide located on the 7 meter formation with variation in the distance between pavement and edge of ditch, pavement and edge of slope. The gravel is left high above the formation so that vehicles can readily distinguish between the gravel and the earth. At later times the ditch maintenance crews will place earth between the gravel and the edge of ditch, taking care to have stone drain outlets for the pavement at some 10 meter intervals. The typical road section has cross slope in 2 directions on straight alignment but on curves has been revised to generally have a single slope from the fill slope to the inner ditch. While this appears unnatural due to the fact that drainage becomes contained instead of free flowing, it has to be understood that the fill slope is unstable, that the water would erode the slope, cause slippage in places, and in event of rains may cause vehicles to slide toward the fill slope, hit a soft spot and fall 50 or 100 meters down the steep fill slope. The slope to the cut ditch and culvert outletting should more than offset this initial disadvantage. As gravel is not present alongside the road it has not been possible to place the gravel by hand. Neither is murrum present in sufficient quantity. Murrum (laterite pebbles) has also the disadvantage of being slippery in wet weather (dangerous on continuous climbing or descending side hill roads).

Alignment changes in 3 places have eliminated some dangerous bends and reduced the road length by nearly two kilometers.

Gravelling operations have begun using the stone gravel quarry at kilometer 1. Equipment at the site are a rubber tired compactor for use on earthwork and pavement, and two trucks. However, one truck which arrived in December ran over a fill slope and has been deadlined ever since. It is hoped that the vehicle will be in operation again soon. The compactor, which arrived in February also needed three weeks mechanical work before being operational. A power shovel for excavating and loading gravel arrived in March 1982. Gravelling operations began at kilometer 0 and is now at kilometer 1.5. Large quantities of earth to form the road (which should not formally be necessary) was needed prior to pavement laying and this has increased the cost of final paving. In addition absence of competent drivers has cut down on operational efficiency. Sometimes, one driver works two trucks and sometimes only one truck is available. While transportation distance is presently small, the operation rate of more costly power shovels and compactors should not be determined totally by the small number of attendant trucks. Drivers and operational trucks must increase to three trucks for paving operations. GRB has been requested to increase the total number of general use trucks to six. Gravel stone or rock is being used and is at greater thickness than the 8 cms requested. This is due to a present two layer use operation at greater thickness instead of one layer with selective spreading by the spreading crew. In addition the trucks should spread out by open tailgate and driving forward instead of dumping in one pile which results in thicker layers and more work in spreading. (Stone is necessary on the clayey subgrade).

It should be noted that the power shovel and additional two dump trucks were not included in the PP. It should also be noted that equipment supplied by GRB is old and serviceable and that vehicle repairs together with equipment or plant supplied without operators present a major problem. The problem of repairs to vehicles entails the driver taking the vehicle to Bujumbura and waiting with it while it is repaired. A repair maintenance shed at Murango with mechanic for running repairs would be an advantage. The shed exists and proposed equipment will cost some \$5,000. Materials supplied to the project appear not to be causing any major problem (cement, reinforcing steel, structural steel, POL, precast concrete planks), but delivery of handtools has presented a problem. Handtools were initially bought locally due to delivery time of U.S. tools, which finally

arrived in March 1982 instead of late 1981. This nearly caused major problems but tools are now available for the present labor force and its future expansion. Any additional requirement for tools should be procured locally within the shelf item ceiling or in Kenya.

See Tables 2 and 3 (Monthly Progress Charts by percentage complete and quantities remaining to be done for March 1982).

Labor for the project has averaged some 500 to 600 men but this is based on the maximum number of unskilled workers per month. Absenteeism is some 20 to 25 percent. See Table 4 (monthly labor figures). This indicates how the work force has built up and gives an idea of construction activities and training at any one time. Labor for the project varies daily with home agricultural activities, weather, labor activity location and the need for sizeable work teams. A tight control has to be placed on project labor and tools through the team leader, bookkeeper, and supervisor, as well as control of food provided by the Food for Work program. While control appears to be sufficient, visual observation by the evaluation team, monitoring REDSO engineers and visitors indicate some 100 laborers less than the monthly figure shown which correspond roughly to 20 percent absenteeism.

Progress of construction has been related to the estimate for the PP. This appears to show that percentage of work complete in relation to total work estimate and costs is in relation to months worked against total months of construction and in the correct approximate relationship but this has been only an indication. A better indicator is to take production from June 1981 in relation to earthwork and culverts over the remaining period of time and the paving from March 1982 over the remaining period of time. It also requires an update of quantities (which has been done in this evaluation.) See Section 24 (Financial Analysis" for revision of quantities, unit prices and total cost. From quantities performed in April 1982 to total quantities required using only months of efficient productions, indications are that the contract could overrun by six months for earthwork and culverts with consequent overrun for the pavement except that present inefficiencies and excessive pavement thicknesses have to be corrected in order to place the paving timetable and costs back into correct order. A part excuse for the inefficiency of the gravel paving operation is that the work and training began and continued in the rainy season and vehicles were not available. This however is only a part excuse, not the main reason and the operation has to be improved immediately by means of additional trucks, drivers,

correct pavement thicknesses, efficient formation and gravel paving laying. The estimated time lag in earthwork will be corrected soon by providing additional laborers and for culverts by additional teams. Production up to present day can be considered as behind schedule on all times.

Administration, engineering and supervision is the responsibility of GRB, and is normally paid for by GRB but not in all cases. Team supervision is by team leader (AID), sectional engineers (GRB), full time supervision by Hubert Verhulst (six months year AID, remaining years GRB through World Bank funding) Pierre Rucquoy, half time on supervision and monitoring (GRB through World Bank funding) through third IDA highway loan. Administration is mainly in Murago, but two people are in Bujumbura (GRB). Engineering and supervision are adequate except that initial difficulties and problem solving that occurred in the first year which would have given the desirability of having two experienced men in the field. Engineering is still higher than budget expectations. This situation has lessened but is being replaced by the spreading out of the project. However, with present engineering supervision and trained laborers, this problem may be kept under control. Administration (GRB) appears to be on the large side, but is performing reasonably well under supervision.

Consideration should be given to having an independent bookkeeper/accountant on a part time basis who would assist in preparation of monthly reports, financial disbursements, operational efficiencies, and checking of labor and food distribution. Monitoring by REDSO engineers if made every two months for the first year would have helped the logistical set up and problem solving, then quarterly thereafter. PP suggested every 4 months.

Road completion and take over of construction should be set up on continuous functional road basis. 0-8 km (Musave), 8-13, 13-18, 18-24 (Murago), 24-29, 29-34 (Mugenge), 34-39 (Kagidagi), 39-44, 44-50 (Mayani), 50-55, 55-60 (end of road) or such variation that ties into villages or schools. Maintenance should be set up as stated in the PP with forces of one man per kilometer working in ten-man units with a foreman. These men would be required while the newly cut slopes stabilize. Ditches must be kept open and surplus earth material placed on areas between pavement and edge of ditch given ease of operation.

Road construction is now estimated to be complete in June 1984 (6 months late). Procurement of materials outside Burundi should allow for ordering and storage due to seasonal transportation.

Figure 1

SUMMARY OF EVENTS

1980

July 17 Cooperative Agreement
Dec. 17 GRB gives advance disbursement of 5 million FBu

1981

Jan. 3 First tools from GRB arrive at Murago warehouse
Jan. 8 Nissan truck assigned to project
Jan. 21 Hubert Verhulst began his duties
Feb. 9 Depost of first check \$45,000
Feb. 24 First ten tons of cement at site
End Feb. 60 workers widening slopes at Km 6 Construction started on Ruhora and Ndama bridges
March Make road passable up to Murago warehouse Km 25
March Masons worked on Kms 0-1, 19, 25
March 13 Begin food supplies
April Heavy rains. Irregular work. Problems on truck supplies. Spot filling of road between Kms 0-30; 514 workers
April Digging of slopes km 6 and 7, 16 to 17. Masons Km 1-2, 19, earthwork teams km 6-7, 15-16
May Rains stopped, 485 workers. Workers problems being resolved. Truck problems
June H. Verhulst trying to have workers accept system of work contracts. 410 workers employed. Problems fuel tanks, truck, supplies.
July Masons and mechanic trainees. 471 workers
July 15 Rock crusher installed
July Work on Ruhora and Ndama bridges completed. Problems with team supervision
August 581 workers. Earthwork access to rivers
September Awaiting U.S. tools. Behind schedule in all works
Sept. 11 Site visit of DG Roads, DG Conservation, DG environment
October Heavy rains. Manpower for ditches difficult to obtain. Compressor not used through lack of penumatic picks. Second truck arrived.
November Frequent rains, 548 workers
Nov. 16 Bururi Governnor visit to site. Satisfied with work. 12 masonry apprentices. Driver training. Site nurse installed. Masons contracting work.
December 534 workers. Second truck deadlined.

1982

January Washout at Km 32. 532 workers
Jan, 15 Accounting records for 1981 given to USAID
Jan. 22 Meeting on difficulties resulting from reduction
in Food for Work rations
Jan. 27 First meeting of senior project officers.
Compressor still out of action. Second truck
still deadlined
February Arrival on site of power shovel, compactor and
third truck. Continuous problems with compressor.
Problems with truck drivers
March Began refilling road bed, 503 workers
March 5 Fourth tipper truck arrived (old vehicle).
3 trucks now working
March 11 Meeting with CRS Director
March 19 Arrival of 2 tons of U.S. tools
March 29 Arrival of 4 tons of U.S. tools
May 6 Mid-term evaluation begins
May 17 GRB review of preliminary midterm evaluation results

FIGURE 2

Proposed Training Program for July

<u>Title</u>	<u>Numbers</u>	<u>Proposed Training or in training</u>
Head of Personnel	1	<u>Propose</u> course by correspondence in order to obtain Head of Personnel diploma
Administrative Asst.	1	<u>Propose</u> one year bookkeeper asst. course, secretary (courses during the afternoons).
Assistant Drivers (Maintenance tech.)	3	Minimum two years training in order to obtain similar positions with more responsibilities on other sites.
(Dynamiting) technicians	2	Candidates wanted will be trained by the military on project site.
Drivers, operators	1 1 3	Already trained On training until June 82 Wanted candidates for July 82 Training undertaken by ORT school.
Heavy manual labor	4	Trained with drilling and breaking with compressor.
Masons apprentices	16	Trained at the same time with the the masons on the project site.
All team leaders	25	At the beginning without any particular knowledge, are trained by site leaders and his assistants.
Total number on 4/30/82	<u>57</u>	persons

TABLE 1

MONTHLY PROGRESS SCHEDULE

	1/81	2/81	3/81	4/81	5/81	6/81	7/81	8/81	9/81	10/81	11/81	12/81	1/82	2/82	3/82	4/82
ITEM																
Preparation of housing, stores etc.	-	-														
Make road passable to Mirago																
Masons begin work																
Transportation of materials by truck				810	1152	1443	1799	1979	2252	2537	3353	3856	4230	4669	6704	7561
Earthwork slopes in m ³	5683	11277	19532	24130	29139	31849	37200	46000	60300	67250	72560	79300	83373			
Longitudinal ditches in m	395	395	780	1545	2100	6300	7160	7900	10200	11050	11950	13250	15550			
Box culverts repaired							1	1	2	2	3	4	4	5	5	
Box culverts new										1	1	2	2	2	2	
Culverts in each new		2	3	5	5	10	10	12	17	18	18	19	23	24		
Culverts repaired in each		1	3	3	4	6	11	11	13	15	18	21	24	27		
Filter Drain						1	1	1	1	1	1	1	2			
Gravel refilling in m ³			360	465	465	510	725	842	930	1100	1435	1504	1519	1534		
Gravel compacted in m ³													500	860		
Road profile digging												1400	1400	5100	7148	

Forming Road 100 80 20 60 - - - - - 15 - - - - - 9%

Note: Work presently confined to first 30 kilometers.

TABLE 4

LABOR FORCE

	1/81	2/81	3/81	4/81	5/81	6/81	7/81	8/81	9/81	10/81	11/81	12/81	1/82	2/82	3/82	4/82
Adm Buj	1	1	2	2	2	2	2	2	1	1	2	2	2	2	2	2
Adm Murago	1	1	1	3	2	3	2	2	2	2	1	1	5	5	6	6
Tech const.				2	2	2	2	2	2	2	2	2	2	2	2	3
Tech masons	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Managerial		3	15	17	18	19	21	25	25	26	29	29	29	29	29	29
Artisan/Drivers	2	2	7	10	9	9	9	9	10	10	12	17	17	18	18	21

Station	7	12	8	8	7	9	13	12	11	13	19	22	25	29	
Compressor/Load			1	2	1	2	6	10	10	10	12	12	11	11	
Unskilled*	26	329	491	471	465	441	435	392	462	548	534	534	521	503	
Apprenticeship		6	6	9	4	6	11	11	10	10	13	15	15	16	
Total	9	42	374	545	520	516	501	507	466	536	584	587	604	630	622

*Figures are maximum during the month. Absentee rate is some 20 to 25 percent.

24. FOOD FOR WORK PROGRAM

This program under PL 480 Title II is designed to supplement minimum wages by food supplements of 100 pounds of bulgur wheat and five litres of soya cooking oil per worker every 25 working days. This is for use by the worker and his family. This program is administered by the Catholic Relief Services (CRS) in Bujumbura and given out by project management in Murago. CRS is responsible for importing, clearing and storing the food in Bujumbura, while the project will transport the food to Murago on an as needed basis. Transportation accounts for about 60 percent of the food costs delivered to Bujumbura. In addition a bag charge is made to workers. This is a small charge to cover additional transportation from Bujumbura to Murago. As a bag charge is being collected from the workers, but food is being generally transported by project vehicle, a check should be made into the basis for this charge. In January 1982, Food for Work programs were cut back worldwide including this project. An appeal for restoration up to the original levels for food used under this project was made to AID/W and was successful. The appeal was based on labor for earth moving and soft rock excavation which is all heavy manual work requiring greater food intake than normal.

In March 1982 AAO/B was notified that food stocks should be maintained at a ten percent level. AAO/E replied that stocks have to be maintained at a higher level, preferably 40 percent due to seasonal transportation of coffee crops. Trucks go from Burundi to Mombasa, Kenya, with coffee and return with PL 480 food. The round trip takes one to three months depending on the season. The importance of the food component on this project is that workers, when asked why they accept FBU 50 (\$0.55) per day (presently below minimum wage) say the food plus wages gives them food in their stomachs and money in their pockets. Loss of the food component or inconsistent delays would require a substantial increase in wages and would still result in dissatisfied workers. The evaluation team confirms AAO/B practical requests to AID/W.

Food distribution to project workers began in March 1981.

Problem at Murago is receipt of damaged goods especially oil. It is recommended that CRS checkout shipments for damaged goods prior to their being transported from Bujumbura to site.

A modified revision to the minimum wage increase from FBU 50 to possibly FBU 140/day may allow the Food for Work to be considered as a partial supplement to the wage and not as

total supplement to it. Cost of food for a one days ration for the worker and his family is \$1.40; value to worker at local market prices is \$0.50.

25. FINANCIAL PROGRAM

A. COST ESTIMATE

The PP estimate of costs was based on the following table:

Table 5

Estimate of Costs as backup for PP

1.	Earthwork in soil	CBM	204,000	\$1.50	\$306,000
2.	Roadway pavement	CBM	28,000	6.90	193,200
3.	Shoulder drain	CMB	1,400	1.00	1,400
4.	Ditches earth	LM	58,000	0.72	41,760
5.	Ditches rock	LM	1,860	9.25	17,205
6.	Pipe culvert	EA	40	1,000.00	40,000
7.	Pipe culvert 60-80 cm (new)	EA	150	1,200.00	180,000
8.	Culvert repair	EA	11	1,200.00	13,200
9.	Box culvert with slab span	EA	30	4,000.00	120,000
10.	Bridge at Dama (5.5 span)	LS	1	18,000.00	18,000
11.	Bridge at Ruhora (6.0 span)	LS	1	57,000.00	57,000
12.	DBST	Km	2.5	12,000.00	<u>30,000</u>
					1,017,125
				Contingency 15 percent	<u>151,569</u>
				Subtotal	1,169,334
				Inflation 30 percent (2 years)	<u>350,800</u>
				Total	<u>\$1,520,134</u>

Review of quantities during the evaluation reveal the following:

- Earthwork estimates were low and should have been split into earthwork in soil, soft rock and hard rock.

- Roadway pavement should have been split into pavement and road formation including rolling. The pavement quantity will be low due to changed thickness 5 cm to 8 cm. Ditches, culverts, bridges, DBST have no major change. Filter drain and gabions should be added.

- Review of unit prices have been made by GRB Pierre Rucquoy and REDSO evaluation engineer. The following unit prices are GRB unit prices modified by evaluation engineer as considered necessary. Minimum labor wage cost FBU 50. This results in the following revised cost estimate:

Table 6

Revised Cost Estimate

1a.	Earthwork in soil	CBM	370,000	\$1.05	\$388,500
1b.	Earthwork in soft rock	CBM	11,000	2.10	23,100
1c.	Earthwork in hard rock	CBM	2,000	12.00	24,000
1d.	Transportation of fill by truck	CBM	2,000	5.00	10,000
2a.	Ditches in soil	LM	58,000	0.60	34,800
2b.	Ditches in rock	LM	2,000	2.50	5,000
3a.	Roadway formation incl. rolling	SQM	420,000	0.20	84,000
3b.	Roadway pavement 8 cm gravel	CBM	30,000	7.0	210,000
4.	Shoulder drain	CBM	1,500	1.00	1,500
5a*.	Pipe drain	EA	30	1,200.00	36,000
5b*.	Pipe culvert 60-80 cm	EA	150	1,600.00	240,000
5c*.	Pipe culvert repair extension	EA	40	1,000.00	40,000
6.	Box culvert, slab top	EA	11	4,000.00	44,000
7.	Bridge at Dama 5.5 m span	LS	1	18,000.00	18,000

8.	Bridge at Ruhora 6.0 span	LS	1	40,000.00	40,000
9.	DBST	Km	2	15,000.00	30,000
10.	Filter or rock drain	EA	27	400.00	10,800
11.	Gabion protection	CBM	100	20.00	2,000
12.	Mobilization	LS			<u>60,000</u>
		Subtotal			1,301,700
		Contingency 10 percent			<u>130,170</u>
		Subtotal			1,431,870
		Inflation 15 percent			<u>214,780</u>
		TOTAL			<u>1,646,650</u>

*Pipe supplied by others

Unit prices based on daily rates in FBU of laborer 50, Rockman 120, Tree Cutter 100, Watchman 80 to 100, Apprentice Mason 80, Apprentice Drivers 120, Skilled Masons 200, Drivers, operators, mechanics 240 to 255, Chief timekeeper 220, Technical Chief 290 to 500, Bookkeeper, Chief of Personnel 500 to 720.
 Vehicles Mercedes 78/km, Nissan 74/km, Driver 6/km
 Compactor Sakai 1750/hr, Operator 63/hr
 Power Shovel Poclain 2033/hr Operator 350/hr
 Compressor with accessories 413/hr, Operator 60/hr.

B. FINANCIAL PLAN

The PP summary of the Financial Plan was \$2,118,000 comprising:

-- USAID Development Assistance Grant	\$926,000
-- GRB contribution in goods and services	\$567,000
-- US PL 480 Title II Food for Work	<u>\$625,000</u>
	\$2,118,000

Assuming that the total Food for Work component can be accommodated for the life of the Project (3 plus years) then the components varying with the construction quantities and costs are AID Development Assistance of \$926,000 and GRB Contribution \$567,000 totalling \$1,493,000 which corresponded to the initial cost estimate of \$1,520,000. This now should correspond to the revised cost estimate of \$1,626,650 which is a cost overrun of \$153,650. It should be noted that all anticipated funds

programmed for contingencies and inflation, will be utilized. The USAID and GRB contributions will now be broken down in order to reflect the revised components of the revised cost estimate.

USAID Contribution

This contribution broken down by disbursements is shown in Table 7 and 8 for monthly disbursements and cumulative disbursements versus budget through March/April 1982. Comments on the project budget itemized according to the budget follow:

1. Technical Assistance - Prefunding for H. Verhulst services is now terminated so that remaining monies are available for general use.
2. Contract Services - A base line study of \$17,000 has been funded. Evaluation services are needed for present and future requirements. Some monies will probably be surplus.
3. Labor - The monies remaining in the project budget will be sufficient to cover labor costs for an additional 20 months including an increase by 200 workers for a 12 month period for the earthwork required to cross the Dama Valley. However, there will not be sufficient funds to complete all the earthwork required to bring the entire road to all weather standards. Due to previous underestimation of earthwork quantities an additional \$80,000 will be required for labor costs based on the present minimum wage.

There will probably be an increase in the minimum wage of laborers working on the project which will result in additional cost overruns as the size of increases proposed cannot be accommodated within the inflation figure of 15 percent. (An increase from FBU 50 to FBU 88 per day represents a 75 percent increase and would represent a potential overrun of \$190,000 in labor costs in addition to the \$80,000 required to complete the road; an increase from FBU 50 to FBU 140 is a 280 percent increase and would result in an overrun of \$450,000, plus the additional \$80,000 already anticipated). It is recommended that a special engineering review of the project budget be carried out in October 1982 when the situation concerning the minimum wage will have been clarified and additional information available on progress being made on works activity with a trained crew in favorable weather conditions as well as experience with the gravelling operations. At that time a decision should be taken on the various options available in light of budgetary resources.

4a. Tools U.S. Procurement - This money has been partially spent and with delivery in late March will cause budget to be essentially used up.

4b. Tools local procurement - This item may require additional monies for tool replacement in the remaining months.

5a. Asphalt - This item awaits construction road surfacing of spray and stone.

5b. Cement - This item has sufficient monies to allow for price increases or purchasing of concrete pipes instead of ARMCO.

5c. I beams - This item is probably complete for the project leaving surplus monies.

5d. Rebar - Some 70 percent of this item has been used. The remaining monies may be surplus.

e. Miscellaneous - This item should be sufficient, barring unforeseen circumstances.

6a. POL - This item should be sufficient for all existing vehicles and plant plus a possible increase of cost. However, some additional funding may be required due to increased vehicle use on the gravelling operation.

6b. Start up costs - This item will be completely expended. Additional monies may be needed for small storage huts along the road.

6c. Shelf items - Should be sufficient.

7. Contingency and inflation - This item will be entirely used for deficit items.

GRB Contribution

The GRB contribution is outlined in Table 9 in terms of budget and March/April expenditure. Comments on the GRB budget follow:

Equipment costs will increase due to the use of one Poclair shovel and two dump trucks in addition to the one roller, two dump trucks and one air compressor as shown in the PP. A request has also been made to increase total trucks to six, (one general supply, one masonry, three gravelling, one for

repair and service). However, the GRB has to make allowance for down time and temporary deadlining of equipment due to lack of repair parts. An example of this is one truck not operating for six months and the air compressor not operating for six months or more. The hourly rate of equipment now reflects the age and existing running hours when brought to the site. Increased use of equipment may cause costs to increase up to \$100,000. Expenditure by GRB not shown in budget items are taxes, miscellaneous materials, private transportation and hand tools for project use while waiting for U.S. tools.

c. Recommendation

The Financial Plan as reviewed against past and future construction activities and costs show that although a portion of the increase above the financial ceiling will be borne by the GRB through increased equipment contributions, an increase in USAID funds will also be required to cover increased earthwork and hence labor costs. It is also recommended that the paving operation and road formation items which are potential cost overruns be made more efficient so as to be contained within the budget ceiling. The main concern of AID is however, the probable increase of minimum labor wages which may be partially avoided due to the supplement of food (daily wage \$0.55 increasing to \$0.95 plus food yields a daily wage of \$1.40), provided that the food ration can be continually maintained. However, an increase in the minimum wage could reflect in a total cost overrun to the AID budget portion of between \$270,000 to \$530,000 depending on the size of the increase.

TABLE 8

CUMULATIVE DISBURSEMENTS VERSUS BUDGET

MARCH/APRIL 1982

APRIL	BUDGET US\$	DIS. MARCH		DIS. APRIL		DB MARCH	DB APRIL 82, in US\$	DB IN	% DB \$ MARCH
		BUDGET FBU IN 1000 FBU	1982 IN 1000 FBU	1982 IN 1000 FBU	1982 IN 1000 FBU				
1. Technical Assist.	45,000	4,030	3,353			37,437		83	
2. Contract Services	42,000	3,761	1,532	1,532		17,000	17,000	40	40
3. Labor	404,002	36,178	10,192			113,817		28	
4a. Tools US Proc.	40,000	3,582	2,112	2,112		23,644	23,644	59	59
b. Tools Local Proc.	10,000	896	630			7,030		70	
5a. Asphalt	16,000	1,433	0	0	0	0	0	0	0
b. Cement	82,044	1,347	2,162			24,138		29	
c. I Beams	27,000	2,418	1,606			17,933		66	
d. Rebar	12,500	1,119	842	842		9,400	9,400	70	70
e. Misc.	26,592	2,381	570			6,365		24	
6a. POL	56,241	5,036	1,060			11,837		21	
b. Start Up Costs	44,444	3,980	3,627			40,504		91	
c. Shelf Items	29,360	2,629	785			8,765		30	
7. Contingency & Inflation	90,817	8,133	0	0	0	0	0	0	0
Total	926,000	89,923	28,470			317,870		32	

TABLE 7

MONTHLY DISBURSEMENT

	1/81	2/81	3/81	4/81	5/81	6/81	7/81	8/81	9/81	10/81	11/81	12/81	1/82	2/82	3/82	4/82
1. Technical Assist.	268	705	705	679	775	186	0	0	0	0	0	34	0	0	0	0
2. Contract Services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Labor	65	83	421	635	687	706	708	962	697	847	803	1421	1041	44	1074	
4a. Tools U.S. Proc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b. Local Proc.	82	0	289	0	0	0	0	102	0	10	147	0	0	0	0	
5a. Asphalt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b. Cement	586	212	0	592	34	0	0	0	213	0	0	0	0	106	1025	
c. I Beams	0	0	0	446	0	0	0	0	0	0	496	0	0	0	79	
d. Rebar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
e. Misc.	2002	104	55	79	19	0	0	0	0	134	0	122	38	0	103	
6a. POL	0	0	189	0	178	0	90	85	53	238	0	43	137	47	0	
b. Start up Costs	0	0	565	1143	0	370	0	0	135	0	0	(176)	57	0	0	
c. Shelf Items	0	0	29	0	39	0	0	0	62	0	0	15	0	0	1527	
7. Contingency & Infl.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sub Total in 1000 FBu	3003	1103	2192	3574	1733	1262	798	1149	1160	1229	1445	1458	1273	196	2407	
Commodity Procurement in U.S.\$																
2. Contract Services	0	0	17000	0	0	0	0	0	0	0	0	0	0	0	0	0
4a. Tools	0	0	0	0	0	0	0	0	23644	0	0	0	0	0	0	0
5d. Rebar	0	0	0	0	9400	0	0	0	0	0	0	0	0	0	0	0
Totals in U.S.\$	33532	12318	41479	39916	28757	14098	8906	11832	36616	13720	16139	16287	14211	2198	26880	
Totals in 1000 FBu	3003	1103	3724	3574	2575	1262	798	1149	3272	1229	1445	1458	1273	196	2407	

TABLE 9
GRB Inputs - Budgets and Expenditures

<u>Personnel</u>	<u>US\$</u>	<u>FBU</u> <u>in 000</u>	<u>Expenditure</u> <u>March 1982</u> <u>in \$ 000</u>	<u>% Expenditure</u>
Central Office Overhead	25,265	2,273	6,994 U.S.\$	27
Job Supervision and Overhead	91,600	8,244	21,040 U.S.\$	23
Engineering	50,328	4,532	21,230 U.S.\$	42
Labor Paving 2.5 km	500	45	0	0
Taxes	0	0	20,063 U.S.\$	100
<u>Equipment</u>				
Roller	94,090	8,468	288 U.S.\$	1
Dump trucks	101,400	9,126	27,050 U.S.\$	27
Aircompressor	38,500	3,465	163 U.S.\$	1
Power Shovel	0	0	130 U.S.\$	100
Asphalt Distributor	933	84	0	0
Aggregate Material	4,100	369	1,025 U.S.\$	25
*Materials	0	0	10,290 U.S.\$	100
Private Transport & Misc.	0	0	8,257 U.S.\$	50
Hand Tools	0	0	27,479 U.S.\$	52
<u>River Bridges</u>				
Dama River	21,500	1,935	10,050 U.S.\$	50
Ruhora River	65,000	5,950	33,500 U.S.\$	52
Contingency 15%	73,982	6,658	0	0
Total	567,000	50,775	189,160 U.S.\$	33
Salaries by others				
P. Rucquoy (15 months) 1/2 time			185,163 U.S.\$	
H. Verhulst (9 months) (6 months paid by AID)				
*Includes Armco Pipes by others				

26. ECONOMIC/SOCIAL ANALYSIS

A. Introduction

The evaluation has focused primarily on road workers and their families as this is the group of beneficiaries who are most affected by the project at the present time. With construction activities still under way in the first 24 kilometers of the road and scarcely begun in the remaining 36 kilometers, it is too early to expect measurable changes in producer surplus resulting from road user savings and market access to any great extent. Some evidence indicating that the latter effects are beginning to occur was found in the course of the evaluation and are described below. In addition, an effort has been made to set up a system for the continuing collection of information over the remaining life of project which will assist in conducting the final evaluation.

B. Methodology Used in Economic/Social Analysis

Two methods were used to secure information for the evaluation. First, road under reconstruction, supplemented by a limited survey of households along the road in the upper section where construction activities has not yet started. Secondly, information on vehicle traffic and pedestrians/bicycle traffic was collected for a seven day period at a barrier located at kilometer 3.2 of the road. These two data collection efforts are outlined below as well as a recommended system for collecting market price information on a regular basis. Information on the effects of wage income generated by the project and of food rations donated to workers and their families which resulted from the survey of workers and their households were presented in previous sections of the evaluation. Accordingly, later portion of the discussion in this section will cover five economic/social topics which have not been considered previously: the results of the road use survey, economic cost/benefit analysis, a discussion of possible difficulties in securing an adequate labor force for reconstruction work on the upper section of the road, a consideration of whether possible negative effects on land ownership patterns are likely to arise as a result of the project, and the role of women.

The evaluator wishes to acknowledge the contribution of Ms. Josephine Burke and Ms. Valerie Kamwana who conducted the interview in Kirundi with skill and warmth, and of Mr. Juvenal Buzugona who collected the extensive information on road users with care and patience. Mr. Gilbert Ndayagye, Mr. Egede

Butungwanayo, Mr. Longin Ndorima and Mr. Verhulst of the project gave invaluable assistance as did Mr. and Mrs. Pierre Rucquoy whose hospitality permitted the survey team to remain in the project area during the course of the interviews. The contribution of these individuals and of Mr. Mikidadi Maarufu, the USAID chauffeur were essential to the evaluation effort.

C. Data Collected: Methods and Consistency of Results with Previous Surveys

1. Worker and Household Survey

Eleven workers and seven of their households were interviewed in the course of the survey. As it was judged important to interview a worker and then interview his own household to have a useful portrait of the two sides of the situation, it was not possible to develop a larger random sample of workers. Instead, the location of various teams working along the road were noted, and numbered and the team from which a worker would be collected chosen at random. When the interviewing was in progress, we asked the chosen teams if any member of the team lived in a household which was fairly close to the road.

This tactic introduced a bias into the sample but it was necessary to take this step as a day could have been spent on each worker reaching households several kilometers from the road, with the possibility that the household members we wished to interview would not be present when we arrived. In addition, we wished to interview households without the worker present which would not have been as easy if the worker was conducting us a long distance to his home.

Although each worker interviewed insisted on introducing us to his family and several of the workers were working a number of kilometers from their home, we were able to thank each worker for this help, tell him we were going to talk about cooking and "women's" things, and that the driver would take him back to work. This tactic worked in most cases, and even when the worker said he was finished for the day, he went off to do other chores so we could talk to his wife in private. This was essential if the women were to speak frankly, and it was probably only possible as the evaluator and the interviewer/translator were women.

Four workers were interviewed whose families we did not contact. We did not find any bachelors among men with households along the road so we supplemented our worker information by talking to two bachelors without interviewing

their households. Two other men interviewed came from outside the area of influence of the road. We sought interviews with these workers to have a perspective on why some workers were prepared to leave their homes in order to work on the project.

Three household interviews were conducted at selected points along the upper section of the road. These were intended to provide information on the attitude to provision of improved access to market, school and medical facilities, the marketing of agricultural production in the area, and additional information concerning the potential labor force for construction activity in the upper section of the road.

Given the size of the sample and the manner in which the information was collected, the data are not suitable for statistical analysis. It is suggested instead that the information be treated as a series of individual cases; however, the extensive information available on these cases can easily be supplemented by more limited random samples to validate particular points, e.g. a random sample of workers could be drawn up, and those workers asked how many mature and immature coffee trees they own when the worker comes to collect his food ration, thus providing verification of whether workers own less than average numbers of coffee trees. It can also be compared to data generated by the larger random survey carried out by SOMEBU. In general, a preliminary comparison suggests that information given on crops and types of crops sold in each area is consistent with the SOMEBU data.

2. Road Use Survey

Information on vehicle traffic as well as pedestrians/bicycle/motorbike traffic was collected at a barrier located at kilometer 3.2 which is in the middle of the most complete road section, PK 0-8. With respect to vehicles, information was collected on where they were coming from, their destination, the number of passengers (in future the data collector has been asked to indicate also the sex of the passengers) and the type of any other products the vehicle was carrying. Data collected on pedestrians/bicycles/motorbikes included the sex of the road user, point of departure and destination, reason for the trip, and if they were going to market, what they were buying and/or selling.

Arrangements have been made to collect information on vehicle traffic at the barrier on a continuing basis. Data on other types of road use will be collected at least twice a year, once in the rainy season in early May and once after the coffee and

the second food crop harvest in mid-July, and possibly will also be collected in late January/early February throughout the remaining life of project. Given the length of the road, data will be collected at additional points along the road in future surveys in line with progress on construction efforts. This should provide useful information on trends in road usage which will be available for use in preparing the final road evaluation.

3. Market Price Information

It is recommended that market prices should also be collected several times a year at markets in the project area to provide an idea of price trends. Collecting price information only at three points (baseline, mid-term evaluation and final evaluation) runs the risk of distortions arising from short term effects. Much more useful information would be generated by the collection of data at several times in a year.

An attempt was made to collect market prices for a series of food and consumption items while the evaluation was in progress. However, the time constraints of the interview schedule and the fact that markets are held at opposite ends of the road on the same day resulted in information which is of questionable value. It is recommended that USAID staff and/or project staff resident in the road area collect price information in the markets three to four times per year. A possible schedule is late January to early February, early May, mid July and mid October which would provide an indication of prices at different points in the crop cycle. It is also recommended that the system used by SOMEBU in collecting prices for the baseline study should be followed to generate comparable information: the surveyor watched several market transactions for each product and stepped in after the transaction had been completed and he had noted the price paid, to ask permission to weigh the purchase thereby developing an average price per kilo for the product. It is essential that the information is collected by Burundian staff to avoid delays, and if two or three individuals can be involved, it should be possible to collect the information on one Sunday plus one Wednesday each time the data are collected.

D. Results of the Road Use Survey

1. Vehicles

The results of the survey of road use by vehicles are summarized in Tables 10 and 11 (see pages 48 and 49). As can

be seen, there has been a rapid and impressive increase in vehicle traffic, especially in light of the present stage of road construction and the fact that the data was collected in midst of the rainy season.

Prior to the start of the project, both the PP and the SOMEBU survey found that vehicle traffic was close to nil despite the fact that several individuals in the project area owned vehicles. The current average of five vehicles a day, and the number of commercial vehicles (as opposed to Catholic Missions and administrative vehicles - the survey does not count any vehicles related to the project) indicates a sharp upturn in both commercial products coming into the area and the possibilities for export of local produce. The majority of vehicles are coming from Bujumbura, travelling to Murago, and returning from there to Bujumbura. The vehicles are bringing in consumer products and passengers, and leaving with passengers, local food products and empty bottles (soft drinks and beer).

TABLE 10

Characteristics of Vehicle Traffic on Route 84

Sample Week 11-17 May, 1982

<u>Date</u>	<u>Number of Vehicles</u>	<u>Number of commercial Vehicles¹</u>	<u>Total Kilo- meters tra- velled on Route 84</u>	<u>Total Number of Passengers</u>
May				
11 (Tuesday)	4	-	150	17
12 (Wednesday)	5	3	102	30
13 (Thursday)	7	5	228	53
14 (Friday)	2	1	48	7
15 (Saturday)	4	1	132	17
16 (Sunday)	6	4	158	74
17 (Monday)	5	3	134	40
	<u>33</u>	<u>17</u>	<u>952</u>	<u>238</u>

Average number of vehicles per day: 4.7

Commercial vehicles using road: 52 percent

Average length of trip on Route 84: 28.8 kilometers

Average number of passengers per day: 34

¹Commercial vehicles taken as those transporting merchandise, food products and/or relatively large numbers of passengers (more than 6).

Characteristics of Trips made by Vehicles Using Road

By Point of Departure and Destination

	May 11 <u>Tue</u>	May 12 <u>Wed</u>	May 13 <u>Thu</u>	May 14 <u>Fri</u>	May 15 <u>Sat</u>	May 16 <u>Sun</u>	May 17 <u>Mon</u>	<u>Total</u>	<u>%</u>
<u>Coming From:</u>									
Bujumbura	3	3	4	1	1	3	2	17	52
Rumonge	-	1	-	-	-	1	-	2	6
Bururi	1	-	-	-	1	-	-	2	6
Murago	-	-	2	1	2	2	2	9	27
Ruhora River	-	1	-	-	-	-	1	2	6
Burambi (Muyama)	-	-	1	-	-	-	-	1	3
Total	4	5	7	2	4	6	5	33	100
<u>Going To:</u>									
Bujumbura	-	1	3	1	2	2	3	12	36.4
Rumonge	-	-	-	-	1	-	-	1	3.0
Musave	-	2	1	-	-	-	-	3	9.1
Murago	1	2	2	1	1	3	2	12	36.4
Ruhora River	2	-	-	-	-	1	-	3	9.1
Burambi (Muyama)	1	-	1	-	-	-	-	2	6.0
Total	4	5	7	2	4	6	5	33	100.0

The number of passengers carried is impressive. The most often stated expectation of a benefit from road improvement was the possibility of catching a lift to medical facilities when vehicles are passing on the road. Women in particular described the great difficulties of carrying sick children long distances to the hospital. The household survey included a question on illness in the family in the last five months, and most families reported that children had had an infectious disease (from the description it appears to be chickenpox). As all the workers' families reported taking children to Murago Hospital, and going there for their own health problems, malaria, flu, coughing, etc. the burden of walking many kilometers under these conditions is obvious. The number of vehicles coming and going suggests the possibility of catching lifts to medical facilities has increased already.

2. Pedestrians/Bicycles/Motorbikes

Various aspects of the data collected in the survey of road use by pedestrians, bicycles and motorbikes are summarized on Tables 12 and 13 (see page 51 and 52). The information collected could be used to answer a variety of other questions, e.g. calculating the average distance of trips taken, estimating the volume of food product moving into and out of the area, etc. It has not been possible to carry out these analyses given the time available and the lack of computer facilities. However, the data and others collected throughout the remainder of the project will be available for use in the final evaluation.

The data summarized in Tables 12 and 13 provide information on such questions as bicycle usage, involvement of women in marketing, and the zone of influence of the road. Bicycle traffic is low, but is somewhat higher than expected. This type of transport can be used effectively to carry agricultural production to market. The use of bicycles will also help the road to capture the human traffic which presently uses the road for portions of their journey and paths for other portions (a possible beneficial effect on the environment could result from confining the bulk of traffic to the road). Trends in bicycle usage will be useful indicator of the road user savings gained directly by the local population.

The importance of marketing as a reason for usage of the road by women is apparent in the information as more than half the women stated that was the purpose of their trip. In addition nearly as many women as men are going to market and many of them are selling products as well as buying. In general, fish,

1982
Characteristics of Non-Vehicle Road Usage (By sex of road user)

Sample Week 11-18, 1982

	M E N										W O M E N										
	11 Tue	12 Wed	13 Thu	14 Fri	15 Sat	16 Sun	17 Mon	Total	Average %		11 Tue	12 Wed	13 Thu	14 Fri	15 Sat	16 Sun	17 Mon	Total	Average %		
<u>Mode of Transport</u>																					
On foot	157	166	174	131	140	139	133	1040	149	92	63	75	63	65	50	125	49	490	70.3	99.6	
On bicycle	11	6	1	17	4	8	28	75	11	7	0	0	0	0	0	0	2	2	.3	.4	
On moto	2	1	0	5	1	1	0	10	1	1	0	0	0	0	0	0	0	0	0	0	
<u>Total</u>	170	173	175	153	145	148	161	1125	161	100	63	75	63	65	50	125	51	492	70.6	100	
<u>Reason for Trip</u>																					
Market	37	94	47	24	16	43	32	293	42	26	25	71	30	28	21	52	28	255	36	52	
Work	113	56	58	73	110	11	75	496	71	44	23	3	10	12	17	-	6	76	11	15	
Visit	6	6	6	36	3	15	25	97	11	2	5	1	13	16	6	9	10	60	9	12	
Other	14	17	64	20	16	79 ¹	29	239	34	21	5	-	10	9	6	64 ²	7	101	14	21	
<u>Total</u>	170	173	175	153	145	148	161	1125	161	100	63	75	63	65	50	125	51	492	70	100	

¹ Includes 56 men attending church

² Includes 31 women attending church.

Analysis of Trips of Road Users (By sex of road user)

Sample Week 11-18 May, 1982.

Coming From:	M E N										W O M E N									
	11	12	13	14	15	16	17	Total	Aver. ¹	%	11	12	13	14	15	16	17	Total	Aver. ¹	%
	Tue	Wed	Thu	Fri	Sat	Sun	Mon				Tue	Wed	Thu	Fri	Sat	Sun	Mon			
Musave	139	86	33	65	62	26	59	470	67	42	49	29	23	36	8	36	16	197	28	40
Mibanda	4	32	31	11	15	9	1	103	15	9	6	21	6	-	5	3	4	45	6	9
Mugende	-	19	61	23	8	7	25	143	20	13	1	22	21	19	12	5	19	99	14	21
Kigera/Kahinda	-	1	-	-	23	27	30	81	12	7	-	2	-	-	-	14	4	20	3	4
Kibumba	-	-	-	-	-	8	6	14	2	1	-	-	-	-	2	-	3	5	1	1
Murago	-	4	1	12	6	7	16	46	7	4	-	-	-	1	-	6	-	7	1	1
Burambi	-	-	-	-	1	10	-	11	2	1	-	-	-	-	1	-	-	1	-	-
Kagongo/Cugaro/ Minago	23	31	49	24	28	51	16	222	32	20	7	1	13	8	21	51	3	104	15	21
Butare	-	-	-	6	-	1	-	7	1	1	-	-	-	1	-	7	-	8	1	2
Rumonge	-	-	-	12	-	1	2	15	2	1	-	-	-	-	-	-	-	-	-	-
Bujumbura	4	-	-	-	-	-	1	5	1	-	-	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	2	1	5	8	1	1	-	-	-	-	1	3	2	6	1	1
	170	173	175	153	145	148	161	1125	161	100	63	75	63	65	50	125	51	492	70	100
Going To:																				
Musave	23	6	18	27	3	33	12	122	17	11	5	-	5	9	1	35	3	58	8	12
Mibanda	3	9	9	-	9	1	-	30	4	3	1	-	-	-	-	26	-	27	4	5
Mugende	2	3	5	3	19	18	2	52	7	5	1	1	1	-	6	23	-	32	5	7
Kigera/Kahinda	-	-	-	-	-	-	-	-	-	-	-	-	3	2	2	-	-	7	1	1
Kibumba	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
Murago	-	-	2	17	13	1	9	42	5	4	-	-	1	-	2	-	-	3	-	-
Burambi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kagongo/Cugaro/ Minago	138	149	138	91	63	33	124	736	105	65	54	73	48	45	38	-	43	301	43	61
Butere	-	2	3	8	39	10	-	62	9	6	2	1	5	9	1	-	-	18	3	4
Rumonge	4	2	0	7	-	3	12	28	4	2	-	-	-	-	-	4	4	4	1	1
Bujumbura	-	-	-	-	-	16	-	16	2	1	-	-	-	-	-	4	-	4	1	1
Other	-	2	-	-	-	33 ²	2	37	5	3	-	-	-	-	-	37 ²	-	37	5	8
	170	173	175	153	145	148	161	1125	161	100	63	75	63	65	50	125	51	492	70	100

¹ Numbers may not add to total due to rounding.

² One man is travelling to Rutwenzi and 32 to Vumbaganya to attend church.

Three women are travelling to Rutwenzi and 34 to Vumbaganya to attend church.

oil, tomatoes and commercial consumer products (salt, sugar kerosene, matches, soap, cloth, soft drinks and beer) are coming up the road. Beans, cassava products, sugar cane and bananas are moving down the road to Minago and hence to the Bujumbura market.

More than twice as many men use the road as women during the week, however, the figures are distorted by the number of men working on construction teams at the lower end of the road. Although the surveyor did not count project vehicles, it would have been difficult to avoid counting road workers. When construction activities are complete later surveys will probably show the numbers of men and women using the road more in balance although men do travel from the project area down to Lake Tanganyika to work on the fishing boats. It is expected that men will essentially monopolize vehicle/bicycle/motorbike transport.

E. Conclusions

1. Project Cost/Benefit Analysis

a. Effects of Cost Overrun on Project IRR

It was not judged useful to attempt to prepare a revised cost/benefit analysis of the project for the mid-term evaluation. There are many uncertainties at present on various cost items, e.g. the CRS budget for FY 83/84 is currently under preparation and FY 82 actuals are not yet available, and the effects of the increase in the minimum wages are not yet known. In addition it is too soon for the road to have a quantifiable effect on producer surplus.

Instead an attempt was made to consider the possible effects on the project IRR of cost overruns arising from the original error in estimating the quantities of earthwork required to bring the entire road up to all-weather standard. It appears that the effect will be minimal as increased rural incomes are a benefit of the project, and the original analysis treated the new income stream in an overly conservative manner.

The cost/benefit analysis accepted only 40 percent of the workers' salaries as a benefit of the project (the net benefit after deducting the normal value of a day's labor in the agricultural sector). As there is known to be a substantial amount of under-employment in the agricultural sector in Burundi, it is unlikely that any drop in agricultural production arising from employment on the road will be as great

as 60 percent of the workers' salaries (especially as the unemployment time of other men is made use of by employing them to help the workers' wives). The income stream flowing from the workers' wages is also having a strong multiplier effect, and as the wages are coming from sources outside the Burundian economy it would be fair to apply a value to the income stream greater than the worker's wage.

A more conservative approach which accepted only the full value of the workers' wage as a benefit would go some way to including the multiplier effects while accepting some loss to agricultural sector production as resulting from worker involvement in the road project. It is recommended that this latter approach be taken in calculating the final project IRR as it will give a truer picture of the benefits resulting of a labor intensive project¹. This will have a strong effect on the project IRR as the benefit occurs at the same time costs are incurred and prior to the heavy effect of discounting on the benefit stream.

In addition a third of the currently projected cost overrun will be netted out of cost/benefit analysis as it is composed of workers' salaries so the project IRR will not be affected by the total amount of the increase. However, project management must consider the value of this project against other priority activities in light of funding availabilities. The present project cost overrun is not serious, however large increases in the minimum wage will result in a much higher cost overrun than is indicated in section 25 of this evaluation and suggests the need to take hard financial decisions concerning the future course of the project.

¹ The evaluator prepared the original analysis and took the more conservative approach given two facts: (a) uncertainties concerning the likely effects on agricultural production of employing a large number of men on the road project, e.g. would it result in their withdrawing entirely from agricultural production and (b) uncertainties with respect to how the incomes would be used, i.e. if the men used the income to buy aluminium roofing sheets it would have very little multiplier impact. Experience with the project and the household interviews has proven that the men are still contributing to agricultural production and are using a fair portion of their incomes to purchase local goods and services. As a result a less conservative approach to valuing the income stream is indicated.

Consideration should be given to ways of using the food supplements as a means for reducing project cost, e.g. as incentives for regular working and for performance above normal work norms. In addition, an argument should be made for a national policy on similar construction projects which permit a lower wage plus food supplement in light of the benefits to the local community arising from such projects, i.e. the workers are working for themselves as well as for the government. The evaluator believes that the food contribution is highly valuable as it helps to cushion the area against any drop in agricultural production arising from the loss of the workers' labor contribution and as it is a benefit which is entirely received by the workers' families in most cases. However, if it is necessary to pay the full minimum wage plus the food supplement the cost will be unacceptably high and it would be difficult to justify the continued use of FFW in labor intensive construction projects. Such an outcome should be avoided.

b. Producer Surplus

The cost/benefit analysis projected a producer surplus from sales of bananas as the long term benefit arising from the project. The benefit was based on an expected increase of 15 percent in real terms in the price paid to producers as a result of road user saving, and a one percent supply response for each one percent price increase.

It is much too early to determine whether the producer surplus is developing. However, there is evidence that prices have already risen by at least 15 percent in real terms as the women in the Murago area reported receiving a Fbu 150 to Fbu 160 for a large bunch of bananas as opposed to Fbu 120 at the time SOMEBU's baseline study was carried out in January-March 1981. The price of Fbu 120 was also the price the PP team found in the area in 1979. An increase in line with any recent inflation in food prices would be to no more than Fbu 130 per bunch. It is believed the prices reported by the women represent the true price received on an annual basis as they are considerably below those currently found in the Murago market, i.e. Fbu 240 to Fbu 280. This has not been accepted as the normal price given the time of the year and the current low production of bananas.

If the price has already risen to an average of Fbu 150 to Fbu 160 it has probably occurred more as a result of increased economic activity in the area arising from the large increase

in cash incomes coming from last year's record coffee crop, and the salaries of road workers, rather than improved access to urban markets. However, the vehicle survey does indicate that the latter is already occurring to a limited extent. Local inhabitants reported that the Murago market is attracting many more individuals than formerly and that dry season attendance was on the order of 4 to 5,000 persons (an attendance of 1,000 was observed by the evaluation team on the very rainy day we visited the market). The increased activity is probably due both to increased incomes as well as the improved availability of salt, sugar and other consumer items which is arising from the regular arrival of vehicles at the market. As such, the increased price of bananas may be a mechanism for translating a portion of men's coffee and wage incomes into women incomes which are used for family food purchases.

The price increase resulting from local economic activity should help to insure that producers secure the higher price from traders when market access improved after road completion. The price differential is still great enough to attract the trader (the price of FBU 250 to FBU 300 for a large regime is the normal level in the Rumonge/Minago market) and local producers will not be forced to sell to the traders at a low price when they can already secure a higher price from local customers. This suggests that the longer time frame of labor intensive construction activity plus workers incomes (greatly facilitated by the jump in coffee incomes) may be providing the time and financial resources necessary for local producers to adjust to improved market conditions hence helping to ensure that their positions vis-a-vis the traders will be strong enough to capture the benefit of road user saving.

c. Benefits from Other Crops and Road User Savings

The project IRR was based on workers' income and a producer surplus from banana sales. A review of recent experience indicates that benefits are also arising from other sources which will further improve the actual IRR of the project. These benefits include road user saving on marketing the coffee crop (the bulk of last year's production was transported out of the area by vehicles for the first time), savings by other types of road users and a potential producer surpluses on other crops, notably cassava and cassava products, sweet potatoes and cocoa yams and, to a lesser extent, beans.

The road may result in greater coffee production due to both improved marketing conditions and increased activity on the part of extension agents although the record coffee harvest in

1981 is also a contributing factor. The Government has expanded its coffee tree nursery which is bisected by the road at the Ruhora river, and the demand for trees has doubled over previous years. Most of the road workers reported planting new trees in the fall of 1981. Large stocks of insecticides for coffee bushes were noted at Murago and Muyama and were being distributed by extension agents.

The household interviews provide evidence of substantial sales of cassava and cassava products from the area, and a consumer surplus will probably result from this crop as well. Given the substantial additional benefit expected from the road (and the increased benefits resulting from the upward adjustment of the benefit from workers' incomes) the project will most likely show an increased IRR at the time of the final evaluation despite cost overruns.

Although the road represents considerable difficulties from the point of view of construction, the location of this prototype project in an area with ready access to a flat paved road to Bujumbura and with substantial capacity for producing a marketable surplus was a fortunate one. It is probably one of the few areas in Burundi which could show a substantial producer surplus without an allied specific agricultural development program.

d. Cooperative Structure

Both the PP and the SOMEBU study stressed the importance of strengthening the cooperatives in the area to ensure the local inhabitants were able to catch the benefits of the road, rather than having them monopolized by wealthy traders. Although the discussion in B.2 above suggests that the producer surplus will develop even in the absence of strong producer sales cooperatives, the presence of such cooperatives would most likely increase the incomes of local producers especially if they could organize a direct sales outlet to the Bujumbura market.

Unfortunately, limited progress has been made in organizing the cooperative in Muyama while the Murago cooperative has experienced considerable management difficulties in recent years and is much weaker than at the time the PP was prepared. Deposits have fallen from Fbu 1.6 million to Fbu 800,000 and the cooperative was forced to sell its vehicle as it could no longer afford the operating costs. The Burambi commune administration has contributed Fbu 300,000 to the Muyama cooperative which has been used to construct a store in the

market (to be opened in July 1962), and deposits of FBu 80,000 have been subscribed by members.

Both cooperatives are currently consumer cooperatives buying products and farm supplies from Bujumbura and selling them to local consumers. Both hope to organize purchases of local products for sale in Bujumbura when they go to collect supplies. However, it is questionable whether either cooperative has the management of capital resources to undertake this additional activity. Local development authorities should consider how these organizations can be strengthened to further increase the benefit of the road project to the local population.

2. Other: The GRB is building a post primary vocational/agricultural training school at Ruhora. It is clear that the decision to build this IDA financed school at Ruhora is a result of the road reconstruction program rather than elsewhere in northern Bururi province.

Labor Force Availability

a. Project Experience to Date

Initially, the project management did not apply any selection procedures for workers. Local authorities and others were told that workers were required and any who turned up were accepted. The same procedures will be used when the project moves into new sections of the roads.

As work progressed, certain of the workers who did not perform well were dismissed; others worked on the project for a few weeks or months and stopped. Project management estimates that a total of 1,200 individuals have worked on the project at one time or another. The present labor force is in the order of 600 workers; attendance is about 18 days out of every 25 day work period, i.e. an attendance rate of 72 percent, so a labor force of 430 or so workers is on the road on any one day. The project management indicated that this labor force was relatively stable and had been on the project for some time. This contention was supported by the workers' interviews which found that the average length of time they had been on the project was 8.5 months.

Team leaders take attendance every morning and spot checks are made by project management to ensure accuracy. At the end of the month, a worker is paid for a number of days he has been present in that month and the food ration is distributed to him

when he has worked 25 days. The system used is that a worker travels to Murago where his attendance is checked to ensure he has worked 25 days. If he has, he is given a chit for the warehouseman and goes to receive his ration.

A system of task working has been organized for many of the teams and contracts are also used for certain categories of work. These are related to work norms for a 25 day working period, and the workers are paid when they finish the contract even if it is in a shorter time period. The flexibility of management procedures has probably permitted the workers to assist in normal agricultural production tasks and should be continued.

b. Labor Force Availability on the Upper Section of the Road

To date the project has been able to attract an acceptable number of workers though labor availabilities have not been sufficient to achieve project completion targets. Both the SOMEBU survey and a household interview in the Muyama area indicate that the project will not encounter difficulties finding workers when work increases on the road section from Murago to the Ruhora Dama River.

However, both SOMEBU data and the household interviews indicate that there may be problems with labor recruitment for the section from the Dama River to Muyama, especially in the light of the large volumes of earthwork required in that area. The population of the area is much lower than in the Musabe/Murago/Muyange areas and sons are likely to be attending schools or herding cattle. Other development activities (tea and forest planting) are also putting demands on labor in the area. However, the Burambi commune administration was confident that sufficient laborers would be found.

The project management will have to examine the situation closely and take appropriate action if required. It may be necessary to use laborers from the lower sections of the road. This solution would probably result in the need for at least rudimentary housing for the workers, particularly in the rainy season, and may result in some additional cost to the project.

3. Changes in Land Ownership Patterns

Evaluations of rural roads in other developing countries have noted a tendency for farm holdings near roads to increase in size and for this process to result from the wealthier sections

of the community forcing poor farmers to sell their lands. Attention needs to be paid to this issue and has been considered in the evaluation.

In the course of the household interviews women were questioned on whether additional land was available to purchase in their areas and the answer was invariably no. Land in Burundi is held to belong to the State with patrilineal clans having de facto ownership to right of usufruct. The team was told by knowledgeable individuals in the area that the administration had stopped any selling of lands by individuals and had also intervened in certain cases to stop individual patrilineages from dividing their lands between too many sons. Certain younger sons were moving out of the area to settle in the Nyanza Lac region where more land was available.

Accordingly, although access to land is a problem in Burundi, the structure of land holding and Government control over sale by individuals would appear to negate any possible effect the road could have on land ownership.

4. Role of Women in the Project

a. Employment on the Road

No women are working on the Route 84 project and this issue was researched given the benefit which women have received from employment on road projects in other parts in Africa, e.g. the Kenya rural access roads. The project management team indicated that no women had presented themselves to work on the project, and that public opinion in the area would not accept such employment for women. Female headed households would benefit from the project, however, by sending a junior male to work on the project (one of the unmarried road workers interviewed came from such a household).

Women were asked why they were not working on the road in the course of the household interviews. They were almost unanimous in replying that it would be shameful for women to do such work and that it was dangerous for pregnant women. In addition they said that someone had to stay and look after the household and the farm and that the men would not do as good a job as they did. Only one young woman said that she might work on the road if she saw other women doing it and even she was not enthusiastic about the prospect. Female opinion appears to support the local division of labor.

b. Benefits from the Road Project

It has been noted in other evaluations of rural roads that males tend to monopolize the benefits of such projects as they use vehicle/bicycle transport to much greater extent than women, and also receive a larger share of any economic benefit which may arise. It is likely that men will monopolize vehicle and bicycle transport and may enjoy also a greater share of the economic benefits. However, women have already benefitted by receiving a share of the workers' wages for family consumption needs which does not occur with respect to coffee incomes. Salaries have also made a contribution to purchasing a supply of nutritious food such as fish which may be permitting a higher level of food crop marketing by women. Such a process may well continue with women producing surpluses of certain crops for sale and buying high value foods (fish and oil in particular) which they do not produce themselves.

It is a possibility that men in the area may begin to monopolize food crop marketing as it becomes big business in the area. However, experience in other parts of Africa have indicated that men generally underestimate the value of food sales by women, and tend to concentrate on activities which they consider to be of greater monetary value if they have the opportunity to do so. The presence of coffee, oil palms and large herds of cattle in the different elevations of the project areas as well as the high returns which can be secured from fishing suggest that men already have many activities which consume their time. Women may well continue to do most of the selling of food crops, and in this case they will secure a fair share of the producer surplus. Rapid market access is probably crucial in this respect given the other responsibilities of women and should be a benefit to them arising from the road. The situation should be carefully monitored at the time of the final project evaluation and the data from the road user survey should help in this regard.