Coastal Transport Links for Zambia

An Examination of Route Options through Northern Mozambique and Associated Project Development

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Consultant

Louis Berger International, Inc.
Contract AID/afr-C-1593

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PREFACE

The following report, prepared for the United States Agency for International Development (USAID) under contract number afr-C-1593, represents an extension of initiatives begun under the Southern Africa Development Analysis Project (SADAP). The report is concerned with the regional transport needs of Zambia as a landlocked state in Southern Africa and is divided into four main sections. The introductory section describes the transport problems of landlocked states in general and provides a justification for the selection of Zambia as a priority area for AID intervention. The second section discusses the tonnage capacity of existing international routes for Zambia with adjusted projections for the 1980s. The third section identifies various route options utilizing port facilities at Beira and Nacala in Mozambique. The fourth section gives preliminary details of an transport project keyed to utilization of these northern corridor routes.

Summary statements of the relative merits of three transport projects in the region, including a large scale version of the northern corridor project, are included as an annex to the report. Current information concerning the status of key bridges in January 1980 appears in a second annex. A bibliography of selected sources relevant to the proposed project is also provided.

Readers interested in additional information concerning the transport sector in Southern Africa in general are referred to the first SADAP transport report, Transportation and Telecommunications in the Southern Africa Region, (USAID, Contract no afr-C- 1424), August, 1978. A basic rationale and strategy for development assistance for the transport sector in Southern Africa, as well as preliminary project proposals, are provided in Transportation in Southern Africa: Application of an Assistance Strategy to Project Design (USAID), Contract no. afr-C-1132), August 1979.

The analysis of Zambian transport needs contained in this report has been placed within the context of Southern Africa as a region, defined to include those territories located south of 8 degrees South Latitude: The Republic of South Africa (RSA), Lesotho, Swaziland, Namibia (Southwest Africa), Botswana, Zimbabwe-Rhodesia (Southern Rhodesia), Zambia, Malawi, and Mozambique. The importance of the Benguela and TAZARA railways in Angola and Tanzania, respectively, requires inclusion of these two countries in any discussion of transport in the region, especially in regard to Zambia. Although the status of Namibia and Zimbabwe-Rhodesia remains unsettled at the writing of this report, for the sake of analysis they are treated as equivalent to countries in the region. The cutoff date for research related to this report is December 31, 1979.

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Section I

Introduction

In an age of economic interdependence, the linkage between economic units is frequently taken for granted. Private and commercial consumers, for example, come to assume a ready supply of commodities whose origins are often distant, and little thought is given to the transport system which has made these commodities accessible. However, failure to recognize the role of transport can be historically documented as a major factor in the collapse of an economy, the loss of a war, the fall of an empire, or the demise of a people. Unfortunately, it is usually only when transport linkages are disrupted that their importance is most fully appreciated.

The dependency of a landlocked state upon its neighbors for access to the world market illustrates the importance of transport linkages. The need for cooperative relations and actions gives an additional dimension to transport planning for such states. Adjusting the frequently competitive interests of the coastal and landlocked states, however, has not proved easy; in fact, the problems faced by the landlocked states have been given priority status by the United Nations Conference on Trade and Development (UNCTAD) and are the stated concern of many other groups as well.

The initiatives associated with the Southern African Development Analysis Project (SADAP) were set not only within a regional context but also within the context of development options for the six landlocked states in Southern Africa. Transport has been found to be the single major constraint on economic development for the region in general and for the landlocked states in particular. The constraining role of transport for the landlocked states in Southern Africa is most evident in Zambia. This is primarily a result of factors directly related to the transport links which serve Zambia.

For example:

- There is a high degree of dependence on single mode--mainly rail--and single route transport in Southern Africa.
- Operational and managerial problems severely limit the efficiency of primary links.
- Maintenance needs have become an increasing constraint on utilization of existing links.

- Operational and managerial problems restrict the capacity of port facilities servicing primary links.
- A large volume of goods must be carried for considerable distances.

Various other factors also affect the supply and demand of transport services:

- Political and security problems have closed certain routes.
- Population displacement from agricultural areas to the copper belt--stimulated by higher wages in the copper belt-- have reduced the potential for agricultural production in Zambia.
- A cycle of dry seasons has additionally increased the Zambian need for imports of food.

An assessment of the current transport situation in Zambia is complicated by many factors. In recent years there have been major seasonal variations in domestic harvests--reflecting climatic conditions and the supply of fertilizer-- which have dramatically affected the Zambian need for food imports. Fluctuations in the state of the transport system itself, moreover, have varied the ability of the transport system to meet such needs at any one time.

The situation in Zambia is complicated by the fact that the economy is dependent upon external sources for imports of both food and fertilizer. During the late 1970s declining transport capacity made it increasingly difficult to obtain stocks of both categories of essential items. Increasing dependence upon food imports reduced the tonnage of fertilizer which could be handled. This in turn resulted in lower harvests which only increased the need for additional food imports.

The cycle became so serious in late 1978 that the government of Zambia (GOZ) opened the border with Southern Rhodesia to admit transit traffic for Zambia arriving from ports in the Republic of South Africa (RSA). This step was taken primarily to ensure the arrival of enough fertilizer for national needs before the fall rains. The deadline was not met, however, necessitating continued use of the Southern route to augment food stocks in Zambia.

The two basic staple foods in the country are maize (corn) and wheat. Wheat is entirely imported and almost entirely consumed in urban areas. Consumption in recent years has averaged about 650,000 tons of maize and about 120,000 tons of wheat.* Maize stocks in Zambia in early 1979 were estimated at about 380,000 tons, or enough to last until the harvest in July. Production in 1979, however, was estimated to fall short of food requirements by between 250,000 and 350,000 tons. The July 1979 harvest lasted only until some point in December of that year, and the remainder of domestic needs has had to be supplied by imports.

In addition to the estimated shortfall of 350,000 tons of maize, 120,000 tons each of wheat and fertilizer will be needed by the end of 1980. Thus, in order to return the economy to a pre-crisis situation, there will be a need for a total of about 715,000 tons of imports of food and fertilizer during 1980, including 125,000 tons of corn to replenish domestic reserve stocks. The corresponding average monthly transport capacity requirement is about 60,000 tons.

The situation in Zambia has been one of crisis for the last year. Major shipments of grain will be needed before the Spring of 1980 in order to avert widespread malnutrition and possible starvation. Emergency activities underway may be able to offer temporary relief, but this outcome is not certain. What is certain is that the situation represents more than a short-term problem and that its resolution will require long-term assistance to the transport sector.

The following report offers an overview of projected traffic capacity on existing routes and discusses route options providing linkage with port facilities in Mozambique at Beira and Nacala. The development of such links is seen in the context of an integrated, regional, truck and bi-modal truck/rail transport project. An essential element of this project is transport through Mozambique. Detailed development of the proposed project has been limited by the lack of adequate information about transport conditions in Mozambique. An important function of this report, therefore, is to specify those areas of information needed for further project design. Since the project relates to the interests and projects of other donor agencies, consultation with other donors active in the region is also anticipated.

*Metric tons are used throughout this report.

Section II

Projected Tonnage on Existing Routes

In mid 1979, optimistic assessments indicated that the capacity of existing transport routes servicing Zambia might be as much as 62,000 tons of fertilizer, maize, and wheat a month or a yearly total of about 744,000 tons. This capacity is only slightly in excess of anticipated requirements. This assessment was based on the three routes specified below:

Via Dar es Salaam	25,000 tons (total capacity 32,000 tons)
Via Mozambique	14,000 tons (total capacity 14,400 tons)
Via South Africa	23,000 tons (total capacity 30,000 tons)

The assessment was based on an assumption that both the size and timing of shipments would be handled with maximal efficiency.

By the end of 1979, however, various events had seriously eroded the capacity of these three routes. The monthly tonnage for December 1979 had fallen to less than 20,000 tons and projections for early 1980 did not exceed 40,000 tons a month. These figures, annualized, imply import capacities ranging from 240,000 tons to 480,000 tons annually, compared to import needs of 715,000 tons annually for the three specified commodities.

The following analysis is keyed to transport over four routes. The majority of traffic is expected to be carried over the rail and road routes of the Tanzam corridor and over the Southern Route to the RSA. The route through Malawi and Mozambique offers secondary transport capacity. The original projection for mid 1979 indicated that traffic over these three routes could handle emergency needs. The capacity of the Malawi/Mozambique route remains open to question, however, and events since mid-1979 have seriously affected the capacity of the other two core routes. The Benguela Railway has therefore been included in the analysis as a supplemental route. (See Figure A, Primary Projected Supply Routes for Zambian Imports.)

A. The Benguela Railway

The Benguela Railway runs from the port of Lobito in Angola to connect with Zaire Railways (SNCZ) and provides a western access route for Zambia. The combined route is about 21,000 km long. In the past, international traffic has been split between Zambia and Zaire on a 50/50 basis. Export tonnage has always exceeded import tonnage. In 1973, Zambian tonnage on the Benguela was about 67,000 tons a month. Of this an estimated 35 percent or 23,000 tons a month represented imports.

Guerrilla activities within Angola, however, led to disruptions of service and eventually resulted in a cessation of international service after 1975. Although by 1979, security was less of a problem, it still prevented service and the line was in a deteriorated condition. Efforts to resume international service in 1979 brought only one train across the system. Proposed service for 1980 includes a train composed of about 25 cars which would run empty from Lobito and carry manganese on the return trip. No imports for Zambia have been routed to Lobito as yet, but on the basis of weekly operations a monthly volume of about 1,350 tons could be handled. It is estimated that with the equipment on line one train could be run daily, but additional investment in maintenance and management would have to be made in order to achieve this. (See Table 1, Zambia: Projected Import Capacity, The Benguela Railway).

In mid 1979, a donors conference was held to discuss reactivating the Benguela. A total equivalent to US$ 28 million was pledged for Phase I Operation. Implementation of this phase is intended to bring capacity to 70,000 tons a month of which 25,000 tons would be shared jointly by Zambia and Zaire for imports. At full efficiency, Phase I would mean an annual capacity of 150,000 tons by 1982. The majority of this capacity could be used for maize, wheat, and fertilizer imports. Most specialists, however, feel that the projected added capacity for Phase I is overly optimistic.

After 18 to 24 months of operation, the reactivation program would shift to Phase II. This phase would require an additional US$ 54 million in order to reach a projected capacity of 96,000 tons a month. Of this only about 34,000 tons--again divided between Zambia and Zaire-- would be for imports. Projected annual capacity for Phase II at full efficiency would be about 204,000 tons of imports. This projected capacity for Phase II is similarly regarded as optimistic. In addition to discounting tonnage capacity for each of the two phases, moreover, it is likely that considerable delays will be encountered in implementation of the investment as pledged. Even if utilization of this line were possible for the Spring 1980 emergency, the impact would be marginal. Security factors, moreover, continue to prevent serious consideration of this route.

Table 1

Zambia: Projected Import Capacity by Routes, The Benguela Railway

Assumption		Monthly	Yearly
B-1)	Current system, one train weekly (12.5 tons import x 25)	1,354	16,250
B-2)	Current system, 1 train 5 days a week	6,771	81,250
B-3)	Current system, 1 train 7 days a week	9,505	114,063
B-4)	40% of total capacity for Phase I Investment	5,000	60,000
B-5)	60% of total capacity for Phase I	6,250	75,000
B-6)	80% of total capacity for Phase I	10,000	120,000
B-7)	100% of total capacity for Phase I	12,500	150,000
B-8)	40% of total capacity for Phase II	6,800	81,600
B-9)	60% of total capacity for Phase II	10,200	122,400
B-10)	80% of total Capacity for Phase II	13,600	163,200
B-11)	100% of total capacity for Phase II	17,000	204,000

B. The TANZAM Corridor

The shortest and least expensive access to port facilities from Zambia is the TANZAM Corridor linking Zambia to Dar es Salaam. This corridor is serviced by both rail and road connections running about 1,800 km from Lusaka to Dar. The estimated cost of shipping one metric ton of maize via this route is US$ 65 by rail and US 125 by road, 1979 prices. Projected capacity over this route in mid 1979 was 32,000 tons of imports monthly, of which 78 percent or about 25,000 tons was scheduled for maize, wheat, and fertilizer.

1. TAZARA

The Tanzania-Zambia Railway (TAZARA) is a jointly owned and operated venture of Zambia and Tanzania. Construction of this railway was financed by the Peoples Republic of China (PRC). The originally planned capacity of the line was 90,000 tons of imports per month for Zambia. The system has been plagued by engineering, construction, operational, and managerial problems, however, and has in fact never reached more than an average of 35,000 tons a month during any twelve month period.

In early 1979, import capacity stood at about 25,000 tons a month. As a result of heavy rains, several sections of the road bed were washed out and the line was closed for part of April and May. Temporary routing was established, requiring reduced speed and tonnage loads. The washout was believed to be partly due to unstable soils, and soil tests and an engineering survey may be needed to assess the need to relocate portions of the route. A minimum of one year will be required to restore service over the line even if only minor rerouting is necessary. Import capacity in the interim was reduced to 20,000 tons per month, of which 78 percent or 15,625 tons was scheduled for maize, wheat, and fertilizer (See Table 2. Zambia: Projected Import Capacity, TAZARA).

Traffic over this route came to a halt again in late 1979 when Zimbabwe Rhodesian security forces blew up the rail bridge over the Chambeshi River near Kasama. Consideration was then given to a temporary rail link over an adjacent road bridge--again requiring reduced speed and tonnage loads-- with transshipment by truck at some point near the Zambian border for haulage on the TANZAM Highway. The PRC has reportedly expressed willingness to assist with both a temporary route and reconstruction of the main bridge, but even under the best of circumstances a minimum of one year would be required to restore service to the 20,000 ton level. Even with full restoration of service and additional investment in locomotives, the long run total capacity for imports would be limited to about 40,000 tons a month as a result of restricted port facilities at Dar es Salaam.

Table 2

Zambia: Projected Import Capacity, TAZARA

Assumption		Tonnage Monthly	MWF*	Annual
T-1	January 1979	25,000	19,500	300,000
T-2	Awaiting repairs to roadbed	20,000	15,600	240,000
T-3	Bridge outage, bi-modal transshipment plus T-2 (low estimate)	5,000	3,900	60,000
T-4	Bridge outage, bi-modal transshipment plus T-2 (high estimate)	8,000	6,240	96,000
T-5	Bridge outage plus temporary bridge, plus T-2 (low estimate)	5,000	3,900	60,000
T-6	Bridge outage, temporary bridge plus T-2	8,000	6,240	96,000
T-7	Projected maximum capacity with additional investment not limited by port facilities	40,000	31,200	480,000

*Monthly tonnage allocated to maize, wheat, and fertilizer.

2. The TANZAM Highway (Alternately the ZAMTAN Highway)

The TANZAM Highway provides a major route for Zambian truck transport to port facilities in Dar es Salaam. Zambia and Tanzania jointly own and operate a trucking fleet over this route with a projected capacity of about 12,000 tons of imports a month in mid 1979. Of this total about 78 percent or 9,360 tons was devoted to maize, wheat, and fertilizer. The ability of the fleet to sustain this level is subject to maintenance of the existing and rather old fleet of about 400 trucks plus the arrival of about 175 new trucks, and short-term sub-contracting of an additional 400 trucks from the private sector. (See Table 3, Zambia: Projected Import Capacity, TANZAM Highway.)

Operation over this route was disrupted in late 1979 by the destruction of the Mkushi bridge near Mkushi Boma. Trucks reportedly were still able to move by diverting to another crossing, but this again meant reduced speed and weight loads. Information was unavailable on the time required to repair this bridge. Clearly traffic over this route is subject to many variables, the majority of which are difficult to control.

C. Southern Route to the RSA

Prior to the closing of the border with Southern Rhodesia in the early 1970s, almost two thirds of Zambian external traffic was routed to Beira via Victoria Falls and then Salisbury. With the closure of the border-- in protest against the Rhodesian Unilateral Declaration of Independence (UDI), Zambian traffic shifted first to the Benguela Railway and then to TAZARA. With the emergency opening of the border to transit traffic through Zimbabwe-Rhodesia in late 1978, trafffic was rerouted to East London, a distance of about 3,500 km. This routing was made possible by the construction of a new link to the RSA by Rhodesian Railways after UDI. The estimated cost of importing a ton of maize over this route was US$ 78 in 1979 prices.

Imports over the former route to Mozambique in 1972 had totalled about 72,000 tons a month. Deterioration of both Zambian Railways-- especially a major rail bridge over the Kafue Gorge -- and Rhodesian Railways, as well as turn-around problems for rail cars, restricted the flow of imports over the route to East London. Although about 136,000 tons were transported over this route in late 1978, the projected tonnage of imports for early 1979 was about 25,000 tons a month. (See Table 4. Zambia: Projected Import Capacity, Southern Route to the RSA.)

Table 3

Zambia: Projected Import Capacity, TANZAM Highway

Assumption		Tonnage Monthly	MWF*	Annual
TZ-1)	Mid 1979 Projection with new trucks and subcontract	12,000	9,360	144,000
TZ-2)	TZ-1 minus new trucks	9,600	7,488	115,200
TZ-3)	Bridge outage, diverted traffic (TZ-1 base) (40% former capacity)	4,800	3,744	57,600
TZ-4)	Bridge outage diverted traffic (TZ-2 base) (40% former capacity)	3,840	2,995	46,080
TZ-5)	TZ-3 at 60% former capacity	7,200	5,616	86,400
TZ-6)	TZ-4 at 60% former capacity	5,760	4,446	69,120
TZ-7)	TZ-1 at 80% of capacity	9,600	7,488	715,200

*Monthly tonnage allocated to maize, wheat and fertilizer

Table 4

Zambia: Projected Import Capacity, Southern Route to RSA

Assumption		Tonnage Monthly	Tonnage MWF	Tonnage Annual
SR-1	1979 level first six months	25,000	19,165	300,000
SR-2	Projected 1979 level end of year	30,000	23,000	360,000
SR-3	SR-1 discounted to 60% for deterioration	15,000	11,500	180,000
SR-4	SR-1 discounted to 80% for deterioration	20,000	15,335	240,000

Efforts to solve some of the problems slowing traffic over this route were designed to increase monthly tonnage to 30,000 tons. Of this total about 23,000 tons were scheduled for maize, wheat, and fertilizer. Efforts to bring operations on this route to this level were interrupted, however, when the border was closed by Zimbabwe-Rhodesia in November to maize traffic destined for Zambia. This move was taken to exert pressure on the participants in talks then underway in London. One of the first acts of the transition government in mid December was to reopen the route to maize traffic. The first shipment of maize, estimated at about 92 tons, arrived at the Zambia border near the end of December 1979.

Operation over this route is threatened by several factors. System deterioration is likely to continue to be a problem for both rail lines. Even if and when international assistance is pledged for these lines, it will be some time before programs can be implemented and their impact can be felt. If hostilities should break out during the transition of Southern Rhodesia to independent majority rule, the RSA has threatened to close down the route. The willingness of the new government of Zimbabwe-Rhodesia to continue to permit transit traffic to use the route in the face of competing national needs is also uncertain.

D. Malawi/Mozambique

With the completion of the rail link between Lilongwe and Salima in Malawi, imports can now be sent by rail from Beira and Nacala to Lilongwe and then transshipped by truck to Lusaka. Theoretically this route has been open for some time without the new rail link, but the condition of the route and inefficiencies in operation and management of portions of the route have deterred its use for more than light traffic. Early in 1979 an agreement was reached by the GOZ with the Government of Malawi (GOM) to provide an allocation of up to 7,200 tons a month through Malawi from each of the ports of Beira and Nacala. This compares to a total external traffic in 1972 for Zambia through Malawi of 3,500 tons a month. The GOZ did not immediately take up the allocation to capacity. Enough trucks were believed to be available to handle the proposed allocations, but sustaining operations at this level was uncertain. Coordination problems were anticipated as well.

New locomotives for Malawi and Mozambique are planned for 1980. If delivery is made on these locomotives, import capacity over this route might be increased to 25,000 tons a month. This would require additional investment, however, as well as technical assistance. Further discussion of such investment is offered in Section IV. For the present, the capacity of this route is assumed to be a maximum

Table 5

Zambia: Projected Import Capacity
Via Malawi-Mozambique

Assumption		Tonnage Monthly	Tonnage MWF	Tonnage Annual
MM-1	Augmented 1972 level	5,250	500	60,000
MM-2	Maximum 1979 allocation	14,400	14,000	172,800
MM-3	Maximum capacity with new rail equipment and technical assistance	25,000	24,250	300,000

of 14,000 tons a month for maize, wheat, and fertilizer. Achievement of even this capacity level probably depends upon external assistance. (See Table 5. Zambia: Projected Import Capacity via Malawi/Mozambique.)

E. Composite Route Analysis

Analysis of projected import capacity for Zambia is greatly complicated by the large number of variables which can affect transport capability. The following analysis projects average monthly capacity for December 1979, for the first half of 1980, for the last half of 1980, and for each year through 1986. (See Table 6: Zambia: Projected Composite Import Capacity, 1979-1986). Although a general discussion of the assumptions involved in the model is provided below, a more detailed description of actual calculations is provided in the notes which follow the table.

The model assumes a simple population growth of 3 percent per year. Overall growth of the economy is kept static. Import capacity is discounted to allocations for maize, wheat, and fertilizer.

Four levels of demand are used:

- Demand 1: Current crisis needs for maize, wheat and fertilizer, plus restoration of domestic reserves of maize. Total of about 715,000 tons a year.
- Demand 2: Current crisis needs without restoration of reserves. Total of about 590,000 tons a year.
- Demand 3: Modified crisis needs without restoration of reserves. Total of 300,000 tons a year.
- Demand 4: Minimum demand to meet wheat and fertilizer needs. Total of 240,000 tons a year.

The assumptions used to project future capacity are optimistic. It is assumed that no additional events will intrude upon the operation of transport in the region. It also assumes that the restoration of currently disrupted service will happen within a minimal time frame. Actual performance may well be below the projected level.

The model predicts average monthly tonnage over time. This is also somewhat misleading in that timing is very essential to the supply of both food and fertilizer. The model, therefore, assumes optimal management of import flows and discounts the possibility of major system breakdown. These are, again, optimistic assumptions.

Table 6

Zambia: Projected Composite Import Capacity, 1979-1986
Average Monthly Tonnage

Route	Monthly Tonnage Food Imports	Dec 1979	Jan-June 1980	June-Dec 1980	1981	82	83	84	85	86
Benguela	-	-	1,354	2,500	2,500	2,500	5,000	6,250	6,250	10,200
TAZARA	15,600	1,950	3,900	6,240	10,000	19,500	19,500	19,500	19,500	19,500
TANZAM	9,400	2,995	2,995	3,744	5,616	7,488	9,360	9,360	9,360	9,360
Southern Route	23,000	3,710	23,000	19,165	15,335	15,335	19,165	23,000	23,000	23,000
Malawi/ Mozambique	14,000	5,060	5,000	5,000	10,000	10,000	14,000	14,000	14,000	14,000
Total Supply	62,000	13,655	36,249	36,649	43,451	54,823	67,025	72,110	72,110	76,060
Demand 1	59,600	59,600	61,388	61,388	63,230	65,127	67,081	69,093	71,166	73,301
Excess	2,400	-	-	-	-	-	-	3,017	944	2,759
Deficit	-	(45,945)	(25,139)	(24,739)	(19,779)	(10,304)	(56)	-	-	-
Demand 2	49,200	49,200	50,676	50,676	52,196	53,762	55,375	57,036	58,747	60,509
Excess	12,800	-	-	-	-	1,061	11,650	15,074	13,363	15,551
Deficit	-	(35,545)	(14,427)	(14,027)	(8,745)	-	-	-	-	-
Demand 3	25,000	25,000	25,750	25,750	26,523	27,319	28,139	28,983	29,852	30,748
Excess	37,000	-	10,499	10,899	16,928	27,504	38,886	43,127	42,258	45,312
Deficit	-	(11,345)	-	-	-	-	-	-	-	-
Demand 4	20,000	20,000	20,600	20,600	21,218	21,855	22,511	23,186	23,882	24,598
Excess	42,000	-	15,649	16,049	22,233	32,968	45,514	48,924	48,228	51,462
Deficit	-	(6,345)	-	-	-	-	-	-	-	-

NOTES FOR TABLE 6

Calculations given in this table are for a closed non-growth economy with an annual rate of population growth of 3%. No further hostilities or disruptions of service are assumed. Figures represent maximum capacity rather than actual tonnage and are calculated on the basis of average monthly tonnage per year.

Benguela

1979	-	No traffic on a regular basis
Jan-June 1980	-	Assumes regular traffic once a week and imports diverted to Lobito
June-Dec 1980	-	50% of assumption B-4
1981-1982	-	50% of assumption B-4
1983	-	Assumption B-4
1984-1985	-	Assumption B-5
1986	-	Assumption B-6 plus 200

TAZARA

1979	-	Route closed
1980	-	Repairs to bridges underway, increasing capacity (Assumptions T-3, T-4)
1981-1982	-	Assumption T-1, assumes repairs to all bridges completed and reconstruction of roadbed completed
1983-1986	-	Stabilization at assumption T-1

TANZAM

1979	-	Disruption due to bridges out, assumption TZ-4
Jan-June 1980	-	Assumption TZ-4
July-Dec 1980	-	Assumption TZ-3
1981	-	Assumption TZ-5
1982	-	Assumption TZ-7
1983-1986	-	Return to projected 1979 level (TZ-1)

Southern Route

1979	-	Closed
Jan-June 1980	-	Assumption SR-2
July-Dec 1980	-	Decline to assumption SR-1
1981-1982	-	Deterioration to SR-4
1983	-	Assumption SR-1
1984-1986	-	Assumption SR-2

NOTES FOR TABLE 6 (Continued)

Malawi/Mozambique

1979-1980 - Assumption MM-1
1981-1982 - Assumption MM-1 x 2
1983-1986 - Assumption MM-2

The model assumes that some imports will be delivered to Lobito in Angola and that imports over the Benguela Railway will reach an annual average of about 10,000 tons a month by 1986. This assumption indicates a much slower rate of investment impact than originally projected at the donors conference but seems a more realistic base in view of the complications involved in stabilizing service over this line.

Traffic over the Tanzam Corridor is assumed to be restored by 1983 to the 1979 projected level. No provision is made for increased capacity beyond this level until after 1986. This reflects uncertainties about future investment for this corridor.

Although traffic through Victoria Falls and Salisbury to the RSA is assumed to proceed without hos tilities, difficulties in maintaining this capacity are anticipated. Traffic through Malawi/ Mozambique is calulated to reach the 1979 allocation by 1983; this assumption is also optimistic and will probably be possible only with external assistance.

The model indicates that at Demand level 1, import capacity will remain in deficit until the mid 1980s. During 1984-1986 fluctuations can be expected around a dangerously low margin of 1,000 to 3,000 tons a month. The annual deficits during the early 1980s, moreover, are not added cumulatively to future import needs. This would only be possible (unless starvation and malnutrition are entered into the model) if there are major emergency efforts during each of these years.

Deficits persist for Demand level 2 with a large monthly margin expected by the mid 1980s.

Under the projections in Table 6, Zambia remains dependent upon its links to port facilities in the RSA. Initially this amounts to about 60 percent of import capacity. This declines to about 30 percent in 1986. Even assuming Demand levels 3 and 4, disruption of this route would create a serious problem until the mid 1980s. Dependence upon this route, moreover, has political costs which the GOZ might not wish to pay.

An alternate version of the model is shown in Table 7. The assumptions in this table are the same as those used in Table 6, except that traffic over the Benguela is eliminated and traffic via Malawi/Mozambique is discounted to a maximum of 5,000 tons of maize, wheat and fertilizer a month for 1986. This alternate involves deficits for all of demand levels 1 and 2 and shows declining excess capacity for levels 3 and 4 after 1984. This may still be an overly optimistic perspective, but it demonstrates the susceptibility

Table 7

Zambia: Alternate Composite Import Capacity, 1979-1986
Average Monthly Tonnage

Route	Monthly Tonnage Food Imports	Dec 1979	Jan-June 1980	June-Dec 1980	1981	1982	1983	1984	1985	1986
TAZARA	15,600	1,950	3,900	6,240	10,000	19,500	19,500	19,500	19,500	19,500
TANZAM	9,400	2,995	2,995	3,744	5,616	7,488	9,360	9,360	9,360	9,360
Southern Route	23,000	3,710	23,000	19,165	15,335	15,335	19,165	23,000	23,000	23.000
Malawi/ Mozambique	14,000	2,500	2,500	2,500	2,500	3,000	3,500	4,000	4,500	5,000
Total Supply	62,000	11,155	32,395	31,649	33,451	45,323	51,525	55,860	56,360	56,860
Demand 1	59,600	59,600	61,388	61,388	63,230	65,127	67,081	69,093	71,166	73,301
Excess	2,400	–	–	–	–	–	–	–	–	–
Deficit	–	(48,445)	(28,993)	(29,739)	(29,779)	(19,804)	(15,556)	(13,233)	(14,806)	(16,441)
Demand 2	49,000	49,200	50,676	50,676	52,196	53,762	55,375	57,036	58,747	60,509
Excess	12,800	–	–	–	–	–	–	–	–	–
Deficit	–	(38,045)	(18,281)	(19,027)	(18,745)	(8,439)	(4,123)	(1,176)	(2,387)	(3,649)
Demand 3	25,000	25,000	25,750	25,750	26,523	27,319	28,139	29,983	29,852	30,748
Excess	37,000	–	6,645	5,899	6,928	18,004	23,386	26,877	26,508	26,112
Deficit	–	(13,845)	–	–	–	–	–	–	–	–
Demand 4	20,000	20,000	20,600	20,600	21,218	21,855	22,511	23,186	23,892	24,598
Excess	42,000	–	11,795	11,049	12,239	23,468	29,014	32,674	32,478	32,262
Deficit	–	(8,845)	–	–	–	–	–	–	–	–

(See Table 6 Notes for primary assumptions in addition to adjustment noted in text)

of the Zambian economy to any change in its system of linkages to the outside world.

Both versions of the model have been based on assumptions of a static economy with marginal population growth of 3 percent per year. Movement of the rural population to urban areas is not included, and higher population growth in urban areas is not taken into account in the model. Various estimates of import needs for the year 2,000-- using less static assumptions-- indicate total import needs ranging from 150,000 tons to 200,000 tons a month. Even if total primary route capacity were expanded to the greatest extent possible as shown below, there would still be a deficit ranging from 18,000 tons to 68,000 tons a month.

	Maximum Capacity
Benguela	17,000 tons monthly
TANZAM Corridor	70,000 tons monthly
Southern Route	30,000 tons monthly
Malawi/Mozambique	25,000 tons monthly
Total Supply	142,000 tons monthly

Such import capacity expansion, moreover, would be possible only with major investment in each route over the next fifteen years in order to ensure maximum capacity level for the year 2000. Distribution problems, especially for Zambia Railways, would still represent a major constraint. This suggests a need for development of the trucking industry as well as additional rail infrastructure. This suggestion is discussed somewhat more fully in Section IV.*

* In January 1980, information was received about additional damages to rail and road briges in Zambia. A brief table with this information is provided at the end of this report as Annex II. The range of damage indicated seriously undermines projected import capacity for 1980.

Section III

Route Options

A. Introduction

The above analysis of projected flows for Zambian imports over existing links to port facilities demonstrates the inadequacy of these links to meet either short term needs for essential commodities or long term development needs. Efforts to alleviate these problems will have a delayed impact and will still leave a shortfall in total capacity. The development of eastern links through the northern corridor of Mozambique to port facilities at Beira and Nacala, therefore, is proposed as a transport alternative to existing routes.

Theoretically there are at least ten route options which could provide transit from Lusaka to either Beira or Nacala. (See Figure B. Zambia/Mozambique Composite Route Options.) Economically feasible operation over these routes would require selective upgrading on certain sections, increased maintenance, upgrading of storage and handling capacities, and associated coordination and planning activities. (More detailed consideration of these activities is given in Section IV). For the purpose of route analysis, however, discussion is limited to one contingency route and the four least costly routes based on distance and required investment. (See Table 8. SUMMARY: Northern Corridor Route Options by Mode and Distance)

Development of the northern corridor routes to Beira and Nacala is dependent upon intermodal traffic, using a mix of road and rail routes. The contingency route and one of the four route options discussed (option D) rely on road transport alone. However, they give access only to Beira. The other routes are keyed to rail service and can reach either port facility.

B. Selected Route Option Analysis

1. Route Options A and AA, Lusaka/Nacala

Route Option A is an intermodal link from Lusaka to Nacala (See Figure C. Zambia/Mozambique: Route Option A) with a total distance of 1,102 miles. Of the total, 464 miles or about 42 percent are by road and the remainder are by rail. Intermodal transfer takes place at Lilongwe.

Route segments A1 and A2 (See Table 9. Zambia/Mozambique:

Table 8

SUMMARY: Northern Corridor
Route Options by Mode & Distance (miles)

Option	Road	Rail	Total
Contingency	1,226	---	1,226
Option A	394	708	1,102
Option B	394	535	929
Option C	585	401	986
Option D	875	---	875

TABLE 9. Zambia/Mozambique: Northern Corridor, Primary Route Options
Route Option A - Lusaka/Nacala

Number	Segment	Mileage	Mode	Comments
A-1	Lusaka to Chipata	374	Road	paved standard, spot repairs needed but but acceptable early 1979
A-2	Chipata to Mchinji	20	Road	paved standard, spot repairs needed
A-3	Mchinji to Lilongwe	70	Road	newly paved, possible increase in handlin and storage facilities
A-4	Lilongwe to Salima	86	Rail	newly constructed line, good condition
A-5	Salima to Balaka Junction	130	Rail	acceptable condition
A-6	Balaka Junction to Border	55	Rail	acceptable condition
A-7	Border to Nacala	367	Rail	in need of upgrading, needs additional appraisal for long term use. Port keyed to containers so will need additional facilities for cereals and fertilizer.
		1,102		

Northern Corridor Primary Route Options, Route Option A. Lusaka/ Nacala) are well constructed paved roads. Recent rains have left these roads in need of some spot repairs. Increased utilization will necessitate upgrading maintenance operations for these two segments.

Route segment 3 is a newly paved road leading to Lilongwe. Storage facilities at Lilongwe are not suitable for bagged cargo but considerable direct handling could be maintained. There are excess storage facilities in Balaka, but this would require a longer route by truck. Moreover, Malawi would probably prefer to use Lilongwe for transit traffic in order to maximize the return on its investment.

The remainder of the railway through Malawi (Segments 4 and 5) is adequate for the projected traffic, at least in the short run. Priorities related to switching and yard facilities may need to be given further considerations.

The condition of the rail link through Mozambique (Segment 6) to Nacala is uncertain. Unconfirmed reports indicate that the line may need upgrading in order to handle major increases in traffic levels. Additional information is needed before a full appraisal can be made. There is only a small amount of storage capacity in Nacala. The port was developed primarily as a container port, and there are no facilities for handling bulk cereals. Assistance in management is also needed to prevent port congestion.

Route Option AA is basically the same as Route Option A except that it would use the new rail link to Mchinji nearing completion under assistance from the Canadian International Development Agency (CIDA). The opening of this line has been delayed and is now scheduled for 1980/81. (See Figure D. Zambia/ Mozambique: Route Option AA.) The route runs for about 1,102 miles, of which 394 miles or 36 percent is by road. (See Table 10. Zambia/Mozambique: Northern Corridor Primary Route Options, Route Option AA, Lusaka/Nacala.)

2. Route Options B and BB, Lusaka/Beira

Route Option B is an intermodal link from Lusaka to Beira. (See Figure E. Zambia/Mozambique: Route Option B.) The route runs a total of 929 miles of which 464 miles or 50 percent are by road. The remainder are by rail. Intermodal transfer takes place at Lilongwe. (See Table 11. Zambia/Mozambique: Northern Corridor Primary Route Options, Route Option B, Lusaka/Beira.) Route segments 4 and 5 are within Malawi and are in relatively good condition. Segments 6 and 7 run from the border of Mozambique to the port at

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4. Project Components

A brief summary of the elements included under each project

TABLE 10. Zambia/Mozambique: Northern Corridor, Primary Route Options
Route Option AA- Lusaka/Beira

Number	Segment	Mileage	Mode	Comments
AA-1	Lusaka to Chipata	374	Road	paved standard, spot repairs needed
AA-2	Chipata to Mchinji	20	Road	paved standard, spot repairs needed, need for handling and storage facilities at Mchinji.
AA-3	Mchinji to Salima	156	Rail	newly constructed line, open by 1980/81
AA-4	Salima to Balaka Junction	130	Rail	acceptable condition
AA-5	Balaka Junction to Border	55	Rail	acceptable condition
AA-6	Border to Nacala	367	Rail	in need of upgrading, needs additional appraisal for long term use
		1,102		

the employment generated by the project also depends on government policies and the implementation of regulations governing truck

3. Selection of Sub-projects

TABLE 11. Zambia/Mozambique: Northern Corridor, Primary Route Options
Route Option B - Lusaka/Beira

Number	Segment	Mileage	Mode	Comments
B-1	Lusaka to Chipata	374	Road	
B-2	Chipata to Mchinji	20	Road	
B-3	Mchinji to Lilongwe	70	Road	newly paved
B-4	Lilongwe to Salima	86	Rail	newly constructed line, good condition
B-5	Salima to Vila Nova da Fronteira	131	Rail	relatively good condition
B-6	Vila Nova da Fronteira to Dona Ana	32	Rail	acceptable short term but assessment of condition is needed
B-7	Dona Ana to Beira	216	Rail	acceptable short term but assessment of condition is needed, need to upgrade handling and storage at Beira
		929		

Beira. The condition of these routes is acceptable for short term capacity use, but maintenance problems may be developing. Storage facilities at Beira are adequate but do not provide for bulk handling of cereals. Bagged cargo is handled relatively well, and there is no major problem with congestion.

Route Option BB is basically the same as B but, as in the case of Route Options A and AA, it would use the new rail link nearing completion. Transshipment would take place, therefore, at Mchinji. (See Figure F. Zambia/Mozambique: Route Option BB.) The route runs 929 miles of which 394 miles or about 42 percent are by road. (See Table 12: Zambia/Mozambique: Northern Corridor Primary Route Options, Route Option BB, Lusaka/Beira.) The remainder of the route segments match those under Route Option B.

3. Route Option C. Lusaka/Beira

Route Option C is an intermodal link from Lusaka to Beira. (See Figure G. Zambia/Mozambique: Route Option C.) The route runs a total of 986 miles of which 585 miles or almost 60 percent are by road. The remainder are by rail. Intermodal transfer takes place at Moatize.

Route segment 1 is paved standard road in relatively good condition but with the need for some spot repairs. (See Table 13: Zambia/Mozambique: Northern Corridor Primary Route Options, Route Option C, Lusaka/Beira.) Segments 2 and 3 are partially improved roads which are being improved to paved standard. The GOZ has reportedly started work on Segment 2 but needs assistance in order to complete the route. Segment 3 is reportedly more close to completion. Segment 4 is reportedly completed.

Storage facilities at Moatize will need to be upgraded, but there are some handling facilities. The GOM is interested in developing this route because of adjacent coal deposits. The projected volume of grain imports and coal exports would seem to justify investment in this route option. It would also take pressure off of Malawi Railways, facilitating a higher import capacity for Zambia.

Segments 4 and 5 are believed to be in acceptable condition for at least short term use. Storage and handling facilities at Beira will need to be upgraded as discussed under Route Option B.

4. Route Option D. Lusaka/Beira

Route Option D is a single mode link from Lusaka to Beira. (See Figure I: Zambia/Mozambique: Route Option D.) This road route

TABLE 12. Zambia/Mozambique: Northern Corridor, Primary Route Options
Route Option BB - Lusaka/Beira

Number	Segment	Mileage	Mode	Comments
BB-1	Lusaka to Chipata	374	Road	paved standard, spot repairs needed but acceptable end 1979
BB-2	Chipata to Mchinji	20	Road	paved standard, spot repairs needed
BB-3	Mchinji to Salima	156	Rail	new route available only in 1980/81, see option A for immediate routing; need to upgrade handling and storage
BB-4	Salima to Vila Nova da Fronteira	131	Rail	relatively good condition
BB-5	Vila Nova da Fronteira to Dona Ana	32	Rail	acceptable short term but assessment of condition is needed
BB-6	Dona Ana to Beira	216	Rail	acceptable short term but assessment of condition is needed, need to upgrade handling and storage at Beira
		929		

TABLE 13. Zambia/Mozambique: Northern Corridor, Primary Route Options
Route Option C - Lusaka/Beira

Number	Segment	Mileage	Mode	Comments
C-1	Lusaka to Katete	323	Road	paved standard, spot repairs needed but acceptable end 1979
C-2	Katete to Cassacatiza	25	Road	road under construction to paved standard start-up reported but progress uncertain and assistance needed. Closed wet season
C-3	Cassacatiza to Bene	85	Road	paving reportedly nearly completed, possible assistance needed.
C-4	Bene to Moatize	152	Road	paving reportedly completed, storage and handling facilities need upgrading
C-5	Moatize to Dona Ana	185	Rail	acceptable short term
C-6	Dona Ana to Beira	216	Rail	acceptable short term, need to upgrade handling and storage at Beira
		986		

runs a total of 875 miles. Segments 1, 2, and 3 are the same as those used for Route Option C. (See Table 14: Zambia/Mozambique: Northern Corridor Primary Route Options, Route D. Lusaka/Beira.) Segment 4 diverts to Tete instead of Bene. Segment 5 and 6 are over paved standard main road. There may be need for spot repairs to these two segments. As stated under Route Option C, storage and handling facilities need upgrading at the port of Beira.

5. Route Option E. Contingency Route Lusaka/Beira

Route Option E is a contingency road route running from Lusaka to Beira. (See Figure I. Zambia/Mozambique: Route Option E.) This route is the longest of the options, running 1,226 miles. Segments 1,2, and 3 are the same as for Route Option A. The route continues by road, however, from Lilongwe to Blantyre (Segment 4). The segment is paved but in need of repairs. Overlays and short section rehabilitiation are planned for 1980. (See Table 15: Zambia/Mozambique: Northern Corridor Primary Route Options, Rouce Option E, Contingency Route Lusaka/Beira.)

Segment 5 runs from Blantyre to Zobue. This segment is paved only to the airport. It is very narrow as well and needs some overlay work. The remainder of the segment is improved road in need of paving. Passability in wet weather is not certain. Segments 6 and 7 run from Zobue to Beira. These two segments are the same as for Route Option D.

This route presents a contingency option for use during dry weather and possibly during the wet season until the road from Katete to Cassacatiza is completed. Although the first half of the route is somewhat shielded from possible impact should hostilities occur in Zimbabwe-Rhodesia, the last half of the route is just as vulnerable as other options. The route would allow for direct road haulage without intermodal transfer. This could be an initial advantage until storage and handling facilities for the intermodal routes are upgraded. The greater distance of the route makes it a more expensive option than the others discussed and it clearly should be considered only as a temporary option.

TABLE 14 . Zambia/Mozambique: Northern Corridor, Primary Route Options
Route Option D - Lusaka/Beira

Number	Segment	Mileage	Mode	Comments
D-1	Lusaka to Katete	323	Road	paved standard, spot repairs needed but acceptable early 1979
D-2	Katete to Cassacatiza	25	Road	road under construction to paved standard start-up reported but progress uncertain and assistance needed. Closed wet season.
D-3	Cassacatiza to Bene	85	Road	paving reportedly nearly completed, possible assistance needed
D-4	Bene to Tete	91	Road	paving reportedly completed
D-5	Tete to Chimoio	235	Road	paved standard, spot repairs needed
D-6	Chimoio to Beira	116	Road	paved standard, spot repairs needed; Storage and handling facilities needed for Beira
		875		

TABLE 15. Zambia/Mozambique: Northern Corridor, Primary Route Options

Route Option E, Contingency Lusaka/Beira

Number	Segment	Mileage	Mode	Comments
CNT-1	Lusaka	374	Road	paved standard, spot repairs needed but acceptable early 1979
CNT-2	Chipata	20	Road	paved standard, spot repairs needed
CNT-3	Mchinji to Lilongwe	71	Road	newly paved
CNT-4	Lilongwe to Blantyre	222	Road	paved standard but in need of repairs overlays and short section rehabilitation scheduled for 1980
CNT-5	Blantyre to Zobue	63	Road	paved to airport only, needs widening as well as some major overlay work. Remainde of distance to Zobue needs paving.
CNT-6	Zobue to Chimoio	351	Road	paved standard, spot repairs and possible overlays needed.
CNT-7	Chimoio to Beira	125	Road	paved standard, spot repairs and possible overlays needed
		1,226		

Section IV

Project Development

The following discussion presents a preliminary design for an intermodal regional transport development project serving Zambia, Malawi, and Mozambique. The project is keyed to the development of coastal links between Zambia and the ports of Beira and Nacala in Mozambique using a mix of road and rail transport. Project components include selected upgrading of key roads, construction of handling and storage facilities, and a wide range of technical assistance activities, from grain transportation management to road and vehicle maintenance. Although the project is designed to be self-contained, interest in other projects relevant to this project has been expressed by other donors. Coordination with such interests will be an essential aspect of project development.

The discussion is divided into three major sections: Project Description, Project Design Issues, and Estimated Project Cost. In some cases, specific information was unavailable or conditions were subject to change. A complete, up-to-date assessment of these factors cannot be made without field work. In such cases an effort has been made to indicate the kinds of information needed.

A. Project Description

1. Historical Framework

Investment in transport in Southern Africa during the colonial period was keyed to the movement of mineral and agricultural products for export. Except in certain coastal areas, there were few East-West links; most traffic flowed South to the ports in the RSA by rail. Rail service to coastal facilities in Mozambique, for example represented point to-point links rather than a unified system. Linkage between these lines either did not exist or passed through another territory. Roads were especially undeveloped.

The establishment of independent states in the region left six landlocked countries for whom access to port facilities was available only by means of rail links through neighboring countries. After independence, most countries in the region initiated major investment programs in road transport. The effect of these programs, however, has been offset by increasing maintenance requirements, high construction costs, and the lack of balanced development between primary and secondary roads. As rail service capacity has declined, road service has been increasingly restricted by inadequate road maintenance, equipment maintenance, and maintenance of transport vehicles.

Zambia is one land-locked state whose economy is currently in crisis due to a combination of social and political factors. Existing links to the traditional port of Beira have been disrupted by the closure of borders with Rhodesia. The alternate access route over the Benguela Railway has also been effectively closed by guerrilla activity. The Tanzam corridor has failed to reach its projected transport capacity and has been seriously damaged during recent hostilities.

At the same time, the ability of Zambia to provide for its own food needs has been weakened by demographic shifts, drought, and failure to receive fertilizer imports. An economy already in deficit with regard to food now finds that production of its basic staple, maize, will be insufficient to meet even the most basic needs of its population in the coming years. Thousands of Zambians are malnourished and hungry today; unless emergency efforts can alter the situation, deprivation will become starvation in the near future.

In 1976, the Congress of the United States instructed USAID/W to investigate opportunities for a U.S. assistance program in Southern Africa. In response to this request, AID/W established the Southern Africa Development Analysis Project (SADAP). The analysis undertaken in this project revealed the key role of transport sector constraints on the economic activity of all other sectors and on regional development. SADAP recommended support of regional transport sector projects and multi-donor cooperation in project development and funding. Subsequent analysis suggested a strategy for assistance to the transport sector and identified potential regional and country projects.

The project to promote the development of road/rail links between Zambia and the northern ports of Mazambique has been prepared using this analytic approach. The regional structure of the proposed project is clearly consistent with the overall SADAP Strategy. The project also attempts to provide assistance within the context of activities by other donors, particularly the European Economic Community, the IBRD, UNCTAD, and other bilateral donors such as CIDA.

2. Project Justification

The primary purpose of this project is to increase the Zambian import capacity for food and fertilizer through the development of intermodal linkage with port facilities at Beira and Nacala in Mozambique. This will improve the ability of the country to increase the supply of food for its people both qualitatively and quantitatively. The project addresses both short- and long-term imbalances in import capacity and domestic food supply, the most essential of basic human needs.

In addition to supporting import capacity for food and fertilizer, the project will facilitate development of commerce, mining, and manufacturing, which are not presently constrained by the transport sector. Long range development could also facilitate imports of spare parts as well as provide export earnings to pay for such parts. Upgrading the transport planning capabilities of the country will help to orient decision-making in the long run toward making a maximal impact on indigenous sectoral needs.

Increased linkage to the ports of Mozambique will reduce regional dependence upon the RSA and promote regional development on both a conceptual and practical basis. Increased import flows and more reliable distribution can be expected to increase interest in investment and further assistance to the region. Improved regulation of regional road traffic will aid regional flows of goods and may also reduce road damage resulting from excessive loads. The ability of this project to mesh with multi-donor interests could serve as a stimulus for further multi-donor cooperation on regional development.

The inability of Zambia Railways to meet either the present or future demands for internal distribution is a major justification for investment in an alternate mode of transport. Out of a total estimated import/export capacity of 5,180,000 tons for Zambia Railways in 1979, only 590,000 tons or about 11 percent was available for imports. (See Table 16. Zambia Railways: Projected Annual Traffic Levels at Capacity 1979/1984.) Of this, food and fertilizer represented only about 350,000 tons. This represents an average monthly capacity of only about 29,200 tons compared to the projected monthly demand of 59,600 tons. Even allowing for 9,400 tons moving on the Tanzam Highway, there would still be a shortage of 21,000 tons a month. Thus in order to handle the projected needs for 1979, Zambia Railways would have to increase its import capacity devoted to food and fertilizer by 72 percent.

The IBRD is presently negotiating a project to assist Zambia Railways which may increase operating capacity by 15 percent by 1984. Capacity devoted to imports, however, would only be increased by about 270,000 tons a year by 1984. Assuming a proportionate allocation to food and fertilizer, Zambia Railways capacity for food and fertilizer would only be increased by about 13,350 tons a month in 1984. Total monthly capacity for food and fertilizer on Zambia Railways would then be 42,550 tons. Assuming traffic over the TANZAM Highway of 9,350 tons a month, total average monthly import capacity for food and fertilizer would be 51,900 tons. This compares to a projected demand level in 1984 of 69,100 tons.

Table 16

Zambia Railways: Projected Annual Traffic Levels at Capacity 1979/1984 (000 tons)

Class	Local	% of Total	Export	% of Total	Import	% of Total	Transit/ Zaire	% of Total	Total Foreign	% of Total	Total Traffic
1979	3,380	65%	840	16%	590	11%	370	7%	1800	35%	5180
1984	3,600	60%	1120	19%	860	14%	390	7%	2370	40%	5970
Absolute Increase	220	28%	280	36%	270	34%	20	2%	570	72%	790
Percent Increase	7%		33%		46%		5%		32%		15%

Note : All figures rounded

SOURCE: Raw data for calculations taken from preliminary draft project appraisal report, IBRD, Washington.

The IBRD estimates, moreover, that an additional U.S. $ 200 million in investment is needed over the period 1984/1989 just to meet the normal annual increase in demand of 3 to 4 percent. Without this investment, rail capacity would fall even further into deficit. Recent reports from Zambia, moreover, indicate that there will be delays in negotiations for the new IBRD loan and that the deterioration of the Zambian Railways is meanwhile increasing.

3. Problems to be Addressed by the Project

Food Supply. The most immediate problem to be solved by the project is food supply for Zambia. Increased food and fertilizer imports will be used to help meet the present situation, expected to last through the mid-1980s, and will provide a basis for expanded capacity to meet needs throughout the decade.

Handling and Storage. The distribution of food and fertilizer imports is significantly hindered by cargo handling and storage problems. This is due both to inadequate amounts of equipment and facilities and to inefficient use of the existing equipment, facilities and manpower. Investment is needed at the ports, at the points of intermodal transfer, and at three sites in Zambia.

Traffic Coordination. In order to build capacity over the northern corridor routes to a significant level, considerable attential will have to be given to the coordination of import flows through the three project countries. Standardization of procedures and reduction of delays at border crossings will be facilitated through such activity.

Road Maintenance. The substantial investment in road development already made in the three countries could easily deteriorate as a result of inadequate maintenance or excessive axle loads. Assistance needs to be given to the existing inspectorate system to expand supervision of truck transport to the railheads and to facilitate maintenance operations.

Upgrading of Selected Roads. The project will assist one major construction project and will upgrade existing roads at points where maintenance problems are recurrent.

Intermodal Linkage. Consideration will be given to both short and long run problems of intermodal linkage. An assessment of investment needs for expanded capacity is included.

Land-locked States and Regional Dependence. The provision of East/West linkages for Zambia will help to reduce its dependence on the RSA and to promote a regional perspective in the three project countries. This is likely to affect both transport and commerce, and is also expected to influence decisions by foreign donors and investors.

Route Option B is an intermodal link from Lusaka to Beira. (See Figure E. Zambia/Mozambique: Route Option B.) The route runs a total of 929 miles of which 464 miles or 50 percent are by road. The remainder are by rail. Intermodal transfer takes place at Lilongwe. (See Table 11. Zambia/Mozambique: Northern Corridor Primary Route Options, Route Option B, Lusaka/Beira.) Route segments 4 and 5 are within Malawi and are in relatively good condition. Segments 6 and 7 run from the border of Mozambique to the port at

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4. Project Components

A brief summary of the elements included under each project component is given below:

1. Cargo Handling and Storage

- Construction of warehouse or handling facilities at 5 major points in the system (two ports, two intermodal transfer points, Lusaka), and at two regional distribution centers in Zambia.

- Procurement of associated handling equipment

- Technical assistance and training in equipment operation and cargo management

2. Truck Transport Development

- Technical assistance in transport coordination and regulation

- Technical assistance in vehicle operation, management, and maintenance

3. Road Upgrading

- Assistance with completion of Katete/Cassacatiza Road

- Selected spot improvements

- Technical assistance and training in road maintenance and repair

5. Project Beneficiaries

The direct beneficiaries of the project will be the population of Zambia as a whole, as well as workers involved in transport, handling, or storage of food and fertilizer imports carried over the route and exports returned to Malawi and Mozambique for local use or transfer to port facilities. Once capacity reaches the project targets, traffic over this route would also generate benefits to associated service facilities along the route. Indirect benefits will come to the population of Malawi and Mozambique as a result of tariffs charged for transit of goods to and from Zambia.

The extent to which the project will improve equity is not immediately obvious. In part this will depend on food distribution policies in Zambia. The extent to which equity will be enhanced by

TABLE 1(

Number	Segmer
AA-1	Lusaka
AA-2	Chipat
AA-3	Mchinj
AA-4	Salima Junctio
AA-5	Balaka Border
AA-6	Border

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the employment generated by the project also depends on government policies and the implementation of regulations governing truck transport over the route.. Transport projects in other regions provide example in which benefits from transport development passed to the more aggressive entrepreneurs in a country, attracted to the project area as a result of increased opportunities for profit, rather than to the local population in the project area.

Lack of entrepreneurial skills is an important constraint on participation in project benefits. Other potentially significant factors include licensing, fees, and operating costs. This aspect of the project should be given explicit consideration in project design.

B. Project Design Issues

Seven design issues should be addressed in the project preparation process. This is due partly to a need for additional information from the field. It also reflects the unstable political situation in the area, especially with regard to Zimbabwe Rhodesia. Project components may need to be adjusted in terms of both size and cost as a result of additional information.

1. Route Selection

On the basis of the information presented in section III, the most likely short-term routing would be Route Option A and B. With the opening of the road to Cassacatiza, the preferred routing will be Route Options A for Nacala and Route Options B and C for Beira. Access to Beira can also be supplemented with Route Option D. Cost will be an important consideration in the use of route option D, but it provides additional or alternate capacity to rail routes.

2. Route Capacity

Space allocated by Malawi Railways for imports destined for Zambia amounts to about 7,500 tons monthly from each port to Lilongwe in Malawi. Import flows, however, have not yet reached this level. Damage to the two bridges on the route caused by Rhodesian security forces have slowed import flows temporarily. The goal of this project is to increase import capacity over this route to 25,000 tons a month by road/rail. An additional 5,000 to 10,000 tons a month may move by road once the road to Cassacatiza is opened, but port capacity may be a constraint on achieving this capacity level.

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3. Selection of Sub-projects

The major upgrading project is the road from Katete to Cassacatiza. Other improvements over short distances will be included in order to upgrade overall route capacity, reduce maintenance costs, and protect the routes from deterioration. Additional information is needed in regard to the status of work already underway on the link. Construction and engineering assessments may be needed for the selection of other sub-projects.

Food storage facilities for the project will be located at the two ports, the two intermodal transfer points, and three points in Zambia, one of which has been designated as Lusaka. These facilities are designed to facilitate transport of food supplies into Zambia and then to regional storage facilities. The EEC and FAO have expressed interest in a national grain storage facility project. The final location of project facilities will depend upon existing and projected needs. Storage facilities are into seen as long term holding areas, but rather are keyed to rapid shipments from ports to distribution points. The size of facilities can only be roughly estimated and adjustment may be required with additional information.

4. Maintenance and Recurrent Costs

Routes within Zambia and Malawi are relatively new and are in acceptable condition. Additional information is needed about routes in Mozambique. Technical assistance will advise incorporation of routing use into existing maintenance programs, especially considering maintenance projects already proposed for Zambia and possible assistance for Mozambique in the same area. Recurrent costs may require additional consideration.

5. Economic Feasibility

This project is designed to meet an emergency situation with respect to food supply, a basic human need. It may well not be possible to assign an economic value to the short-run consequences of the project, especially when there is a high degree of uncertainty regarding the viability of alternatives. Nevertheless, it is clear that the cost of a "no-action" alternative is unacceptable in human terms and may have far-reaching economic implications for the region as well. The project is designed to capitalize to the greatest extent possible on existing and planned investments, to relieve bottlenecks, to ensure a steady flow of imports in volumes that will permit Zambia to move toward greater self-sufficiency in food, and to promote intra-regional exchange. While the primary justification of the project is social need, economic benefits will also flow from the increased efficiency of road maintenance and goods handling and from the employment generated by the project.

6. Regional Versus National Objectives

Regionalism has not been particularly successful in Southern Africa, but developments in recent months indicate a new awareness among countries in the area of the needs and benefits of regional cooperation. Most certainly this project cannot succeed without a commitment to cooperative development of intermodal road/rail transport by the recipient countries. The recent expression of enthusiasm for regionalism at the Arusha Conference must be followed by policy, institutional, and resource commitments by the recipient countries. Such commitment may require the sacrifice of certain national priorities. The demonstrable benefits of the project make such a sacrifice more likely than in more intangible fields such as education. Care must be taken, however, to ensure that the regional approach inherent in the project is supported by the recipient countries and is not imposed by the donors.

7. Vehicle Availability

Preliminary estimates for 1979 indicated that there was a sufficent quantity of trucks in Zambia including publicly owned trucks and private trucks available through short term contract, to handle projected needs for imports over the northern corridor route for 1979. The extent to which the vehicle fleet has deteriorated since then is not known. Trucks displaced to connect with TAZARA as a result of bridge damage in late 1979 may have also drained away available vehicles. It is assumed that there will be sufficient vehicles in service by the time of project start-up to handle initial needs on the Northern Corridor route. CIDA has expressed an interest in supplying additional trucks should there be a deficit of vehicles. Vehicle availablitiy needs to be verified and kept current in order to ensure effective project implementation.

8. Multi-Donor Cooperation and Coordination

Although the project is designed to be self-contained, other donor activity which will affect the project should be taken into account. Possible assistance by the IBRD for Zambia Railways and for a road maintenance program should be considered, as well as possible projects in food storage by the EEC or FAO. Moreover, CIDA might be willing to assist with the purchase of additional trucks and spare parts. Additional discussion with such donors should be undertaken before final project design is completed. Communication with other donors during the implementation stage of the project will also be necessary.

The regional nature of the project clearly indicates the need for communication with and between the recipient governments.

This activity should take place both during the design stage and during the implementation stage. Coordination between the various project components will also be necessary and should be carefully considered in the final project design.

C. Estimated Project Costs

Total project costs are estimated at about U.S. $24 million. A breakdown of costs by country and component is given in Table 17: Estimated Total Project Cost by Country and Component. The figures given in the table are strictly preliminary and are expected to undergo considerable adjustment as the project design is completed. The assumptions on which they are based are specified in the footnotes following the table. These assumptions will need to be updated as the project is revised in the future.

D. Proposed Project Schedule

The following schedule shows estimated dates for the design and implementation of the proposed project.

Draft Position Paper	May 1980
Donor Consultation	June 1980
PID completed	August 1980
PID approved	October 1980
Grant authorization executed	December 1980
Prequalifying notices to Technical Assistance Contractors and AID Facilities/Equipment Specifications	January 1981
Short List of Technical Assistance Contractors and go out for Facilities/Equipment Bid	April 1981
Insurance PFPS	May 1981
Selection of Technical Assistance Contractors and Facilities/Equipment Bid	August 1981
Negotiations and Awards	September 1981
Short term Technical Assistance	October 1981

Selection of Facilities/Equipment Contractors	November 1981
Complete construction	July 1982
Complete technical assistance	October 1983

Total project cost is estimated at US$ 170 million for a three year period. Of the total, about 23 percent is for Truck Transport Development, about 36 percent is for selective upgrading of roads. Cost figures include project design and associated studies and engineering as well as physical and price contingencies. (See Table 1, Estimated Total Project Cost by Country and Component.)

B. Investment Options for Road Transport

1. Component Approach - The project design for a truck transport project in the region is keyed to an integration of several needs of the transport systems in Southern Africa on a regional basis. As an alternative, investment could be made in one component of the project such as maintenance or handling and storage facilities without parallel development of the other components. Clearly development of a truck fleet has little value without at least selective upgrading of key routes. The coordination of transit traffic would also have to be assisted. Deterioration of the roads selectively upgraded because of inadequate maintenance and major backlogs of or damage to cargo could counterbalance the productivity of investment made in just trucking and road upgrading. The adoption of an approach which integrates all relevant components, therefore, seems not only rational but essential.

2. Country Approach - Traditionally donors have been tied to the development of country programs and have seldom keyed assistance to a regional strategy. The development of regional transport links, however, by definition implies a perspective which transcends assistance to just one country. The systemic nature of the transport sector and the dilemma of the land-locked states in Southern Africa erodes the utility of country programming.

3. Donor Assistance - The very scale and scope of the proposed project suggests the necessity for multi-donor funding. No one donor can be expected to carry the cost of the project. Equally important is the range of donors who can offer valuable experience in assistance to transport development in the region. A wide base of donor support for the project is suggested.

4. Economies of Scale - The economies of scale involved in implementing transport projects indicate the greatest return on investment would come from a project of the size proposed. Project costs could be cut by adopting a preliminary phase to be followed by increased investment or the overall dimensions of the project could be reduced. The feasibility of such a project needs additional assessment but should be considered in the case of a

Table 17

Estimated Total Project Cost by Country and Component
(US $ 000)

Component	Regional	Zambia	Malawi	Mozambique	Total
1. Truck Transport Development					
Technical assistance/Training	360	235	-	360	955
Vehicle maintenance center	-	350	-	350	700
Equipment	115	-	-	-	115
Subtotal #1	475	585	-	710	1,770
2. Cargo Handling and Storage					
Technical assistance/Training	325	215	135	450	1,125
Warehouse/loading facilities	-	750	450	650	1,850
Handling equipment	-	360	200	430	990
Subtotal #2	325	1,325	785	1,530	3,965
3. Selective Upgrading					
Technical assistance/training	360	-	-	-	360
Contract upgrading/materials	-	10,000	-	2,500	12,500
Subtotal #3	360	10,000	-	2,500	12,860
4. Project Design Studies and Engineering	200	350	-	250	800
Subtotal #1-4	1,360	12,260	785	4,990	19,395
5. Contingencies					
Physical (10%)	105*	1,226	78	500	1,909
Price (15%)	160*	1,839	117	745	2,861
Subtotal #5	265	3,065	195	1,245	4,770
PROJECT TOTAL (#1-5)	1,625	15,325	980	6,235	24,165

*Adjusted down to 8% and 12% for the region. Figures rounded in certain cases.

NOTES FOR COSTING TABLE 17

REGIONAL

1.a. 1 Chief of Party/Truck Transport Specialist for 2 years
1 Transport Regulation Specialist for 2 years
4 x 90,000 = 360,000

1.c. 4 Inspectorate vehicles, radios, additional equipment

2.a. 1 Cargo Handling Specialist for 2 years
1 Intermodal Transport Specialist for 1 year
1 Short term Specialist in Grain Handling for 6 months
3 x 90,000 = 270,000
6 x 9,000 = 54,000
324,000

3.a. 1 Road Engineer for 2 years
1 Road Maintenance Specialist for 2 years
4 x 90,000 = 360,000

ZAMBIA

1.a. 1 Vehicle Maintenance Specialist for 2 years
1 Short term Maintenance Training Specialist for 6 months
2 x 90,000 = 180,000
6 x 9,000 = 54,000
234,000

1.b. 1 Vehicle maintenance center at 350,000

2.a. 2 Equipment Operators/Maintenance Specialists for 1 year
(2 or 3 facilities or split function 1 year
each split between 3 facilities)
2 x 90,000 = 180,000

1 In - country training program in Grain Storage/Handling run by Kansas State University at $12,000 (2 wks) plus associated equipment at 5,000 (excludes local costs for trainees) 12,000 + 5,000 = 17,000

3 Positions overseas training sessions 7 weeks at Kansas State University
6,000 x 3 = 18,000

180,000 + 17,000 + 18,000 = 215,000

NOTES FOR COSTING TABLE 17 (Continued)

2.b. 1 Warehouse at Lusaka at 300,000
2 Others (Sites to be Selected) at 225,000= 450,000
Total 750,000

2.c. 200,000 for Lusaka
80,000 each other 2 x 80,000 = 160,000
200,000 + 160,000 = 360,000

3.b. Assistance for completion of 40 kilometer link between Katete and Cassacatiza, plus 30 Kilometers of spot improvements for remaining portion at 250,000 per km = 7,500,000. (This estimate may need to be adjusted.) Selective Upgrading 125,000 per km x 20 = 2,500,000. (Figure may need adjustment)

MALAWI

2.a. 1 Intermodal Transport Specialist at 6 months
6 x 9,000 = 54,000
1 Equipment Operation and Maintenance Specialist at 6 months 6 x 9,000 = 54,000
total 108,000
108,000 + 23,000 = 131,000

1 In Country Training Program in Grain Storage/Handling run by Kansas State University at 12,000 (2 wks) plus associated equipment at 5,000 (excludes local costs for trainees)

1 position overseas training session 7 weeks at Kansas State University at 6,000 x 1 = 6,000
12,000 + 6,000 = 23,000

2.b. 1 Warehouse/Loading facility at 450,000

2.c. Handling Equipment 200,000

MOZAMBIQUE

1.a. 1 Vehicle Maintenance Specialist for 2 years
1 Trainer in Vehicle Maintenance for 2 years
4 x 90,000 = 360,000

1.b. 1 Vehicle Maintenance Center at 350,000

2.a. 1 Port Handling Specialist for 2 years (Beira)
1 Port Handling Specialist for 2 years (Nacala)
2 x 90,000 = 180,000

NOTES FOR COSTING TABLE 17 (Continued)

2.a. 1 Intermodal Specialist for 6 months
6 x 9,000 = 54,000

2 Equipment Operation and Maintenance Specialists for 1 year 2 x 90,000 = 180,000

1 In Country training Program, Kansas State University in Grain Storage/Handling at 12,000 (2 wks) plus associated equipment of 5,000 = 17,000

3 Positions overseas training sessions 7 weeks at Kansas State University at 6,000 x 3 = 18,000
180,000 + 54,000 + 180,000 + 17,000 + 18,000 = 449,000

2.b. 1 Warehouse/Loading facility at Moatize at 450,000
1 Facility at Beira at 100,000
1 Facility at Nacala at 100,000
total 650,000

2.c.

Moatize	200,000
Beira	150,000
Nacala	80,000
	430,000

3.b. 125,000 x 20 Kilometers = 2,500,000

ANNEX I

TRANSPORT INVESTMENT IN THE SOUTHERN AFRICA REGION:

SUMMARY STATEMENTS

ANNEX I

TRANSPORT INVESTMENT IN THE SOUTHERN AFRICA REGION:

SUMMARY STATEMENTS

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TRANSPORT INVESTMENT IN THE SOUTHERN AFRICA REGION: SUMMARY STATEMENTS

INTRODUCTION

The investment strategy proposed in conjunction with SADAP initiatives gives emphasis to three areas:

- Maintenance of existing infrastructure and related equipment;
- Management, Operation and Regulation;
- Selective upgrading of certain key elements in transport system.

Although this strategy does not support massive assistance for large scale construction projects, substantial assistance is proposed for the region in each of these areas. Technical assistance and training are to be major components of such assistance.

The following three discussion papers are keyed to the immediate development needs of the transport sector in the Southern Africa Region. These papers represent summary appraisals of investment options relative to:

- Western Egress to Walvis Bay
- The Kasungula Crossing of the Zambezi River
- Truck/rail linkage between Zambia and the Ports of Mozambique.

The economic rationale for major investment in projects relative to either western egress or upgrading the Kasungula Crossing is dependent upon access to port facilities at Walvis Bay, and upgrading the Kasungula Crossing is, in turn, dependent upon western egress. Access to Walvis Bay is dependent upon resolution of the status of Namibia. Even if access is assured, however, existing facilities at Walvis Bay would have to be upgraded in order to handle the level of traffic necessary to justify investment in transport links to the port. Major investment in either of these projects, therefore, is not recommended at present. The third project incorporates the three major elements of the SADAP strategy mentioned above and also supports the SADAP objective of encouraging regional cooperation between the land-locked and coastal states in Southern Africa. Assistance for this project is recommended.

SUMMARY STATEMENT #1: Investment in a Western Egress for the Southern Africa Region

Primary Relevant Countries
Zambia
Botswana
Namibia

Secondary Relevant Countries
Zimbabwe-Rhodesia
Republic of South Africa

CONTENTS

SUMMARY STATEMENT: Investment in a Western Egress for the Southern Africa Region

I. Setting

The topography of Southern Africa has provided barriers to rather than facilitated transport in the region. Population groups are separated by arid or mountainous barriers, and the scarcity of navigable rivers has restricted the development of a reliable, internal waterway system. The situation was further complicated by border demarcations during the colonial period resulting in the creation of six land-locked states. Transport development during the colonial period, moreover, was keyed to the needs of the extractive industry. The majority of transport routes were run north to south and were serviced by ports in the RSA. Communication between the land-locked states and coastal ports remains seriously hindered by the lack of east to west routes. Some progress has been made in developing interior transport links, but managerial problems and the closure of the Rhodesian border with UDI continue to restrict transport.

Botswana is the most western of the land-locked states. It is served by north to south rail and road links along its eastern edge. Transit traffic is primarily between Zimbabwe-Rhodesia and the RSA. Linkage with Zambia is currently restricted by the deteriorated condition of the Botzam Road running from Francistown to the border with Zambia and the uncertainty of ferry service across the Kasungula. The main highway from Lobatse to Francistown is nearly all paved, but maintenance remains a problem; the railway is operated by Rhodesian Railways and is in relatively servicable condition. Port access is through the RSA.

II. Investment Options

Central to the rationale for the development of western transport links in Botswana are two considerations:

- the development of mineral and other natural resources in the western section of the country;
- the reduction of dependence on the port facilities of the RSA through the establishment of a direct transport link with Walvis Bay.

Ultimately, the two considerations are mutually dependent. Setting aside security and political considerations, investment in western links makes little sense economically without the demand to be generated by mining activity, and mineral development makes little sense without augmented port access. For the purpose of this discussion, therefore, the two related options are treated together.

Although the GOB is clearly interested in the development of western transport links, the priorities assigned to particular transport projects remain in flux. In part, this is a result of insufficient information about the rates of return offered by investment in the various economic activities related to transport development. It is just as much, however, a reflection of GOB preoccupation with takeover plans for the operation of rail service through their country. The GOB has stated its concern over the continued ability of Rhodesian Railways to operate rail service for Botswana and has made the transfer of rail operation into its own hands the primary goal of national transport policy.

Details concerning the projected takeover are considered confidential by the GOB but, relatively speaking, considerable managerial resources have been diverted into planning efforts related to the assumption of rail service. Estimates of the cost of such an operation vary absolutely and in terms of the time frame involved. In the case of an emergency takeover, for example, estimates of capital costs range from US$ 80 million to US$ 160 million; annual operating expenses could run from 11 to 17 million (1979 prices). The IBRD does not feel that the takeover is justified on the basis of economic considerations except in the case of an emergency. Most donors have accepted this position and would offer major assistance only in the case of an emergency. The GOB, nonetheless, continues to actively pursue its goal.

Until recently, interest in development of rail links to Namibia has been largely an interest of the GOB in support of mineral development. Interest in this project by other countries in the region has grown, and at the July, 1979 Arusha Conference support for a western rail link through Botswana was discussed in the regional context of transport needs of land-locked states and cited as a special concern for the to-be established Southern African Regional Transport and Communications Commission (SARTCC).

Major donor interest in transport investment in Botswana is keyed to maintenance and selective upgrading of existing roads to higher standards. USAID is preparing a US$ 14.5 million for road and rail improvements. The IBRD is assisting upgrading the Ramaquabane/Plumtree Road to Zimbabwe/Rhodesia and the feeder road system in the Tuli Block region east of Serowe.

The following discussion of transport investment options for western egress separates road and rail options. The road running from Kanye to Ghanzi and then back east to Nata (see Road Options 1,2,3 Figure . Botswana: Transport Investment Options) form what is sometimes referred to as the inner circle route; the inner circle route is linked to the border of Namibia by the Manuno Road (Road Option 4). The rail options consist of two sections, one to

Sua Pan (the Makarikari Flats) (Rail Option 1) and the other extending the route from Sua Pan to the border with Namibia (Rail Option 2).

A. Road

1. Kanye-Ghanzi Road - (Road Option 1)

This project would involve upgrading about 350 miles of marked track across the Southwestern corner of the Kalahari Desert to a gravel, low speed traffic standard road. No feasibility or design studies have been undertaken. The cost of these studies is estimated at about US$ 1.4 million. Construction cost for this road is estimated at US$ 7 million.[1]

2. Nata-Maun Road (Road Option 2)

This project would involve upgrading about 190 miles of improved road to a gravel, low speed traffic standard road. Feasibility and design studies are estimated at about US$ 740,000.

3. Maun-Ghanzi Road - (Road Option 3)

This project would involve upgrading 187 miles of partially improved road and marked track to a gravel, low speed traffic standard road. No feasibility or design studies have been undertaken. The estimated cost of these studies is US$ 650,000, and construction cost is estimated at US$ 3.7 million.

4. Ghanzi-Mamuno Road (Road Option 4)

This project would involve upgrading 127 miles of partially improved and marked track road to a gravel, low speed traffic standard road. No feasibility or design studies have been completed. The cost of these studies would probably cost about US$ 500,000. Construction cost is estimated at about US$ 2.5 million.

B. Rail

1. Francistown-Sua Pan

This extension of the existing railroad would represent the first of two links across the northern reaches of the Kalahari Desert. Construction cost of the 100 to 125 mile line

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[1] Except where noted, cost figures are given in 1979 prices. Cost figures are based on total estimates or unit cost guides provided by the GOB and may require adjustment.

is estimated at about US$ 42 million to $50 million.[1] A preliminary study of the feasibility of this portion of the extension is found in Colquhoun, O'Donnell and Partners, Francistown-Sua Railway Feasibility Studies, Volume I, for Ministry of Mineral Resources and Water Affairs, Republic of Botswana, April 1975.

2. Sua Pan-Mamuno

This second section of 518 miles would complete the trans-Kalahari railroad from Francistown to the border with Namibia at Mamuno. Construction of this section is estimated at US$ 211 million. Preliminary analysis of the economic benefits of the entire link is found in Johns, Charles J., A Railroad to Unlock Botswana's Mineral Potential, Government of Botswana, Ministry of Mineral Resources and Water Affairs, June 1977. The Commonwealth Fund for Technical Corporation is presently working on an updated feasibility study of the trans-Kalahari.

III. Impact

A. Road

1. Kanye-Ghanzi Road - Construction of this road, which represents the southern half of the inner circle route, would give access to the western Ghanzi agricultural region. The major potential of this region is cattle production. Impact would relate to government extension programs and upgrading basic human needs in the region. The marketing of certain products, some of which are presently transported to the border region of Namibia, might be facilitated and shifted to the national economy of Botswana. Weight capacity of the low traffic gravel standard would limit commercial traffic.[2] Sand stabilization is a problem for road construction throughout Botswana but would require special construction and maintenance techniques in western Botswana.

2. The Nata Maun Road - Upgrading this would give access to the Makgadkgudi Pans Game Reserve and the Okavango Swamps and wildlife santuaries located there. It could lead to efforts to develop these areas which could have adverse environmental implications, but it could also support a tourist industry keyed

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[1] Upgrading the road to a higher standard would prove inordinately expensive compared to short-run return.
For Gravel high traffic full standard the cost would be about US$ 21 million (based on cost factor of 3).
For Bitumin Main Road Standard the cost would be US$ 70 million (based on factor of 10).
Cost factors provided by Ministry of Public Works, GOB.

[2] Mileage and corresponding cost variations depend on the route selected.

to the wildlife in the area. The road would also facilitate exploration for mineral potential in the region and perhaps guarantee the economic base needed to develop the trans-Kalahari Railway. Groundwater problems could increase construction costs.

3. Maun-Ghanzi Road - Upgrading this road is keyed to connecting options 2 and 4 or options 1 and 2.

4. Ghanzi-Mamuno Road - This route is a key link between the inner circle route of Botswana and the Namibia border; the major lateral paved road of Namibia, providing access to Walvis Bay, ends at Gobabis only 75 miles away from the border. The economic rationale for this route is clearly tied to:

- Settlement of status of Namibia and Walvis Bay;
- Completion of either the southern or northern half of the inner circle route in Botswana;
- Upgrading the Gobabis-Mamuno Road.

B. Sua Pan-Mamuno

The exploration of the economic potential of Western Botswana is clearly dependent upon the development of rail access to a western port on the Namibian coast. The inaccessibility of the western region has deterred mineral exploration. Analysis of aerial photographs matched to the modest ground surveys which have taken place indicate a wide range of minerals. The potential annual level of production is estimated at 150,000 to 250,000 tons. Sales revenue could range from US$ 300 million to US$ 500 million; assuming taxes or royalties at about 12 percent of sales, direct revenue could range from US$ 40 million to US$ 66 million. Employment at mines and smelters could range from 5,000 to 8,000, and a central urban complex of 20,000 to 35,000 people would be required. Water and power facilities necessary for mine operation could benefit the entire region. Various developments can be linked to rail expansion into western Botswana:

- Mineral development in the region offers a rich potential:
  - The railway would provide access to such small but high yield copper/nickel deposits as those at Matsitama and Phoenix-Selkirk. The existing mine at Selebi-Pikwe could also ship ore by rail to the west. Lower yield deposits of copper are widespread.

- The railway would pass near the large Orapa-Lethlakane Diamond Mines and township, facilitating the movement of goods and people in and out of the area.

- The railway would provide western access for manganese mines at Palapye and yet to be developed uranium mines.

- Chromite from the Bush Veld Complex in southern Botswana could be shipped north and then west.

- If these deposits of Chromite are as large as believed, large quantities of coal may be needed for processing. Coal will also be needed for soda ash production. Botswana's coal resources are estimated at at least 40 billion tons. Washing of some of the better coals could produce quality export steaming coal and possibly a modest supply suitable for blending as a coking fuel. Total coal production could reach 5 to 10 million tons a year.

- The railway would require major quantities of cement for sleepers, which when coupled with other needs for the transport sector would permit development of a cement industry. This would also benefit housing construction.

- Development of soda ash would allow use of abundant silica in Botswana to establish a glass industry, especially for the production of glass bottles presently supplied to the area by the RSA.

- The railway would permit development of tourism at Moremi Wildlife Reserve near the Okavango Swamp.

- Agricultural development would be facilitated:

  - The Okavango Swamp is the largest inland water delta in the world; agricultural development of 37,000 acres might be possible. The environmental impact of such development has not been assessed and would have to be taken into account.

  - An abattoir could be built either near Sua Pan or further west along the railway, facilitating expansion of the cattle industry in the north.

Several limits on the return from railway development must also be considered:

- Rail construction has little benefit without linkage to Walvis Bay. The current link through the RSA probably

does not have a capacity of more than one million tons a year. Not only is it twice as far from the western mineral deposits of Botswana to Capetown as it is to Walvis Bay, but also access to the RSA is not a certain condition either politically or strategically in case of internal unrest in the RSA.

- The use of Walvis Bay itself cannot be a certainty until the issue of Namibia's future is settled. The RSA maintains a claim to Walvis Bay separate from that to Namibia as a whole. The RSA could grant independence to Namibia but keep Walvis Bay under its jurisdiction.

- Port facilities at Walvis Bay, moreover, would have to be upgraded at large costs. The water depth at dockside is only 33 feet. Currently used ore-carrying vessels have a 200,000 ton capacity and need depths of up to 75 feet. A rough estimate of dredging costs for Walvis Bay is US$ 115 million.

- The rail line within Namibia could not handle heavy payloads of ore. South African Railways has projected upgrading the line in 1990 to a standard comparable with that used elsewhere in Southern Africa. The cost of this upgrading is between US$ 115 million and 190 million. The railway presently stops about 75 miles from Mamuno. Extension of the line could easily cost US$ 30 million.

- The inflow of investment on such a scale as that needed for railway expansion would seriously strain the absorptive capacity of the economy of Botswana in general and the planning and managerial capacity of the GOB in particular.

IV. Recommendations

Major investment in western transport links in Botswana is tied to multiple considerations. In the long run, this expansion could be profitable. The settlement of the Walvis Bay and Namibia issues as well as the commitment and ability of an independent Namibia to upgrade its facilities must be obtained before major investment can be sure to have a profitable return.

- Expansion of western transport links should be in conjunction with but not prior to development of mineral potential of the region.

- If the potential offered by mineral development is as great as expected, the GOB could probably finance the cost of transport expansion with private investment and would at most need only short-term assistance.

- Road development may be linked to the initial and intermediate stage of western development. The rate of return compared to cost and load capacities needs further consideration.

- Road maintenance remains a major problem. Assistance needs to be targeted to this problem before additional road construction takes place.

- The most immediate return on road investment would seem to be such feeder roads in the eastern section of the country as Tuli Block.

- The Ministry of Mineral Resources and Water Affairs needs assistance in order to better assess existing surveys of mineral resources and to conduct selective surveys preliminary to the development of an overall master plan for the region.

- The Ministry of Public Works will have a major role in coordinating transport and mineral development. Assistance will be needed to build the planning and managerial capacity of the GOB relative to this task.

SUMMARY STATEMENT #2: Investment in the Kasungula Crossing of the Zambezi River

Primary Relevant Countries
Zambia
Botswana
Zimbabwe-Rhodesia

Secondary Relevant Countries
Namibia
Republic of South Africa

CONTENTS

SUMMARY STATEMENT: INVESTMENT IN THE KASUNGULA CROSSING OF THE ZAMBEZI RIVER

I. Setting

A. Physical Location

Over 700 miles inland from the coast of Namibia are three irregularly shaped pockets of densely forested land. The two northern pockets are bisected by the Zambezi River before it flows north on its way to the eastern coast of Africa. (See Figure I-B, Southern Africa). Traditionally these forest areas have been oriented toward the river rather than to the semi-arid and desert regions to the South and West, and the river served as the major means of communication within the region.

As a result of the demarcation of colonial claims in the nineteenth century, the boundaries of four territories converged at a point along the Zambezi River at the north end of the middle pocket of forest. The northern leg of Namibia, the northern edge of Botswana, and the western tip of Zimbabwe-Rhodesia met on the south bank of the river and faced the southern boundary of Zambia on the opposite bank of the river. Numerous settlements grew along the banks of the river, including the present village of Kasungula.

B. Economic Importance

Development of the region during the colonial period was limited, and the commercial activity to be found was serviced by small boats. With the extension of rudimentary road systems into the area, however, the river which had served initial transport needs became a barrier to north/south traffic. The marginality of commercial activity in the region and the existence of other transport routes--especially the Livingstone/Victoria Falls route--limited the return on investment in upgrading the Kasungula Crossing--connecting the roads to Kasane and Mambova--beyond the establishment of a ferry service. Upon the receipt of independence, ownership and operation of this service fell to the Government of Zambia (GOZ). The Ministry of Power, Transport, and Communications is presently responsible for this service.

The importance of the crossing was increased substantially during the 1960s by three events: the closure of the border with Southern Rhodesia (Zimbabwe-Rhodesia) following the Rhodesian Unilateral Declaration of Independence (UDI), the closure of the Benguela Railroad as a result of guerrilla activity, and the inability of the Tanzam Corridor--including the Tazara Railway and a parallel highway--to reach planned traffic capacity. Such

various items as fertilizer, agricultural products, processed foods, and selected consumer goods were routed through the Kasungula Crossing. Officially all such items originated in Botswana, but in actuality the route provided a means of access for Zambia to the economy of the RSA.

The proximity of the Victoria Falls road to Kasungula resulted in the development of a major paved road to within about 35 miles of the crossing on the Zambian side of the Zambezi. Development on the Botswana side of the river, however, did not match that in Zambia. The increase in traffic using the crossing during the late 1960s and early 1970s was cited by the Government of Botswana (GOB) as a major factor contributing to the deterioration of Nata/Kasungula road. In the mid 1970s the GOB requested a loan of US$ 10 million to upgrade this route to paved standard. The United States, which had previously given assistance to upgrade this route, agreed and was about to sign an agreement with the GOB when the EEC offered to carry all but the design and engineering costs. These were estimated at about US$ 1.5 million and were to be carried by the United States. Funding problems on the part of the EEC, however, have restricted release of these funds. The route is still not paved and is in deteriorated condition.

C. Recent Developments

The Kasungula Crossing has never carried a significant volume of traffic in either absolute or relative terms, but it has offered a supply line for certain scarce items, the importance of which is difficult to assess objectively. The GOZ became increasingly concerned during the mid 1970s not only because the efficiency of the route was deteriorating but also because the very security of the route was being threatened. Rhodesian security forces and nationalist groups were firing at each other across the river, and at times the fire seemed purposely directed at the trucks or two ferries in use. Truckers became increasingly reluctant to use the route.

The Spring of 1979 brought a major disruption in ferry service at the crossing. First, one of the two ferries became disabled just off the Zambian bank of the river. Then, a few weeks later, on April 11th, the Zimbabwian security forces sank the remaining float. The Zimbabwians justified this action on the grounds that:

- Traffic at the Kasungula Crossing was actually passing through the territory of Zimbabwe-Rhodesia in mid-river. This claim stems from unsettled demarcation claims under dispute.

- The crossing was being used by nationalist groups in their resistance efforts, a claim also under dispute.

Recent actions by Zimbabwian security forces have drawn attention away from the Kasungula Crossing but could result in its temporarily being a primary transport route. In mid-October the Tanzam route was completely blocked as a result of Zimbabwian sabotage. Then on November 5th the southern rail route was closed by Zimbabwe-Rhodesia to Zambian traffic. The absence of established, reliable truck service to the ports of Mozambique left Zambia dependent primarily on air service. The ability of the Kasungula Crossing to temporarily provide even marginal access is seriously threatened by possible Zimbabwian attack.

II. Investment Options

The exact status of ferry service at the Kasungula Crossing is uncertain. As a temporary measure, a ferry previously in service elsewhere in Zambia was disassembled and reconstructed at the crossing. Details of this operation are not readily available but the unit is in operation. Difficulties have been encountered with the operation of the ferry, and traffic is seriously limited. The EEC has agreed to assist the purchase of a new ferry. Assuming no problems in delivery, the arrival and operation of the new ferry was projected for late November.

The assistance offered by the EEC, in a sense, eliminates the option of no investment. EEC support, however, will only provide one ferry, possibly supplemented by the temporary craft. Action on the part of the Zimbabwian security forces could eliminate both ferries, and for the sake of discussion, the option of no investment is offered here. Discussion of the options is set in the context of restoration of at least the Tanzam corridor and hopefully reopening of the southern route through Zimbabwe-Rhodesia. Information is not immediately available to weigh this assumption.

1. No Investment - Following the sinking of the second pontoon float, the GOZ requested assistance from the United States to reestablish ferry service at the Kasungula Crossing. The United States rejected the request on the basis that the security of such an investment could not be guaranteed. The initiation of the Carrington Talks in London and the progress made in recent weeks in resolving the crisis in Zimbabwe-Rhodesia gives credence to the possibility of obtaining a guarantee of secure passage for the service. On the other hand, preoccupation with the settlement talks themselves gives little time for consideration of the Kasungula Crossing issue. Some sources have felt that action

by the Zimbabwian security forces against a new ferry would be regarded as a show of bad faith and, therefore, that the security forces would not act against the reestablishment of ferry service at the crossing. Alternately, other sources argue that such action might be just the show of force desired to demonstrate the resolve of the new government. The recent action of Zimbabwian commando severing the Tanzam corridor and stopping all southern traffic--which had been opened temporarily--would support the latter perspective.

2. Restoration of Ferry Service - The second category of options would involve restoration of the ferry service. Capacity could be less than, equivalent to, or greater than what was offered by the two ferries recently put out of service; most likely one would wish to restore at least equivalent service. When the GOZ requested assistance from the United States in April, it was estimated that it would take about US$ 50,000 to rehabilitate the disabled ferry and another US$ 225,000 for a new ferry to replace the shelled 80,000 ton float. Few sources suggest the wisdom of a third float, but improved on/off loading ramps might be considered. The assistance offered by the EEC is equal to u/A 172,000 or about US$ 234,000. This will cover the cost of a new ferry but leaves open the rehabilitation of the other float.

3. Replacement of Ferry Service with a Bridge - For some time, the GOZ has been pressing for international assistance in order to construct a bridge to replace the ferry service at the Kasungula Crossing. During the 1978 field trip by SADAP consultants, the Department of Roads of the Ministry of Power, Transport, and Communications placed this project among the five major projects for which it was seeking assistance. At that time, feasibility and design studies had not been undertaken. Based on comparable construction projects in the region, it can be expected that the cost of building the bridge today would be about US$ 6 million.

III. Impact

A. No Investment - It should be stated from the outset that investment decisions relative to the Kasungula Crossing may well be unrelated to economic feasibility. Officially, the GOZ maintains that restoration of the ferry service to previous capacity is essential to the "recovery" of the Zambian economy. What this means is interpreted quite diversely. Several factors come into play:

- The absolute and relative flow of traffic over the Kasungula Crossing is small in scale. The cessation of traffic will certainly have an impact, but that impact is tied to the already deteriorated Zambian economy. Widespread starvation or deprivation will not result just because the crossing remains closed, but economic conditions will be further strained.

- Qualitatively the goods being carried over this route were not targeted for mass consumption and the population at large. Food stuffs and fertilizer were included in the inventories, but a substantial percentage of the cargo could be classed as non-essential consumer goods or--especially in the context of the Zambian economy--luxury goods.

- Alternately, it must be admitted that certain of these goods have symbolic or catalytic value. For example, hundreds of cases of beer bottles have been passing over this route. The unofficial rationale was that without these imports there would not be enough beer to supply the military. It was assumed that the frustration resulting from no beer would erode faith in the government and easily lead to mutiny or a coup.

- Finally, it must be noted that the majority of goods carried over this route originate in the RSA. Reopening the service would reinforce dependence on the RSA. Similarly, the RSA could decide to cut off the supply of these items, and an alternate source of supply might be a better investment even if it were somewhat more costly.

B. Restoration of the Ferry Service - Before the ferry service can be meaningfully, i.e., permanently, restored there must be a guarantee of the security of the investment. Obtaining such a guarantee may not be possible until after a full settlement of the Zimbabwian issue, and could easily require greater expenditures by Botswana and Zambia than were formerly being made. The costs of such action as increased border patrols could well exceed the benefits from reopening the crossing.

- Investment in reopening the crossing will continue to be restricted by the poor condition of the road in Botswana serving the crossing.

- The majority of the haulers over this route are Zambian. The resumption of traffic will provide indirect benefit to businesses in Botswana servicing the route. Very little, if any, Botswana produce is marketed over this route so the impact on the agricultural sector would be marginal.

- The major direct benefit for Botswana would be from freight user charges. Assistance should probably be offered to Botswana to reexamine its rate schedule and policies for transit traffic especially in regard to Zambia and the RSA.

- Reopening of the route will still be restricted by the qualitative characteristics of the freight hauled. Zambia should reassess its policies relative to what is being hauled, and alternate control mechanisms to those in use might be considered.

C. Replacement of Ferry Service with a Bridge - The rate of return on the construction of a bridge is not justified in terms of present market demand and traffic levels. The impact of such a bridge would not be immediate to any sizeable population group in the area.

- Construction of the bridge might stimulate certain operations in Botswana, but the scale would be small. Agricultural development in the Tuli Block, for example, or even close to the Zambezi itself might be stimulated if it could be taken to a larger market in Zambia. A more likely market, however, is Zimbabwe-Rhodesia which already consumes produce grown in this region; in such a case market access would be over the Francistown/Bulawayo Road.

- Unless the Botszam Road is completed, traffic over the route to the Kasungula Crossing will still be restricted.

- In the long run, the bridge could be valuable once a route, either rail or road, is opened to Walvis Bay in Namibia. Jurisdiction and access to Walvis Bay remain to be resolved as well. The crossing would represent a major link in the East-West African regional highway system.

IV. Recommendations

- Unless a guarantee can be obtained from Zimbabwe-Rhodesia, no investment should be made in destructable infrastructure for the crossing.

- In the interim, several studies should be made:

  - Existing traffic and demand projections for the next decade

  - Survey of ferry operations and suggestions for improved use

  - Survey of cargo selection and suggestions for maximization of route utility.

- Assistance should be offered Botswana for an assessment of transit traffic rates and regulatory policy.

- Preliminary feasibility and design studies for a bridge should wait until western access through Botswana to the sea has been assured.

SUMMARY STATEMENT #3: Regional Transport Links, Zambia to Ports of Mozambique

Primary Relevant Countries

Zambia
Malawi
Mozambique

Secondary Relevant Countries

Zimbabwe-Rhodesia
Tanzania
Republic of South Africa
Angola

CONTENTS

SUMMARY STATEMENT: REGIONAL TRANSPORT LINKS, ZAMBIA TO PORTS OF MOZAMBIQUE

I. Setting

Of all the land-locked states, Zambia has been most constrained by the inadequacies of the regional transport system in Southern Africa. Exploitation of the rich copper deposits in the country has provided the base for a modernizing economy. As labor has shifted from agricultural production to the mining sector, imports of food and consumer goods have been purchased with the foreign exchange brought by the copper sales. This balancing, however, has been dependent upon access to port facilities and has required long-distance hauling through neighboring states.

Before Southern Rhodesia's Unilateral Declaration of Independence (UDI) in 1965, almost all of Zambia's external traffic was routed to the port of Beira in Mozambique by way of Southern Rhodesia. Although Zambia had begun to reduce its dependence on this route, in 1972, just before the closure of the border with Southern Rhodesia--and consequently the stoppage of transit traffic through its territory--about 55% of Zambia's external traffic still used this route.[1] Zambia was able to sustain the loss of access to Beira by shifting to primary reliance on the Benguela Railroad. When guerrilla activity threatened the operation of the Benguela--eventually leading to its closure--Zambia turned to the newly constructed Tazara Railway and the port of Dar es Salaam. Truck transport along the Tanzam Highway paralleling the Tazara Railway offered supplemental transport equivalent to about 20% of all external flows in 1972 and peaking at 660,000 tons or almost 40% in 1975. The Tazara never reached expected capacity, however, resulting in a serious constraint on the economy. After a peak in 1977 of 937,000 tons volume continued to decline. The inability of the port facilities at Dar es Salaam, moreover, to handle the volume the railway did carry led to a serious backlog in both on and off-loading, delayed wagon turn-around time, created massive storage problems, and resulted in serious cargo damage. Overall foreign trade tonnage for Zambia fell between 1970 and 1978 by 42 percent.

The decline in the volume of Zambian foreign trade was accompanied by a fall in the international price of copper. This eroded the supply of foreign currency needed for imports. The scarcity of spare parts and lubricants which resulted severely

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[1] In 1972, 1,331,000 tons or 63% of the external traffic of 2,111,000 tons used the Southern Rhodesia route. Of this, 467,000 tons were listed as exports and 864,000 tons were imports, representing respectively 55% of all export and 69% of all imports. About 20% of all external traffic was carried by the Tanzam Highway, about 15% used the Benguela, and about 2% was directed through Malawi.

limited maintenance of all types of vehicles. By 1978, the availability rate for road maintenance equipment, for example, had fallen to less than 35 percent of the total on hand. Neglect of road surface maintenance increased, and heavy rains in 1977 left 45 percent of the main road system in need of repair.

Scarcities of eggs, sugar, flour, milk and other basic foodstuffs became common, but the short supply of maize--the basic staple--became increasingly serious. The scarcity of maize was worsened by a cycle of dry weather. The strained transport system alternated short falls in imports of fertilizer with insufficient imports of maize. In late 1978, Zambia was sufficiently desperate to reopen transit traffic through Zimbabwe-Rhodesia in order to get access to ports in the RSA.

Events in 1979 brought continued hardship for Zambia. Early in the Spring, Zimbabwian security forces, in retaliation for supposed Zambia assistance to anti-government Zimbabwian rebels, bombed the ferry at the Kasungula Crossing of the Zambezi. This cut the trickle of goods through Botswana to Zambia. Then, in October, Zimbabwian agents cut the flow of traffic on the Tazara Railway by destroying a major bridge on the line inside Zambia below Kasama. Then, in early November the Zimbabwe-Rhodesian Government announced the closure of its borders to minimize transit traffic destined for Zambia.

II. New Directions for Investment Options

Living under the shadow of contingency planning, Zambia has been forced to concern itself primarily with short-run transport issues. Without a change in political conditions and transport investment patterns in the region, there seems little option to this approach. The interplay of factors affecting transport for both land-locked and coastal states in the region is so complex that it is difficult to separate cause and effect much less project transport capacity with any reliability. Setting aside the constraining role of political events in Angola, Zimbabwe-Rhodesia, and Mozambique, transport in the region remains constrained by dependence upon rail links to coastal ports. Major maintenance, management, and associated technical problems plague this mode and limit expansion of rail capacity in the near future. Development of truck transport offers diversification of transport routing as a supplement to or in conjunction with existing rail links. Thus, the introduction of a trucking service linking Zambia to the ports of Mozambique is suggested as a new direction for transport investment in the region.

A. Effect of Opening the Borders of Zimbabwe-Rhodesia

Although hopes run high for a settlement of the Zimbabwe-Rhodesia problem, there is no time table that can be accurately projected. Opening the borders of Zimbabwe-Rhodesia to transit traffic would offer temporary relief. Several factors must be taken into account, however, in order to assess the permanency and degree of impact that can be expected.

- Rail connection between Zambia and Zimbabwe-Rhodesia uses the Kafue Bridge in Southern Zambia. This bridge is in extremely deteriorated condition as are certain portions of the roadbed between it and the border. Traffic must move very slowly over this section of the route south. Discussions are underway for replacement of the bridge, but it will be several years before such a project would begin and completion would be likely to take over two years after work begins.

- Since the closure of the border by the front-line states, Zimbabwian transport policy has been geared to survival. Major investment in rail transport has been for the construction of a southern link with the RSA at Beit Bridge. Maintenance of the rail system, in general, has been seriously neglected, but deterioration on portions of the line used for transit traffic is believed to be serious. Major expenditures and considerable time will be needed to rehabilitate the system.

- After a settlement, Zimbabwe-Rhodesia would have to reexamine all its transport policies in light of needs of neglected Tribal Trust Lands. There is no guarantee that priority will be given to transit traffic for Zambia if such conflicts with domestic needs.

- During the recent opening of the border, Zambian goods were sent to ports in the RSA. Backlogs of goods began to build, mainly because of activities related to rail operation. The ability of the RSA to handle increased flow is, therefore, uncertain even in the short run. Long run willingness of the RSA to handle Zambian cargo could be affected by political developments in the RSA.

- Traffic would probably flow mainly to Maputo and Beira. Maputo, again, is being developed with RSA funds. Priorities for handling would be given to RSA traffic and even the willingness of the Mozambique Government to open Maputo to Zambian traffic is uncertain. Facilities in Beria for storage and handling would be grossly inadequate to handle major portions of Zambian traffic.

- The need for regional road links to ports in Mozambique remains regardless of settlement of Zimbabwe-Rhodesia's problem. Direct access to a coastal country, moreover, is preferable to indirect access through Zimbabwe-Rhodesia.

B. Rail Investment as an Alternate Option to Road Transport

At present, no donor is willing to finance the cost of building major new rail links in Southern Africa. The Canadian Government has reportedly agreed to extend the end of the Malawi rail line across the border into Zambia in order to simplify handling of transit traffic, but it is unwilling to extend the link any further. Construction of additional rail links is not regarded as economically feasible, and most donors feel, additionally, that problems associated with present rail operations must be solved first anyway.

Investment in new railway construction as an option to development of road transport would not meet transport needs of the region for various reasons:

- Railway operation in the region faces major operational and maintenance problems. Major investment will be needed to rectify the situation. It is not certain that the economies of the countries involved have either the absorptive capacity to handle large scale monetary inflows or provide the various services and managerial skills needed to implement these programs.

- Even if such investment can be carried and is made, there will be some lag in time before any impact will be felt.

- The impact of such investment is keyed to a static population and economy. In fact, by the time programs begin to impact much of the increased capacity will be absorbed by increased demand generated by population growth and economic expansion.

- Even if external rail links are able to increase their capacities, Zambian Railways will not be able to handle internal distribution. Zambian Railways is just about at capacity now. Major investment of US$ 200 million will be needed between 1985-1989 just to modernize without increasing capacity.

- Reliance on rail transport leaves Zambia very exposed to transport crisis in the case of failure by any one rail link. Rail transport needs to be supplemented by road transport to meet both expected demand and security interests.

III. A Regional Approach to Road Transport

The transport problems of the land-locked states in Southern Africa clearly is of a regional nature. Increasingly, interest has been shown by international donors in the development of transport projects with a regional orientation. UNCTAD has undertaken a major study of the TANZAM Corridor with particular interest in port facilities at Dar es Salaam as well. The EEC has suggested a regional road transport project in order to open new transport corridors to the ports of Mozambique. In response to EEC interest for multi-donor cooperation in developing and implementing this project, a project brief preliminary to a project paper has been prepared.

A. Proposed Transport Project

The proposed project would assist development of regional road transport links from Zambia to the ports of Beira and Nacala. Trucking would be handled by a multi-national public corporation similar to the one presently jointly owned by Zambia and Tanzania. Several choices exist, but the most likely routes include:

- East from Lusaka to Chipata and then to Mchinji at the border with Malawi by truck. Freight would then be transhipped to rail for delivery to either Nacala or Beira. (The last portion of the rail link is still under construction, however, so freight would temporarily have to be trucked to Lilongwe for transshipment.)

- East from Lusaka to Katete and then south into Zambia to Moatize where freight could continue either south to Beira by road or be transshipped by rail.

A contingency trucking route might be run through Malawi down to Blantyre and then west to Zobue connecting with the main route from Moatize to Beira. This route is not as direct and at least one section of it would have to be upgraded.

The project would be integrated structurally and functionally so that development in all three countries and for associated facilities would be balanced. Major project elements include:

Truck Transport Development

- Vehicles - a mix of 23-ton truck/trailer combinations and 5-10 ton trucks for secondary distribution. Also, jeeps for inspectorate operation and buses to transport labor.

- Equipment for transport inspectorate operations, including scales, radios, etc.
- Spares for vehicles and equipment
- Technical assistance for vehicle operation, management, and maintenance including truck transport regulation
- Support for vehicle maintenance centers
- Training in vehicle operation and maintenance

Cargo Handling and Storage

- Warehouse facilities - at one major distribution point in Zambia, at one railhead in Malawi, and at the ports of Beira and Nacala
- Equipment including fork lifts and cranes
- Technical assistance
- Training in equipment operation maintenance and cargo management

Road Maintenance

- Facilities and Workshops
- Equipment for road service
- Spares for facilities and equipment
- Technical assistance in maintenance, management and operation
- Training

Selective Upgrading of Key Roads

- Technical assistance for priority assessment, engineering design, and field supervision (30% of 1600 to 2500 km)
- Contract Upgrading
- Equipment for upgrading units (1 to 3 per country)
- Training

IV. Recommendations

The structural/functional coincidence of this project with the goals and strategy proposed by SADAP transport studies suggests that it receive priority consideration. Support by USAID falls into three stages:

- Preliminary Consultation: USAID should support dialogue with the EEC, all other interested donors, and recipient countries. This should include the exchange of background papers and studies underway by both the EEC and USAID.

- Project Development and Design: USAID should support the development and design of this project both with technical expertise, including necessary field trips, and continued communication and consultation with participants.

- Project Implementation: USAID should offer technical and capital assistance equivalent to US$ 20 million for each of the initial three years of the project. This level of assistance might be adjusted during the follow-up period estimated at two years.

Although EEC interest is very active at this time, should complications arise, USAID should take an active role in developing a scaled-down option as an interim measure. During the preliminary stages of discussion, it is suggested that design of both the full and scaled-down version be developed.

TABLE 1

Estimated Total Project Cost By Country and Component
(U.S.$ 000)

Component	Regional	Zambia	Malawi	Mozambique	Total
1. Truck Transport Development					
a. Vehicles & Spares	—	16,370	2,980	13,720	
b. Equipment & Spares	—	110	70	110	
c. Technical Assistance and Training	540	1,080	630	1,080	
d. Vehicle Maintenance Centers	—	850	500	850	
Subtotal #1	540	18,410	4,180	15,760	38,890
2. Cargo Handling and Storage					
a. Warehouse Facilities	—	1,000	400	1,000	
b. Equipment & Spares	—	250	100	250	
c. Technical Assistance and Training	270	540	450	540	
Subtotal #2	270	1,790	950	1,790	4,800
3. Road Maintenance					
a. Facilities and Workshops	—	800	2,000	2,240	
b. Equipment & Spares	—	11,700	2,500	4,500	
c. Technical Assistance and Training	180	920	540	720	
Subtotal #3	180	13,420	5,040	7,460	26,100
4. Selective Upgrading					
a. Contract Upgrading	—	10,000	2,000	8,000	
b. Equipment & Materials	—	20,000	4,000	16,000	
c. Technical Assistance and Training	180	270	50	270	
Subtotal #4	180	30,270	6,050	24,270	60,770
5. Project Design, Studies and Engineering	—	3,000	750	2,200	5,950
Subtotal 1-5	1,170	66,890	16,970	51,480	136,510
6. Contingencies					
a. Physical (10%)	90	6,690	1,700	5,150	13,630
b. Price (15%)	140	10,040	2,550	7,730	20,460
7. Project Total	1,400	83,620	21,220	64,360	170,600
8. Recurrent Cost (per year)					
a/1. Truck Transport	—	2,600	500	2,100	5,200
b/2. Cargo Handling/Storage	—	100	40	100	240
c/3. Road Maintenance	—	2,000	400	700	3,100
d/4. Selective Upgrading	—	3,300	1,300	2,600	7,200
Total	—	8,000	2,240	5,500	15,740

NOTES FOR COSTING TABLE 1.

REGIONAL

1.c. 1 Chief of Party/Truck Transport Specialist for 3 years
1 Transport Regulation Specialist for 3 years
6 x 90,000 = US$ 540,000

2.c. 1 Cargo Handling Specialist for 3 years
3 x 90,000 = US$ 270,000

3.c. 1 Road Maintenance Engineer for 2 years
2 x 90,000 = US$ 180,000

4.c. 1 Road Engineer for 2 years
2 x 90,000 = US$ 180,000

ZAMBIA

1.a.	250 23 ton trucks at US$ 40,000	$10,000,000
	50 5-10 ton trucks at US$ 20,000	1,000,000
	10 Willis Jeeps at US$ 18,000	180,000
	4+ Buses	400,000
	Spares (40%)	4,972,000
1.b.	3 scales at US$ 5,000	15,000
	40 radios at US$ 1,800	72,320
	tools, masts, antennae	15,000
		102,000
	Spares	10,200
		112,000

1.c. 1 Truck Transport Specialist for 3 years
1 Transport Regulation Specialist for 3 years
2 Specialists in Training for 3 years
12 x 90,000 = US$ 1,080,000

1.d. 3 maintenance centers
2 US$ 250,000
1 US$ 350,000
US$ 850,000

2.a. 5 x 300,000 (perhaps should be greater)
US$ 1,500,000

2.b. 5 x 50,000 = US$ 250,000

2.c.	1 Cargo Handling Specialist for 3 years	270,000
	2 Short Term Specialists for 6 mo. each	90,000
	1 Trainer for 2 years	180,000
		540,000

ZAMBIA

3.a.	Facilities & Workshops (Note, figures for Zambia need readjusting on basis of final IBRD project)		800,000
3.b.	New Equipment & Spares		10,400,000
	Rehabilitate Existing		500,000
	Spares for Existing		800,000
			11,700,000
3.c.	1 Engineer	x 3 = 3	270,000
	1 Trainer in Equipment Maintenance	x 3 = 3	270,000
	1 Trainer in Road Maintenance	x 3 = 3	270,000
	2 Short-term Specialists	x .5 = 1	108,000
			918,000

4.a. Cost estimates based 30% x 1600k = 480k
(use 500) 100 paved, 400 gravel
100k x US$ 200,000 = 20,000,000 paved
400k x US$ 150,000 = 60,000,000 gravel
$80 m for project

Distribution:		Total	Contract	Forced Account
Zambia	50%	40	10	30
Malawi	10%	8	2	6
Mozambique	40%	32	8	24

for forced account reduced (1/3)
for labor $10m, $2m, $8m
for recurrent ÷ by 3

4.b. Engineer
1 x 3 years or
1 x 2 plus specialists
90,000 x 3 = US$ 270,000

5. 5% (costs exclusive of T.A.)
for all countries

MALAWI

1.a.	50 23 ton trucks at 40,000	2,000,000
	30 5-10 ton trucks at 20,000	600,000
	6 Willis Jeeps at 18,000	108,000
		2,708,000
	Spares	270,800
		2,978,000

MALAWI

1.b.	2 scales	10,000
	25 radios at 1,800	45,000
	Tools, masts, antennae	8,000
		63,000
	Spares (10%)	6,000
		69,000
1.c.	1 Truck Transport Specialist for 3 years	
	1 Transport Regulation Specialist for 3 years	
	2 Specialists in Training x .5 1 year	
	7	630,000
1.d.	2 centers at $250,000 or use to supplement existing	500,000
2.a.	2 x 200	400,000
b.	2 x 50,000	100,000
		500,000
c.	1 Cargo Handling Specialist for 3 years	270,000
	1 Trainer x 2 years	180,000
		450,000
3.a.	Facilities & workshops 280 x 7 = IBRD for Rural Pilot	2,000,000
b.	Equipment & Spares	2,500,000
c.	1 Road Engineer x 3 = 3	
	1 Training Specialist x 2 = 2	
	2 Short-Term x .5 = 1	
	6	540,000
4.a.	See 4.a., Zambia	
b.	See 4.a., Zambia	
c.	1 Specialist 6 months x $9,000 =	54,000

MOZAMBIQUE

1.a.	300 23 ton trucks at 40,000	12,000,000
	50 5-10 ton trucks at 20,000	1,000,000
	10 Willis Jeeps at 18,000	180,000
	4+ Buses at 100,000	400,000
		13,580,000
	Spares (10%)	135,800
		$13,715,800

MOZAMBIQUE

1.b.	3 scales		15,000
	40 radios		75,320
	Tools, etc.		15,000
			102,000
	Spares (10%)		10,200
		US$	112,200
1.c.	1 Truck Transport Specialist x 3 =	3	
	1 Transport Regulation Specialist x 3 =	3	
	2 Specialist in training x 3 =	6	
	$90,000 x 12 =		US$ 1,080,000
1.d.	3 maintenance centers		US$ 850,000
	2/250,000		
	1/350,000		
2.a.	5 x 200		1,000,000
b.	5 x 50,000		250,000
			1,250,000
c.	1 Cargo Handling Specialist x 3 years		270,000
	2 Short-term		90,000
	1 Trainer x 2 years		180,000
			540,000
3.a.	Facilities & workshops		
	8 x 280		2,240,000
b.			4,500,000
c.	1 Road Maint. x 3 = 3		
	2 Trainers x 2 = 4		
	2 Short-term x .5 = 1		
	90 x 8 =		720,000
4.a.	See 4.a. Zambia.		

ANNEX II

DAMAGE TO MAJOR ROAD AND RAIL BRIDGES

The following list of recently reported bridge damage as of December 1979 is keyed to the map shown in Figure II-B.

Map No.	Bridge	Condition	Completion Date for Repair
1	Kaleya Road Bridge	Temporary bypass, usable only in dry weather	n.a.
2	Chongwe Road Bridge	Bailey Bridge with 50 ton capacity	n.a.
3.	Lunsemfwa Road Bridge	80-foot temporary bridge under construction*	n.a.
4	Lunsemfwa Rail Bridge	Cut	Early March 1980
5	Chambeshi Road Bridge	Needs rehabilitation	n.a.
6	Chambeshi Rail Bridge	Under repair	May 1980
7	Runfunsa Bridges (2)	n.a.	February 1980
8	Chirundu Bridges (2)	Cut	n.a.

*Reconstruction anticipated completion date June 1, 1980

ANNEX III

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