511-0466-2
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AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: [A] A ADD, C CHANGE, D DELETE — PP

2. DOCUMENT CODE: 3

3. COUNTRY ENTITY: Bolivia

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 511-0466

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

8. ESTIMATED FY OF PROJECT COMPLETION: FY 83

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 78; B. QUARTER 3 (Enter 1, 2, 3, or 4); C. FINAL FY 83

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

A. FUNDING SOURCE	FIRST FY 78 B. FX	FIRST FY 78 C. L/C	FIRST FY 78 D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL						
GRANT	(25)	( )	(25)	(300)	( )	(300)
LOAN	(13,050)	(2,450)	(15,500)	(13,050)	(2,450)	(15,500)
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY						
OTHER DONOR(S)						
TOTALS	13,075	2,450	15,525	13,350	2,450	15,800

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 78 F. GRANT	E. 1ST FY 78 G. LOAN	H. 2ND FY 79 I. GRANT	H. 2ND FY 79 J. LOAN	K. 3RD FY — L. GRANT	K. 3RD FY — M. LOAN
(1) F & L	101	061	061	25	15,500	275			
(2)									
(3)									
(4)									
TOTALS				25	15,500	275			

A. APPROPRIATION	N. 4TH FY — O. GRANT	N. 4TH FY — P. LOAN	Q. 5TH FY — R. GRANT	Q. 5TH FY — S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1) F & L					300	15,500
(2)						
(3)						
(4)						
TOTALS					300	15,500

12. IN-DEPTH EVALUATION SCHEDULED: MM 10 YY 80

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

[2] 1 = NO, 2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Frank B. Kimball

Frank B. Kimball

TITLE: Director, USAID/Bolivia

DATE SIGNED: MM 03 DD 10 YY 78

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM 05 DD 14 YY 78

BOLIVIA RURAL ROADS II

PROJECT PAPER

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PART I - SUMMARY AND RECOMMENDATIONS

A. Recommendations

The following action is submitted for AID approval:

- Grant	$ 300,000
- Loan (Loan Terms: 30 years, 10-year grace period, 2% during grace period and 3% thereafter)	15,500,000
- Total new AID obligation	15,800,000

B. Project Description

1. Borrower

The Borrower will be the Government of Bolivia (GOB). The principal executing agency will be the National Road Service (SNC). The Departmental Development Committees (DDCs) of Chuquisaca, Potosi and Tarija will provide support to SNC in implementing the project.

Project Summary

This five-year Rural Roads II Project has two principal objectives: First, is to improve access to the small farm sector by upgrading a minimum of 1200 kilometers of local roads to all-weather standards. Second, is to strengthen the capability of the Caminos Vecinales (Rural Roads) Department of SNC and three Departmental Development Committees to carry out rural roads improvement programs - including the planning, road selection, design, and execution of road upgrading activities as well as road and equipment maintenance.

This road improvement program will benefit an estimated 44,000 farm families by facilitating the delivery of agricultural inputs and services and by stimulating increased agricultural production because of faster, more dependable year-round access to markets and other agricultural services. As a result of the project, small farmer incomes in the project area will increase by 36%.

The Caminos Vecinales Department was established within SNC under a 1976 AID/GOB Rural Roads I Project which is improving roads in the Departments of Santa Cruz, Cochabamba, northern Chuquisaca, and La Paz. The focus of Rural Roads II will be in the Departments of southern Chuquisaca, Potosí, and Tarija. This project will build upon the groundwork laid by Rural Roads I, and in addition,

will involve the DDCs in the planning, financing and implementation of road activities. The DDCs (with assistance from SNC) will be responsible for the analysis of individual road segments and the organization of community labor for the improvement and minor maintenance of the roads. Further, SNC's ability to maintain the rural roads upgraded in this project will be strengthened by a road and equipment maintenance component.

C. Summary Findings

The USAID concludes that the proposed project is technically and financially feasible for completion within the loan disbursement period of five years. Each subproject will be individually investigated for technical and economic viability. The implementing GOB institutions have been throughly examined and are believed to have the capacity to carry out their respective responsibilities under the project. There appear to be no financial constraints to prevent the GOB from providing the required funding for project implementation. The social analysis identifies no obstacles to project implementation, and in fact indicates that the project will help to integrate lower socio-economic groups into the mainstream of Bolivian society. The provision of voluntary labor has been examined and the project designed so that work on the sub-projects will not interfere with normal farming activities. Sufficient experience has been gained in the past few years to assure the Mission that voluntary labor for this type of project is available and that rural communities are willing to participate as required. Project costs are summarized below.

On the basis of the analysis contained herein, the USAID Mission to Bolivia concludes that the project is technically, economically, and financially sound and recommends that a $15.5 million loan and a $300,000 grant be authorized to the GOB.

The project meets all applicable statutory criteria. (See Annex C). The USAID Mission Director in Bolivia has certified that Bolivia has the capability to effectively maintain and utilize the Project (Annex D).

D. Project Issues

1. Funding Level

The project was originally budgeted at an AID loan level of $8.5 million, based on the approved PRP. The requested AID loan is a $7.0 million increase over the approved level. This increase represents increased costs for equipment, the improvement of an

PROJECT COSTS
(US$000)

	AID	GOB	DDCs & Local Communities	Total Program
AID				
Technical assistance (Grant)	275			
Training	300			
Equipment, vehicles & spares	10,655			
Materials	1,470			
Cement structures	900			
Evaluation	100			
Subtotal	13,700			
SMC				
Salaries & operating costs		2,888	2,472	
Equipment operating costs		575	575	
Materials		330		
Training		60		
Facilities improvement		300		
Road maintenance		160		
Subtotal		4,313	3,047	
DDCs and Local Communities				
Community labor			540	
DDCs-Personnel & operating costs			230	
Right-of-way access			200	
Road maintenance			150	
Subtotal			1,120	
Subtotals	13,700	4,313	4,167	22,180
Inflation/Contingency	2,100 1/	437	433	2,970
TOTALS	15,800	4,750	4,600	25,150
Percentages	63%	19%	18%	

Total loan: $15,500,000
Total grant: $ 300,000

1/ Includes $ 25,000 contingency factor for grant.

additional 200 kilometers of roads, and the provision for a road and equipment maintenance component in the project which was not contemplated in the PRP. Part II, B, 1 - Level of Funding - discusses the requirements for the increased funding in greater detail.

2. Project Timing

While construction has not yet begun under Rural Roads I, the Project Committee has determined that it is feasible and desirable to proceed with this proposed follow-on project at this time. Part II, B, 1 - Timing - discusses this issue in greater detail.

3. Design Change

While the design of this project essentially follows the model of Rural Roads I, two important changes have been made in the procedure for the selection of roads as discussed in Part II, B, 2 - Principal Differences from Rural Roads I.

E. Project Committee

USAID/Bolivia

Robert Adams, Chief, Engineering and Transportation Division
Peter Bittner, Loan Officer
Gover Carranza, Project Engineer
Robert Clark, Chief, Development Resources Office
Charles Costello, Regional Legal Advisor
Luis Montero, Financial Analyst
Raúl Pinto, Financial Analyst
Scott Smith, Loan Officer
Harry Wing, Agricultural Economist

AID/W

Benjamin Severn, Economist (LA/DR)
Wendy Stickel, Finance Officer (LA/DR)

GOB

Domingo Marquez, Director Caminos Vecinales Department, SNC
Luis Tindal, SNC Economist
Hermann Castro, SNC Technical Advisor

PART II: PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Background

1. Agriculture Sector Development Constraints

a. Summary of Recent Sectoral Performance

Almost 60 per cent of Bolivia's 4.6 million people live in rural areas, where agriculture is the predominant source of income and employment. The agriculture sector provides employment for almost one-quarter of the total population and over 60 per cent of the employed labor force. It generates one-fourth of GDP and contributes 12 per cent of exports. Given the agricultural sector's preponderant share of Bolivia's labor resources, its sizeable contribution to the national economy, and its role in feeding a growing population, it is clear that sustained economic development in Bolivia hinges on the performance of this sector.

Although the Bolivian economy has been characterized by dynamic and sustained growth in recent years, averaging 6 per cent to 7 per cent per annum since 1970, rural Bolivians have not shared proportionately in the benefits of this growth. Nevertheless, the performance of the Bolivian agricultural sector has been improving steadily over this same time period. Growth in the production of the important food crops of Bolivia's Central Valleys and lowlands has been significant in recent years. These increases have their origin in the overall growth of the economy, the relaxation of price controls during 1973 - 1974, and a good supply response on the part of the sector. However, this increase in the production of important crops is basically attributable to more land being brought into production; yields of these crops, with the exception of vegetables, have not increased as rapidly as the increase in output. In spite of the sector's relatively good performance, therefore, the fundamental structural and technological problems of the agricultural sector, especially of the small farm subsector, have not been removed.

b. Continuing Constraints on Small Farm Development

The small farm subsector comprises over 95 per cent of the estimated 600,000 farm families in Bolivia, yet produces only an estimated 60 per cent of the aggregate sector output. Natural resource constraints coupled with continued dependence on rudimentary production techniques and limited access to economic and social services have resulted in the low productivity and incomes which characterize the small farm subsector. The interlocking set of constraints facing Bolivian small farmers is well documented in the USAID/B Agricultural Sector Assessment and the recent Agriculture Sector II Project Paper. These constraints continue to be present and will only be summarized here.

c. Stagnant Technology and a Weak Scientific Base

Production techniques remain largely traditional in the subsector, and use of fertilizers, improved seeds, and other modern inputs is among the lowest in Latin America. Research capability is limited and dissemination of improved techniques is constrained by inadequate communications and transportation systems.

d. Lack of Human Capital

Training at all levels of the education system is deficient, of limited relevance to the subsector's needs, and inaccessible to the great majority of isolated farm families. A critical shortage exists of trained scientists and technical managers to staff senior positions in the sector.

e. Inadequate Markets for Factors of Production and Output

Modern production inputs are largely imported, restricting their availability and increasing their cost. Lack of market information, grading and weighing standards contribute to uncertainty and inefficiency in marketing of production. A deficient, high-cost transportation system which does not yet provide year-round vehicle access to many production areas severely limits distribution of both inputs and production, contributes to high transportation costs, and discourages production for other than domestic consumption.

f. Poorly Organized Public Services for Agriculture

Social and technical programs that provide essential support services, such as technological development, extension, agricultural credit, and cooperative development, are limited and suffer from lack of budget support and technical and management expertise. Those services that do exist, furthermore, rarely extend to the small farm subsector due to its geographic isolation and limited accessibility.

g. General Policy Framework

Lack of adequate price incentives and favorable tariff policy on agricultural inputs have historically restricted growth prospects in the sector, although major improvements in these policies have been made in recent years.

The GOB has responded positively to this complex of problems beginning with the issuance of its Five-Year Agricultural Plan: 1976 - 1980. This plan marks the recognition of first, the importance of the agricultural sector as a priority contributor to development and, second, the key role of the small farm subsector in Bolivian agricultural

development and the extensive need for GOB assistance to that subsector. These statements of policy have been followed up by a steady growth in GOB investment in the sector, increased price incentives to producers, and a variety of programs aimed at relieving production and marketing constraints faced by the small farmer.

2. The Transportation Constraint

a. Road System Overview

Bolivia's existing road system reflects its historical preocupation with the mining sector and concentration of population in the Altiplano and Valle regions where primary and secondary roads link the cities of La Paz, Oruro, Potosí, Cochabamba, and extend to the major mines. This network of principal roads is only slowly being extended into the far south and Oriente regions. The existing highway system comprises nine primary roads totalling 5,551 kms. and 21 secondary roads totalling 3,804 kms. Only 1,170 kms. or 12.5 per cent of these principal roads are paved, and 6,560 kms. or 70 per cent are gravel surfaced. The remainder are improved dirt-surfaced roads. An additional 2,217 kms. of primary road and 1,748 kms. of secondary road are now under construction.

Feeding into this principal road network are over 28,600 kms. of dirt-surfaced local roads, which account for over 75 per cent of the total road system in Bolivia. It is these roads, plus the countless animal trails which are too narrow for transit by vehicle, which serve the country's small farm subsector. According to current SNC records (see Table 1 below), over half of these local roads are impassable during the rainy season, and another 28 per cent are passable with difficulty and only by four-wheel drive vehicles.

TABLE 1

NATIONAL ROAD SYSTEM: KILOMETERS BY CLASS AND CONDITION OF ROAD (1978)

Class	All-Weather	Passable with Difficulty in Rainy Season*	Not Passable in Rainy Season	Total	%
Primary	4,381	637	533	5,551	15
Secondary	1,784	1,668	352	3,804	10
Local	5,735	8,028	14,911	28,674	75
TOTAL	11,900	10,333	15,796	38,029	100

* Only by heavy trucks and four-wheel drive vehicles.

It is clear from this table that one of the most serious problems of the national road system is the poor condition of the local road network. The construction of these roads is generally deficient, having been built by local communities with little or no engineering study or supervision. As a consequence, the heavy rains which cover the country for three to five months a year can close many of these roads where the clay-based road platform is not stabilized and where there are virtually no drainage structures.

b. Importance of Transportation

Any overall plan to improve the performance of the small farm subsector and thereby raise the standard of living of Bolivia's rural poor is incomplete without a committed effort to improve access to and from the rural areas. The geographic isolation of these areas, separated from the principal markets and population centers by the rugged Andes mountains and expanses of tropical and semi-tropical forest has restricted marketing of production and inputs and delivery of supporting services in extension, credit, health and education. Both the GOB Agricultural Plan and the IBRD Economic Memorandum on Bolivia cite the critical importance of improving internal transportation networks to increase market efficiency, expand resource utilization, and integrate the small farm subsector into the national economy. The IBRD Memorandum states: "The lack of adequate transport facilities is one of the main obstacles to Bolivia's development. It prevents the use of potentially bountiful areas, the integration of the economy, the creation of national markets for both factors of production and product output..."

c. Need for Livestment in Rural Roads

The most immediate need is for improved, all-weather rural access roads to feed into the major road network. Access roads which are serviceable year-round would provide small farmers easier, more dependable, and quicker access to rural markets, reducing transportation costs, spoilage and risks of marketing losses, and increasing production and marketing of food crops as a result. At the same time, improved roads would facilitate a reverse flow of extension agents, farm inputs, credit, and related services from the towns to small farming communities. Constant and dependable flow of these services is essential to improving farm production technology, and thereby raising productivity and incomes in the small farm subsector.

The GOB and Mission strategy for improving small farm subsector performance recognizes the critical supporting role of improved access to and from rural areas. The $ 8.5 million Rural Roads I project represents an initial step toward providing necessary transport

infrastructure in the rural areas. However, given the size and expanse of the small farm subsector in the country and the deficiencies in the existing rural road network, considerable additional investment in rural road improvement is required.

3. Institutions Involved in Road Programs

These programs have been managed by the GOB's Servicio Nacional de Caminos (SNC) which was established in 1961 to take on all responsibilities related to the administration of the national road system. These responsibilities are carried out by a network of 10 SNC District Highway Offices located throughout the country which supervise construction activities and perform heavy equipment and major road maintenance. Under each District Office are several highway residencias, whose principal responsibility is road maintenance.

While SNC's experience has been largely in supervision of major road construction by private contractors, funded by donors such as AID, BID, and the IBRD, it has also undertaken construction on its own of an estimated 1500 - 2000 kms. of primary and secondary roads, over half of these dirt surfaced.

By contrast, SNC's involvement in construction and improvement of the local road network has been limited, even though this responsibility also falls within its administrative jurisdiction. The principal reason for this has been the traditional lack of financial support, either from the GOB or external sources. Between 1963 and 1974, SNC constructed only 545 kms. of rural access roads.

By and large, the responsibility for building, improving, and maintaining rural access roads has traditionally fallen to local interests, private mining operations, large land-owners, and since the agrarian reform, agricultural communities. These groups rely on private contributions from interested communities and private voluntary organizations, utilizing local unpaid labor and whatever equipment was available. The National Community Development Service (SNDC) has been active in self-help rural roads projects, organizing voluntary labor and providing hand tools and minor equipment when possible. More recently, the decentralized Departmental Development Committees (DDCs) have taken on a role in rural road construction, increasingly with assistance from SNC in the form of equipment support, engineering design, construction supervision, and partial financing.

4. Summary of Rural Roads I Project

To complement and expand on this growing SNC role in rural roads construction, AID made an $ 8.5 million loan to SNC in 1976 to

institutionalize a rural roads program within SNC. This rural access roads project provided for the creation of a Rural Roads (Caminos Vecinales) Department in SNC which is responsible for the planning, engineering design, and construction of all-weather rural access roads. Under the central Caminos Vecinales Department are separate offices attached to each of SNC's four District Offices in the project area (Departments of Cochabamba, Chuquisaca, Santa Cruz, and La Paz). (Organizational Chart included as Annex K, Exhibit 2.) The SNC district offices and residencias provide logistical and equipment maintenance support to the Caminos Vecinales offices; however, road construction activities are performed by Caminos Vecinales work groups, utilizing equipment, tools, and materials provided under the AID loan. The AID loan also included funding for technical assistance and training for the newly-created Caminos Vecinales Department and SNC's district offices and residencias in the project areas.

The Rural Roads I project was authorized in June 1976, and the loan was signed late September 1976. Initial conditions precedent were met in December 1976, and SNC began staffing project offices and preparing procurement and contract documentation.

The Caminos Vecinales Department is now staffed with four professional engineers, including a director who was appointed in January 1977, and a long-term technical advisor, who began work on the project in October 1977. Two additional engineering positions in Caminos Vecinales -- the sub-director and a division chief -- are expected to be filled shortly. Applications for a maintenance advisory position are now being received and a contract is expected to be signed by June 1978. Staffing of the four field offices is also nearly complete. The first training course for operators and mechanics is to be held in March 1978.

After initial delays of about six months caused by complex AID and GOB procurement procedures, equipment procurement is now well underway. Contract awards were made in August, and letters of credit have been issued to ten US suppliers for heavy equipment and vehicles totalling over $ 5.0 million. Delivery of these orders is expected to be completed in May - June and construction should begin by July. This represents a delay of approximately five months in the project implementation schedule presented in the PP.

Despite these delays, road identification and community promotion has been in process for several months. Eight SNDC promotors have been assigned since June 1977 to work on the project, undertaking

community promotion activities and collecting preliminary data on roads proposed by interested communities. Eighty-six requests for the improvement of over 2000 kilometers of roads have been received by the Caminos Vecinales Departments as of January 31, 1978. The SNC economist has screened these requests, and identified 33 as complying with eligibility criteria. Socio-economic data have been collected for 14 of these candidate roads, as shown in Table 2 below, and data collection for the remaining 19 is continuing. Further, analysis of these candidate roads for technical feasibility must await delivery of surveying equipment, which is expected by early March 1978. SNC expects to have full feasibility studies and a priority ranking for 300 kilometers of road, or one quarter of the 1,200 kms. to be improved under the project, completed by the end of April.

TABLE 2

PROGRESS TO DATE ON ROAD SELECTION: RR I

Department	Applications		Candidate Roads		Roads for Which Data Collected	
	No.	Est. Road Length(km)	No.	Est. Road Length(km)	No.	Est. Road Length(km)
La Paz	21	455	11	200	9	180
Chuquisaca	30	867	8	191	2	69
Cochabamba	18	333	5	109	1	25
Santa Cruz	17	366	9	184	7	117
TOTAL	86	2,021	33	684	19	391

Thus, substantial progress has been made under Rural Roads I. The Caminos Vecinales Department is in operation, providing managerial and technical support and setting the institutional base for this and future rural roads programs. Other participating agencies, including related SNC offices and SNDC, as well as beneficiary communities, have shown considerable enthusiasm in carrying out their activities under the project. Road selection is well-advanced, providing more than enough candidate roads for the first year of construction. Assuming no delays in delivery of equipment, construction will begin in earnest by July and an estimated 150 kms. should be completed by the end of 1978. A GOB budget contribution of $ 750,000 to cover salaries and some local materials for project activities during 1978 has been approved.

5. Other Construction Activities in Project Areas

As described earlier, there are a variety of on-going rural roads programs involving different institutions and donor agencies.

The three most active of these include the World Food Program (WFP), the joint SNC-DDC Program, and SNDC's self-help road projects. All of these are active in the project areas of AID's Rural Roads I and II, but since these other programs are quite distinct from AID's in terms of purpose and type of construction activity, they will be complementary to and not duplicative of AID's efforts:

- The joint SNC-DDC program will involve both construction and improvement of four roads in Chuquisaca and Potosí which have already been identified under written agreements between SNC and the respective DDCs. Three of these roads are considerably longer than those to be improved under the AID project, ranging from 74 to 222 kilometers, while the fourth road is a 30 km. segment of a secondary road. Also, the roads are not constructed to all-weather standards.

- The focus of the World Food Program and SNDC program is on new construction of penetration roads to open up new areas. Roads constructed under these programs will be to minimal standards (no ditching, drainage structures, or surfacing), utilizing labor-intensive methods with minor equipment support. Programs such as these constitute an important supplementary means of offering new access to isolated farming communities given the existing limitations of SNC's capacity; however, they cannot substitute for construction and improvement of access roads to all-weather standards. Roads built under WFP and SNDC auspices will eventually require upgrading to improved standards by SNC engineers under future Caminos Vecinales programs.

The design of the Rural Roads II project should assure maximum coordination among these rural roads programs by locating the responsibility for selection of roads to be financed under this project in Departmental Road Committees chaired by the DDCs. The DDCs are now administering road construction activities under both the WFP and the joint program with SNC. Coordination with SNDC road projects will be facilitated through SNDC representation on the Departmental Road Committee. This arrangement should assure that roads to be financed under Rural Roads II will be selected so as to complement, not conflict with or duplicate, on-going and planned efforts under the other rural roads programs.

B. Project Priority and Relevance

1. Rationale for Rural Roads II

a. AID's Overall Program Strategy

AID's agriculture and rural development sector strategy in Bolivia pursues the overall goal of increasing the per capita income and standard of living of rural poor people. The strategy for attaining

the goal consists of five basic areas of emphasis which simultaneously address the interrelated constraints facing small farmer development.

These are as follows:

1) Development and Dissemination of the Technical Base for Small Farmer Agriculture

The USAID/B projects focusing on this area of emphasis are basically the Agricultural Sector I loan and its companion grant project Basic Foods Production and Marketing. Both these projects have important technological development and dissemination elements which concentrate on Bolivia's high valleys. The Exploratory Research grant project pursues the expansion of the agricultural technical base for Bolivia's northern agricultural frontier areas. Although AID's involvement in this area will continue with the ongoing projects mentioned above, no major new involvement in agricultural research or extension is planned at this time because of the large IDB effort programmed for the Bolivian Agricultural Technology Institute (IBTA).

2) Improvement of Small Farmer Access to Needed Production Inputs, Including Land and Water

Many USAID/B ongoing or planned projects fall into this area of emphasis. The agricultural credit components of Basic Foods Production, Agricultural Sector I and II and Small Farmer Organizations I all contribute to improve small farmer access to inputs. The planned Productive Credit Guarantee Program will also contribute to this, as will the increased supplies of agricultural inputs to be financed under the Agribusiness and Artisanry Project. The Sub-Tropical Lands Development Loan has as its objective the provision of productive land credit and other inputs to approximately 4,000 small farmers. AID's participation in much needed water resource development has been principally in small-scale community development type projects.

3) Improvement of the Marketing System Servicing Small Farmers

AID projects which focus on this area of concentration are various. The Rural Roads I project and the planned Rural Roads II project focus on the construction of priority farm-to-market roads. Through food for work programs Title II food also contributes to the improvement of farm-to-market roads. The Small Farmer Organizations I loan is supporting the development of cooperatives which also help improve small farmer marketing. The Agribusiness and Artisanry Project has as one of its major objectives providing stronger and more secure markets for small farmer produce.

4) Improvement of Sectoral Management, Planning, and Policy Making

This area of concentration is being addressed by the Agricultural Sector I and II loans and their companion technical assistance grants. The recently approved Farm Policy Study has as its purpose the development of rural base level information and the utilization of that information in sectoral planning and policy making.

5) Rural Sector Human Capital Formation

This area of concentration is being addressed by the training components of all USAID/B rural development projects but especially by the two Agricultural Sector projects. These two projects, like others in the sector, focus on the improved training of high and middle level technicians in the sector and both contain an agricultural university improvement component. Both sectoral projects also attempt to address the need for farmer level training through the construction of training facilities.

Complementary to these projects are AID-sponsored investments in supporting rural infrastructure, including Rural Electrification I and II, totalling $ 20.4 million in AID loan funds, a $ 4.0 million loan for Rural Sanitation.

In addition to these on-going projects, the proposed Rural Development Planning project will strengthen the Departmental Development Committees to enable them to assume increasing responsibility for providing services to rural communities in their respective jurisdiction.

The combined impact of these projects, together with meaningful policy changes and significant GOB commitments of budgetary resources and personnel, should pave the way for a major improvement in the performance of the small farm subsector in selected geographic areas.

b. GOB Program for Rural Roads Construction

It is clear that the GOB's transport sector strategy must increasingly address the serious deficiencies of the local road network. Locally financed rural roads projects, undertaken on private initiative, have served in the past to provide minimal access to rural areas, while the GOB's attention was focussed on the priority need of linking important population centers. However, the great proportion of the major road network has now been developed, and the existing local roads are fast deteriorating due to inadequate design and deficiencies in their original construction. Moreover, the country's increasing dependence

on food crops produced in remote rural areas and the GOB's efforts to improve the standard of living of the small farm subsector imply a necessary new emphasis on developing the local road network.

Because the GOB cannot hope to meet the estimated need for 100,000 kms. of construction of new and improvement of existing rural roads throughout the country, it will have to continue to depend on private local initiative in carrying out rural roads programs. However, increased professional engineering assistance to these local groups is critical to assure adequate planning of local road networks and sound engineering design and construction. The GOB has taken important steps toward providing this necessary assistance in recent years by increasing SNC's participation in on-going rural roads projects. Under the World Food Program's rural roads construction project in Bolivia, SNC is providing supervisory technical assistance in coordination with participating DDCs, which are responsible for organizing construction work groups and distributing food to community laborers. This program has been active in the departments of Chuquisaca, Potosí, and Tarija, and will be expanded into Oruro, La Paz, and Cochabamba. In addition, SNC has signed agreements with the DDCs of La Paz, Pando, Beni, Santa Cruz, Chuquisaca, and Potosí to provide engineering assistance, equipment support, and partial financing for an ambitious program of road construction and improvement. Based on current SNC plans, an estimated 1,635 kms. of rural roads will be constructed or improved in these six departments, including 194 kms. in Chuquisaca, and 222 kms. in Potosí.

c. Timing

Given the implementation status of Rural Roads I, a logical question is - why request authorization for a $ 15.8 million Rural Roads II project at this time. There are good reasons:

- First, as discussed above, is the existence of several major on-going programs in the proposed project area (departments of Chuquisaca, Tarija, and Potosí). The Agricultural Sector II Program, for example, will provide seed processing and storage facilities plus production, investment, and land clearing credit to approximately 6,400 small farmers in the same departments as those in the proposed Rural Roads II project. Construction of rural access roads in the three southern departments will have a major impact on agricultural production by alleviating the transportation constraint. Both Agriculture Sector II and Rural Roads II play a role in the rural development approach now underway in the project area. Other projects such as Rural Electrification II, Rural Development Planning, and Farm Policy Analysis also focus their activities in the three southern departments.

- Second, to turn the question of timing around, what advantages are to be gained by waiting? The GOB is moving forward with its development plans for the southern departments and, as indicated above, there is an overwhelming need for investment in rural roads to alleviate the transport constraint to increased small farm production and improved quality of life for small farmers. The Caminos Vecinales Department is operational and has gained experience in analyzing and planning road construction activities under Rural Roads I. The construction/upgrading activities, which will be carried out at the District Office level, will begin in July, after the arrival of AID loan-financed equipment. Upgrading activities to be carried out under Rural Roads II will be conducted in different Highway Districts in different departments. New staff will be added to the Caminos Vecinales Field Offices, thus no real burden will be placed on resources earmarked for Roads I. Rural Roads II also has a significant road maintenance component not present in Rural Roads I, but which should have implications for how low cost rural road maintenance is carried out at the community level.

- Third, no other donors have expressed interest in a rural roads program in the southern departments. There are programs to construct penetration roads (World Food Program and SNDC), but not to all-weather standards. In addition, major donor programs (IBRD and IDB) are not aimed at departmental and local levels and have no institution building effort in rural road programs.

- Fourth, is the GOB's and AID's interest in increasing the role of Departmental Development Committees. The current GOB Five Year Developement Plan calls for increased reliance on the Departmental Development Committees to identify and implement rural development projects. Rural Roads II is aimed directly at improving and strengthening the planning, design and implementation capabilities of the DDCs and local communities by assigning the responsibilities of analyzing the road segments as well as promoting and organizing community labor directly to the DDCs. The project is important to the GOB because it provides the resources to SNC, the DDCs and the local communities to actually effect increased decentralization in rural road programs. This program begins to take the burden off the national level to plan, finance, construct, and maintain rural roads. In this regard, Rural Roads II departs from the approach in Rural Roads I by placing even greater planning, implementation, and financing tasks on the DDCs. Although Rural Roads II will utilize the ground work laid by Rural Roads I, it is not a "Phase II" of Rural Roads I and thus it argues for approval on its own merits and on its attempt to support the development process at the departmental level.

d. Level of Funding

The PRP for this project (submitted in November 1975) requested an $ 8.45 million FY 77 loan. The project was reviewed in AID/W and subsequently rescheduled in the FY 1978 Congressional Presentation at $ 8.5 million. The GOB has since requested, and the Mission supports a loan for $ 15.5 million and a grant for $ 300,000 to cover the technical assistance costs. Several factors contribute to the request for a higher loan level.

- The GOB's Priorities in the Project Area: Since the PRP submission the GOB has published its Five Year Development Plan. This plan places an increased priority on the development of agriculture in Bolivia's southern departments and recognizes the importance of farm-to-market road improvement in order to facilitate gains in agriculture production.

- Inflation: The PRP was submitted in November 1975. Since that time, a period of 27 months, the Mission has calculated that the prices of equipment and materials have risen about 20 per cent. Combined with a contingency of 10 per cent, these factors increase the AID portion of the project cost by $ 2.8 million.

- Maintenance Component: Recognizing that by the end of Rural Roads II, SNC will have at least 1,200 additional kilometers of access roads to maintain; the Mission has added a maintenance component to the project. This increases the AID portion of project cost by $ 2.6 million.

- Additional Road Construction: The project proposes to improve 1,200 kms. of roads versus 1,000 kms. proposed in the PRP. This additional 200 kms. of roads is expected to benefit about 7,400 farm families. The increased AID portion of the project cost is $ 1.6 million.

2. Project Strategy

a. Focus of Rural Roads II

The geographical focus of this project will be in the southern valleys and altiplano regions of the southern portion of the Department of Chuquisaca, and the Departments of Potosí and Tarija. This region is identified in the Mission's most recent DAP as a priority area for AID assistance given the region's concentration of rural poor and potential importance in production of basic food crops.

The region is predominantly rural, with the rural population accounting for over 79 per cent of the total departmental population

in Tarija, almost 83 per cent in Chuquisaca, and over 88 per cent in Potosí, all well above the proportion of rural population in Bolivia as a whole, which is roughly 60 per cent. Taken together, the three departments account for one-third of the nation's labor force employed in agriculture. In addition, the region is an important producer of basic food crops such as corn, wheat, oats, potatoes, and vegetables.

By all recent measures, these three departments rank among the poorest in Bolivia. Based on 1976 census data, the annual per capita GDP in Tarija, Chuquisaca, and Potosí is $ 232, $ 207, and $ 194, respectively, ranking fifth, sixth, and eighth among Bolivia's nine departments.

These low GDP figures reflect the disproportionately large share of the small farm subsector in the region's economy. As described earlier, the Bolivian small farm subsector features little or no growth, low productivity, and low incomes.

An average of 40.7 per cent of production in the region is marketed, the balance being retained for personal consumption and use as animal feed. Potosí is the least commercialized department, with only 23.4 per cent of production marketed, while production for sale accounts for 51.3 per cent in Chuquisaca and 42.2 per cent in Tarija. The great majority of the region's farm households continues to rely on traditional production methods. Only 4.6 per cent use improved seed and 12.4 per cent use chemical fertilizers.

A significant feature of the region's farm households is their physical isolation. Almost three-quarters of the region's farm households are more than ten kilometers from the nearest market, and over 56 per cent require more than three hours in traveling time to reach the market. This isolation is particularly exaggerated in Potosí, where two-thirds of the rural households are more than three hours from the nearest market. The primary and secondary road networks in these three departments are relatively well-developed, and programs are underway to improve some of the existing major road links, including those between Sucre - Tarija and Tarija - Padcaya.* However, the local road network is seriously deficient.

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* The final design of the Sucre-Potosí-Tarija project is under contract to a Venezuelan firm and is being financed by the Venezuelan Government. Designs for the Tarija-Padcaya project were done by SNC and construction will be done by a private contractor with GOB financing.

TABLE 3

SUMMARY OF ROADS

(Kilometers)

Type	Potosí	Chuquisaca	Tarija	Totals
Primary	555	836	316	1,707
Secondary	624	600	490	1,714
Local	7,920	3,407	1,616	12,943
Totals	9,099	4,843	2,422	16,364

b. Importance to Departmental Development

The Rural Roads II project will utilize the institutional basis established under Rural Roads I. In addition, the project will introduce a role for the DDCs in the analysis and selection of roads to be improved as a step toward decentralizing the planning of rural roads programs.

Under this project, an estimated 1,200 kms. of rural roads and trails will be improved, representing a 30 per cent increase in all-weather access roads in all three departments.

This project will consolidate and expand the institutional objective of encouraging a more active role for SNC in rural roads programs originally established under Rural Roads I. However, by involving the DDCs in road selection, this project will take an additional step toward strengthening the institutional framework for rural roads planning. In recent years, the DDCs, particularly in the project departments of Chuquisaca, Potosí, and Tarija, have taken on an increasingly central role in rural roads construction and improvement programs, as described above. SNC favors this trend, which permits it to provide necessary technical supervision to assure adequate rural road construction while freeing it of some of the burdensome administrative tasks involved in rural roads programs. The DDCs, on the other hand, are willing and able to take on these tasks as part of their overall planning and coordinating role. Moreover, they are eager to participate in the selection of roads to be financed in order to facilitate complementarity of rural road investments under this project with other on-going and planned investments in roads and

related programs. The GOB regards this evolving division of labor as an appropriate and efficient framework for this and future rural roads programs. The project has been designed to further this evolution.

c. Principal Differences From Rural Roads I

While the design of this project essentially follows the model of Rural Roads I, two important changes have been made in the procedure for the selection of roads:

- The methodology for analyzing the economic and social feasibility of candidate roads and prioritizing selected roads has been refined and simplified, eliminating the complex and essentially arbitrary weighting system proposed for use under Rural Roads I. The improved methodology will be used under both Rural Roads I and II, providing standardized road selection criteria under both projects. The Rural Roads I institutional arrangements, however, will remain unchanged.

- Following the Mission's new DAP strategy calling for increased decentralization of project planning and implementation, this project will shift major responsibility for road selection from the central SNC office to the DDCs. Also, SNDC's role has been eliminated. The DDCs in the project areas will screen all community requests for road improvement, collect necessary data on candidate roads, analyze these against established criteria, and prepare a prioritized list of selected roads for submission to SNC. In carrying out these functions, the DDCs will supplant the roles of the SNC economist and MACA extension agents in the procedure for road selection established under Rural Roads I. In addition, the DDCs will take on the task of community promotion which is assigned to SNDC under Rural Roads I. (SNDC will participate in the Departmental Road Committee as an observer.)

The principal reason for these changes in road selection procedures is the GOB's desire, shared by the Mission, to relocate selected planning and implementation functions from the central Ministries to regional-level institutions which are closer to local realities and hence better equipped to respond to local needs. The DDCs have increasingly taken on regional planning functions, and this project will build on that momentum. Furthermore, locating road selection responsibilities in the DDCs has the important advantages of, first, assuring coordination with other agencies and planned investment projects in the department and, second, simplifying the institutional arrangements under the project by eliminating dependence on the SNC economist, SNDC staff, and MACA agents.

The Project Committee has determined that revision of the institutional arrangements (i.e. the participation of SNDC, MACA plus SNC and the DDCs) under Rural Roads I is unwarranted and inadvisable

at this time. The institutional arrangements for road selection under Rural Roads I are already in place -- SNDC has begun its community promotion activities and the SNC central economist has begun to review community requests. A revision of this selection mechanism would interrupt these on-going activities for a minimum of six months while new procedures were negotiated with SNC, SNDC, and the three DDCs in the Rural Roads I project area. This would delay the beginning of construction while equipment stood idle and the momentum of community interest fostered through SNDC promotion waned.

Moreover, the feasibility of involving DDCs in road selection under Rural Roads II rests on two conditions which do not apply to the DDCs in the Rural Roads I project areas. First, the Rural Roads II DDCs will be receiving supplementary technical assistance in project planning and analysis under the Rural Development Planning project, which will enable these DDCs to develop and refine the skills which they will be applying in road selection under Rural Roads II. The DDCs in Rural Roads I project areas will not be receiving such support. Second, the DDCs in the Rural Roads II areas are serving departments in which the small farm subsector predominates and thus are focusing. their activities on programs which benefit this population, including rural roads.

While conditions are not now favorable to involving DDCs in road selection under Rural Roads I, the GOB hopes to work toward standardizing the institutional arrangements for rural roads projects to provide uniform administrative mechanism for both on-going and future road programs. Once the GOB has had adequate experience with the two alternative mechanisms under both Rural Roads I and II, it will review with the Mission the strengths and weaknesses of each to determine which alternative is the most appropriate model for road selection and to consider the option of standardizing procedures under the two projects.

Finally, Rural Roads II has a road and equipment maintenance component. About 18 per cent of the AID financing can be attributed to the purchase of maintenance equipment to improve the district highway facilities and capabilities to maintain roads. The rural roads to be upgraded under Rural Roads I will be maintained by SNC and the local communities in conjunction with a IBRD sponsored road maintenance project scheduled to be signed in July 1978. Thus a maintenance component was unnecessary in the earlier loan.

C. Detailed Description

1. Project Goal

The general agricultural sector goal, as described in the Mission's Agricultural Sector Assessment and DAP strategy, to which this and other AID programs are being directed, is to improve the standards of living of Bolivia's rural poor. The majority of these rural poor have a median annual on farm income of about $ 290 and have extremely limited access to marketing facilities and services such as agricultural extension, credit, schools, and health clinics. This project will contribute to the sector goal of improved living standards by increasing small farm families' income and by improving their access to social services. The increase in income will occur as a result of decreased transportation costs, increased land under cultivation, increased production of higher-value crops, and increased share of production which is marketed.

2. Project Purpose

The project has two major purposes. The first is to improve access to and from small farms in selected areas of the Departments of Chuquisaca, Potosí, and Tarija by upgrading 1,200 kms. of local access roads to all-weather standards. Such roads will facilitate the delivery of agricultural inputs and related services and stimulate increased agricultural production because of faster, more dependable year-round access to markets and other agricultural services.

The second purpose of the project is to expand and improve the capacity of the Bolivian implementing agencies, particularly the Caminos Vecinales Department of the National Highway Service and selected Departmental Development Committees, to carry out a rural roads improvement program, including the planning, selection, design, and execution of road improvement activities, as well as road and equipment maintenance. A major thrust of this institution building will be to decentralize the planning and implementation of the rural roads project to the departmental level.

3. End of Project Status

At the end of the project, 1,200 kms. of rural access roads will have been improved, thereby directly impacting on approximately 44,000 small farm families. Small farmer incomes in the project area should increase by 36 per cent.

In addition, at the end of the project SNC's Caminos Vecinales Department will have expanded its roads improvement and maintenance program into the Departments of Potosí, Chuquisaca, and Tarija:

- Four District Offices at the cities of Sucre, Tarija, Potosí, and Tupiza will be upgraded, equipped, staffed and operational, and capable of (1) managing and directing road improvement activities within their respective jurisdiction, (2) supervising six basic and four support equipment groups working in the districts, and (3) performing heavy equipment maintenance and repairs at the district workshops.

- Ten highway residencias will be equipped, staffed and operational, and capable of (1) supervising community labor used in the improvement of rural roads within the residencias, (2) maintaining the roads, and (3) performing maintenance and minor repairs at the residencia workshop.

- The three DDCs located in Chuquisaca, Potosí, and Tarija will be capable of analyzing, planning, coordinating, promoting, implementing, and evaluating road improvement activities in their jurisdictions.

- At least 100 local communities will have provided the necessary labor for road improvement and continuing minor road maintenance activities.

Finally, by the end of project SNC's Caminos Vecinales office in La Paz will be able to plan and coordinate rural road project activities as well as manage the improvement and maintenance activities. The office will also be able to procure and distribute heavy equipment, hand tools and materials and conduct the training programs necessary to insure the availability of supervisory and technical personnel.

4. Project Elements

The project consists of three major elements: improvement of 1,000 kms. of rural roads to all-weather standards; institution building of participating institutions through technical assistance, training and on-the-job experience; and maintenance of roads and equipment.

a. Institutional Strengthening

This project will continue the institution building of SNC's Caminos Vecinales Department begun under Rural Roads I, but also carry the institution building several steps further by decentralizing some of the decision making and to an even greater extent the actual road improvement and maintenance activities to the departmental and local levels. The Caminos Vecinales Department will be the primary executing agency for this project. However, in keeping with the interest of the GOB and the Mission in greater decentralization of project planning and implementation, Rural Roads II will increase the role of the DDCs and beneficiary communities in subproject identification, analysis, selection, and implementation. Such decentralization

has the advantage of bringing an important part of the decision making process closer to the beneficiaries themselves, who ultimately will be responsible for maintaining the roads.

The beneficiary communities themselves will be a key factor in the success of this project. For this reason, the DDCs will work with the communities to establish a Community Rural Roads Development Committee which, in turn, will be responsible for mobilizing community labor in support of road improvement and maintenance.

(i) Technical Assistance

Rural Roads I is financing long-term technical assistance (one engineering advisor and one equipment advisor for two years each) to the Caminos Vecinales Department. Also, a short term master mechanic and a workshop analyst are being recruited to study the equipment maintenance needs of SNC.

Under Rural Roads II the long-term technical advisory services to Caminos Vecinales will be continued for an additional 24 - 30 months. An economist will be provided for three months at the beginning of the program to assist the chief SNC economists and the DDC economists in refining the methodology for the economic analysis of individual road segments. It is likely that this economic advisor will be provided for another three months during the actual implementation of the project. Finally, a training advisor will be provided for twelve months to organize and begin implementing a training program.

(ii) Training

The in-country training program will serve two major purposes: (1) to improve the capability of the Caminos Vecinales Department at the national and departmental levels, especially with regard to overall management of rural road upgrading and maintenance programs, procurement and distribution of equipment and materials, and (2) to improve the capabilities of the DDCs to carry out their role in analyzing, selecting and subsequently implementing subproject improvement and maintenance activities.

Regarding the specific training requirements for road and equipment maintenance, both Rural Roads I and II will utilize the planned GOB/IBRD Highway Maintenance Program projected for signature in July 1978. This five-year $ 37 million program ($ 25 million IBRD loan and $ 12 million GOB contribution) will have a large institution building and training component aimed at strengthening SNC's road and equipment maintenance capabilities. (See Part III, A - Technical Analysis for further description of this program.)

The training to be carried out in Rural Roads II will be principally focused on the supervisory, mechanical, technical, and equipment operator needs of the program. Loan funds will pay the travel and per diem expenses of training operators and mechanics at the SNC school outside of La Paz, as well as for conducting on site and workshop classes in road construction and equipment maintenance techniques; chief mechanics will be sent to specialized equipment maintenance courses; and training materials (films, audiovisual equipment) and equipment manuals will be purchased. Training courses will be held for district engineers, district and assistant project engineers, residencia engineers and community labor supervisors. The training advisor will work very closely with the advisors to be provided under the IBRD loan to design specific training programs and to assist in establishing a training division within SNC.

The training requirements for the analytical skills required at the DDC level to carry out the socio-economic feasibility studies will be met by a short-term economist working with the SNC and DDC economists.

b. Rural Road Improvement

Utilizing the existing institutional base, while at the same time strengthening and expanding the capabilities of SNC's Caminos Vecinales Department, the DDCs, and the Community Committees, the project will improve about 1,200 kms. of rural roads in the departments of Chuquisaca, Potosí, and Tarija. In all cases existing dry weather roads or animal trails will be upgraded to an all-weather standard. Realignment will be kept to a minimum. Each road improved under the project will connect with an existing all-weather road and serve an area whose principal economic activity is agriculture.

SNC will be responsible for improving the roads using surveying equipment, road improvement equipment, hand tools and materials provided through loan funds. (Annex H, Exhibit 5 contains equipment lists.) SNC, the DDCs, and the Community Committees will provide the operating costs for the program including skilled personnel, community labor, fuel, lubricants, and local materials (rock, gravel, etc.). Average cost per kilometer will range from $ 9,400 to $ 13,700, depending on geographical location.

Road improvement equipment supplied under the project will be provided to six basic work groups and four support work groups, which come under the jurisdiction of the Caminos Vecinales Residences.

- The six basic groups will be responsible for improvement and upgrading of rural roads. Each group will be able to upgrade about 50 kms. of road per year with the assistance of community hand

labor. Two of the six basic groups will be located in northern Potosí and one each in central Chuquisaca, southern Chuquisaca, Tarija, and southern Potosí.

- The four support groups will be responsible for transportation of materials and people, field maintenance and movement of equipment (i.e. overall logistical support to the basic work groups). The four support groups come under the control districts of Sucre, Potosí, Tarija, and Tupiza. The Rural Roads I support group at Sucre will service the Rural Roads I basic group in northern Chuquisaca. The new Sucre Support group established under this project will service the new basic group in central Chuquisaca.

- District highway offices in the project area will supervise the residencias and in turn the basic and support groups working within their respective jurisdictions.

c. Road and Equipment Maintenance

The ten SNC residencias will supervise overall maintenance of the roads upgraded in this program.

- Minor road maintenance will be the responsibility of the Community Committees (formed to upgrade the roads) which will organize community labor to fill potholes, clean ditches and culverts, etc.

- Major road maintenance (generally that which requires equipment) will be the responsibility of the highway residencias, which will provide equipment and skilled personnel to clear landslides, repair washouts, and make a minimum of two passes per year with a motor grader over each road, and maintain the all-weather surface. As an average, each residencia will be responsible for maintaining about 120 kilometers of road per year by end of project.

All maintenance and repair of equipment will be done in workshops located in district offices or the highway residencias, as well as in the field by equipment operators and the mechanics assigned to the mobile lube/shop trucks included in each of the support groups.

Project loan funds will provide equipment for both road and equipment maintenance. SNC will provide skilled personnel, fuel, and lubricants for major maintenance requirements. The DDCs and the local communities will supply the necessary supervisory personnel and hand labor for minor maintenance.

5. Project Organization

The project background and institutional analysis summarize AID's involvement with SNC as well as the strengths and weaknesses of the organization. This section describes the project's organization and the functions to be carried out by each of the implementing units:

a. National Highway Service (SNC)

1) Caminos Vecinales Department

a) Overall management and coordination of project implementation.

b) Procurement and distribution of project heavy equipment, hand tools, and materials.

c) Training program.

2) District Highway Offices (4)

a) Overall management and direction of project activities within district.

b) Employment of personnel and overall supervision of basic and support equipment groups working in district.

c) Heavy equipment maintenance and repair at district workshop.

d) Member of Departmental Rural Roads Interagency Planning Committee.

3) Highway Residencias (10)

a) Maintenance of rural roads within residencia area.

b) Supervision and transportation of community labor used in improvement and maintenance of rural roads within residencia.

c) Maintenance and minor repair of road maintenance equipment at residencia workshop.

4) Basic Equipment Groups (6)

Improve rural roads.

5) Support equipment groups (4)

Provide required support to basic equipment groups working within district.

b. Departmental Development Committees

1) Overall leadership in planning project activities within department, including promotion.

2) Socio-economic study of rural roads proposed for improvement.

3) Chairman of Departmental Rural Roads Planning Committee.

4) Provision of engineer to SNC as assistant project engineer at the work group level to assist SNC in supervising road upgrading activities as well as to perform necessary liaison functions between SNC and DDC.

5) Provision of local currency budget support to SNC for the project in the form of 50 per cent of the operating costs of improvement of rural roads within department.

6) Organization of communities in support of project activities.

7) Liaison and coordination with other governmental agencies, particularly the National Community Development Service (SNDC).

c. Communities

1) Establishment of Community Rural Roads Development Committee.

2) Appointment of local monitor for road improvement and maintenance responsibilities.

3) Organization and provision of free community labor in support of rural road improvement.

4) Continuation of Community Rural Roads Development Committee after completion of rural road improvement.

5) Organization and provision of community labor to carry out minor maintenance on improved rural road.

6. Project Mechanism - Institutional Framework

Much of the groundwork for this project has been laid by the establishment of SNC's Caminos Vecinales Department under Rural Roads I. The specific functions of each of the implementating organizations are described above. Obviously, this project will require a great deal of

coordination among all the organizations if the objectives of improving a minimum 1,200 kms. of roads plus strengthening and decentralizing a rural roads organization are to be achieved. In general, however, the road improvement element of the project in each department will be implemented as follows:

- Local communities submit requests for improving road segments (with evidence of availability of community labor) at any time during the year to DDCs, SNC, or SNDC.

- DDCs assemble all requests and scrutinize them according to initial set of criteria (i.e. proposed segment connects to all-weather road, principal economic activity in area to be served is agriculture, community labor available, and a majority of farms served by a candidate road must be less than 10 hectares). This initial screening will probably occur at various times throughout the year, but must allow time for further analysis before final selection. Those requests not meeting the initial set of criteria are disregarded.

- Caminos Vecinales and DDC engineers will calculate the construction cost per kilometer considering factors such as necessary changes in road alignment, required bridges or culverts, nature of soil, and extent of soil and rock to be excavated.

- Using guidelines from SNC economist, DDCs perform benefit/cost (B/C) analysis as set forth in the economic selection criteria (Annex I, Exhibit 7).

- DDCs complete analysis and rank roads on basis of B/C analysis.

- Departmental Planning Committee composed of the DDC, SNC, SNDC (a non-voting number) and local communities selects road segments to be improved based on B/C analysis and outlines preliminary road construction schedule for coming construction period (dry season).

- After surveying and engineering work is completed, local communities, DDCs and SNC schedule construction activities. Construction of road segments are scheduled so as to minimize construction costs, i.e., SNC attempts to minimize costs and time lost in moving equipment and personnel from one road segment to another.

- DDCs begins promotional activities to organize communities to contribute necessary voluntary labor when SNC construction groups begin work.

- SNC carries out construction/upgrading activities with assistance of community labor. DDC engineers at work group level assist SNC engineers in supervisory responsibilities.

7. Road Segment Selection Criteria

a. First Phase

1) Road segment must intersect an all-weather road.

2) The majority of farms served by a candidate road must be less than 10 hectares.

3) The community must provide evidence that it has ample community labor for both the construction and maintenance phases. Other factors are community organizations, local leadership system and yearly work cycle of farmers.

4) The section requiring improvement should generally not exceed 20 kms. (Note: This seems to be the maximum length of road construction administratively feasible with the use of community labor.)

Those road segments passing the first phase will be subjected to a benefit/cost analysis.

b. Second Phase

1) To be eligible for construction, a road must have a B/C ratio at least equal to one.

2) Those roads receiving a B/C of at least one (using cost of capital of 15 per cent) will be listed beginning with highest B/C ratio.

3) Prior to a construction period, and the selection of roads to be constructed, road segments totalling at least 150 per cent of the anticipated length to be built during that period will be subjected to B/C analysis.

4) Assuming that it will not be possible to construct all the eligible roads within the current construction period, the DDCs will select the number of candidate roads (beginning with the road having the highest B/C ratio) that most closely correspond to the number of kilometers of road SNC estimates can be constructed in a construction period.

The remaining roads will be deferred for consideration in the next period. The roads included in the current period will be grouped by region to minimize cost of moving construction equipment, to maximize supervision coverage, etc. If some of the roads in the current construction period are isolated and do not lend themselves to regional grouping, they maybe replaced by roads on the deferred list that do fall within these groupings if: (1) an isolated road is expected to fall within some regional grouping in the next construction period; or if (2) the average cost per road segment of moving equipment, etc. to an isolated site is estimated to be so much greater than that experienced for the grouped roads that proper accounting of the logistical costs would lower the B/C ratio of the isolated road segment below others that are within the current regions, but currently on the deferred list.

PART III. PROJECT ANALYSIS

A. Technical and Engineering Analysis

1. Choice of Technology

The road upgrading and maintenance aspects of this project focus on low volume roads and trails which are badly situated and aligned, have inadequate cross drainage, inadequate cross sections, and surfacing which does not pertmit truck or bus transit during rainy weather.

The severity of these conditions vary. However, the program of improving these roads to permit secure year-round transit by bus and truck must respond to each of these conditions through the blasting and removal of rock interfering with desired grade and alignment; the excavation, movement and compaction of soils; the excavation, and construction of drainage structures; and the securing, placing and spreading of gravel or crushed rock for an all-weather surface.

The maintenance of these improved roads must provide for removal of slides and debris, and the cleaning of ditches and drainage structures during the rainy season. Provision must also be made for repair of erosion and holes in the embankment and road surface, and for placement periodically of additional surfacing material to replace eroded or otherwise damaged surfaces.

Bolivia is a land rich country with a comparatively small population. In the project zone, much of the population served lives in valleys which are reached by traversing unpopulated mountainous areas. Thus the distribution and availability of manpower for road construction is highly uneven. Consequently, one of the principal considerations in designing a rural access roads program and the mix of equipment is the hand labor to be used.

The U.N. Food for Work Program through the GOB organization ALDE has worked with the DDCs for several years in the construction of penetration roads to minimal standards (e.g. 3-4 meters wide versus 4-5 meters for all weather roads). Officials of the ALDE state that lack of manpower severely limits the rate at which roads can be constructed using their labor intensive approach.

Roads constructed under this approach cost about $2,500 per kilometer plus food valued at $1,000 and require about 1,000 man days of labor per kilomenter. (Voluntary labor requirements under Rural Roads II will be about 150 man days per kilomenter). The ALDE program is carried out only in areas where there is sufficient labor and where the large crews are willing to work full time for pay and food over an extended period of time. Rate of progress under the food for work program is about 1 kilometer per month or about 15% of that projected under Rural Roads II. Moreover, the roads are not constructed to all weather standards. They have no culverts, no rock surfacing, and only ocasionally have ditches.

The lack of access during the rainy season is ultimately the greatest drawback to roads constructed by ALDE. The roads are clearly needed as a first step in meeting the small farmer's impressive demand for farm to market access. But they should be upgraded to all weather standards to facilitate agricultural marketing throughout the entire year. A number of the roads to be improved to all weather standardsin Rural Roads II were originally constructed as penetration roads by ALDE.

To undertake these works in the Bolivian environment on a reasonable schedule with acceptable quality and at minimum cost, dictates a blend of capital intensive and labor intensive technology. As developed in the Rural Roads I program, a balance is struck between these two extremes in technology as follows:

Construction Work Sequence

By Machine:

Roadway excavation and leveling.
Loading and transport of cement, sand, gravel, and aggregate.
Crushing of rock aggregate.
Spreading of surfacing material.
Compaction of fill and surface material
Side ditch excavation.
Transportation and setting of precast members for small bridges.
Stockpiling and screening of gravel, with hand labor assistance.

By Hand:

Clearing and grubbing.
Excavation of retaining walls, fords, and culverts.
Masonry construction.
Handling and installation of drainage pipe.
Side ditch excavation of drainage pipe.

Maintenance Work Sequences:

By Hand:

Clean ditches, drains and culverts, and small slides.
Fill potholes.

By Machine:

Major repairs of washouts and slides.
Replace and compact material for eroded surfaces.

To accumulate cost data and to adapt to variations in local conditions, an experimental program is presently being initiated under Rural Roads I. The road construction under this study will begin in May 1976, and data will be reported at various intervals during the next year. With the results, the GOB should be able to fine tune the mix of hand labor and equipment and improve the production rate of the basic heavy equipment fleet being built up under these two loans, as well as extend the life of the equipment.

It is the current stated policy of the GOB Ministry of Transportation that all major construction works be carried out under contract, with the Servicio Nacional de Caminos to assume responsibilities for planning, contract supervision, maintenance, improvement and other minor works within the national road system. Bolivia has a reasonable and growing core of moderate size contractors who are involved in the construction of the trunk road network, as are the Bolivian Army Corps of Engineers, and a number of other work forces. Rural access roads are being constructed by pick and shovel efforts aided occasionally by construction equipment. This project is directed to the improvement of rural roads, such improvement falling clearly to the SNC within the above GOB guideline. The isolation of these roads, and the comparatively small amount of work do not attract contractors.

Given these considerations and the desire to extend production as rapidly as possible within available funding, using donated labor and avoiding charges for contractor risk and profit, the program will be performed by direct administrative efforts of the SNC.

The response of some 86 communities who are offering programmed cooperation gratis under Rural Roads I indicates assumptions of community support are well founded. These 86 communities are spread from the Yungas to Santa Cruz, with the majority (30) in Northern Chuquisaca.

2. Design Standards

Design standards have been developed for the project, and appropriate design criteria will be specified for each sub-project activity (see Annex H, Exhibit 2). In general, minimum standards regarding loading, vertical and horizontal alignments and width of roadway will be followed.

Roads will be designed to take advantage of the natural terrain, minimizing cuts and fills, with only minor drainage structures contemplated. River crossings will be designed in lieu of bridges where possible, providing culverts for low water flows, and concrete masonry fords for high water crossing, where possible. Almost without exception, all roads will be single lane, with provisions for turnouts for passing at convenient intervals. The roads will be all-weather, using an adequate thickness of gravel or crushed rock as surfacing, except in rare cases where the native soils could provide an adequate surface. The road beds will be at least 4 meters wide. The design loading for each road will depend on anticipated loads to be carried thereon and the bearing capacity of the native soil. No major drainage structures will be built. Concrete pipes, masonry arches, small concrete bridges, and stone fords will be used for cross drainage.

3. Engineering and Construction

a. Surveys

Surveying will be held to a minimum. In most cases, a centerline alignment and profile and determination of culvert locations will provide sufficient information for the design. As all

of the access roads to be improved will follow existing trails or unimproved roads, no extensive location survey will be necessary. In those cases where it appears that a change in alignment would result in a less expensive construction or measurably improve access, such as where the existing road lies in the river bed, the necessary surveys will be done to make a relocation determination. Surveys will be carried out by SNC's permanent or contract employees.

b. Soils Studies

Studies of the plasticity and bearing capacity of the soils are required for each proposed road project. Samples will be obtained in the field and tested in SNC soils laboratories.

c. Design

As in the case of surveys, plans for the project will be simple. In general, plans will indicate only a centerline profile and alignment. Details of drainage structures, typical roadway sections, and right of way problems will complete the requirement for the construction plans. Typical sections and design details are shown in Annex H Exhibit 2.

d. Construction

SNC will be fully responsible for all construction, which will be done by force account with the assistance of voluntary labor.

Equipment on road construction will be operated by either SNC permanent or contract employees. The maintenance of the equipment will be the responsibility of the SNC's departmental staff to which the equipment is assigned, or of an SNC residencia where the equipment is working. As the amount of equipment is limited, emphasis will be placed on full utilization of the equipment during the construction phase although it will have to be transported from site to site as required. Roads to be built will be clustered in groups, however, facilitating the movement of equipment.

Normal construction practices will be followed. In side hill type locations, most of the roadbed will be in the

excavated portion rather than in fill due to the steep slopes generally found in the project area, making it difficult for a fill slope to "catch". Explosives will be used when it is necessary to move large quantities of rocky areas or for large isolated boulders. Construction in the flat areas will normally use the side borrow system where excavation from the drainage ditches and other areas adjacent to the road alignment will be used to provide material for the elevated road bed. No scrapers or other large earth transportation equipment are included in the project, since no long hauls are anticipated. If sub-base material is required to be moved from one location to another, front end loaders and dump trucks will be used. Drainage will be provided by means of side ditches, together with reinforced concrete pipe culverts, drop inlets, and box culverts to provide adequate drainage and cross-drainage facilities.

While the equipment will be used as much as possible during the entire project period, most of the work will be done during the dry season, which varies slightly in different geographical locations but is considered to be some 8-9 months in length. It should be noted that certain work can be undertaken in the rainy season such as clearing of the right-of-way, screening of aggregate and excavation in rock. The seasonal requirements that the campesino labor must dedicate to his crops also will be considered in programming the construction of each road.

4. Road and Equipment Maintenance

The SNC will be responsible for the overall maintenance of roads constructed under this loan. Road maintenance will be divided into two distinct categories: minor maintenance provided by the communities, and major maintenance provided by the Caminos Vecinales division of the SNC. Minor maintenance will be done by communities under the supervision of an SNC work leader and a local monitor to be selected from each community. The monitor will be selected by the community committees that will be formed for the purpose of organizing hand labor for the construction of the road. He will not be paid. After construction, the committee will continue to function for the purpose of maintaining the completed sub-project. The work leader who is not a member of the community committee will receive a nominal salary from SNC. In conjunction with the local monitor, the work leader will be responsible for organizing voluntary labor for minor road maintenance such as filling potholes and cleaning ditches and culverts. For major maintenance, such as landslides or washouts, the work leader will contact the nearest SNC residencia for assistance. Road maintenance equipment is programmed for permanent assignment to each residencia.

The SNC will make a minimum of two passes per year with a motor grader over each road to maintain the wearing surface in a passable condition. For the purposes of the economic analysis, the SNC will commence to replace the graveled surfaces at the rate of about 5 per cent per year. As the roads are expected to be lightly travelled during the first years after completion, deterioration is expected to be minimal.

A quantity of spare parts will be included with the equipment procured under the loan. This will provide the mainstay of the material needed for equipment maintenance. The district workshops will be expanded and will receive additional shop equipment. SNC will provide mechanics to maintain and repair all loan funded equipment. Maintenance and repair will follow the existing SNC system of repairs and will be done at the residencia or in the district shops.

The detailed programs for road and equipment maintenance will be closely coordinated with the proposed GOB/IBRD project discussed below.

5. GOB/IBRD Highway Maintenance Program

The proposed GOB/IBRD Highway Maintenance Program has the overall objective of improving the efficiency of SNC's road maintenance operations throughout Bolivia. The $ 37 million program includes a technical assistance component of $4.55 million to develop a master road and equipment maintenance plan and a training program aimed at supplying the technical and managerial personnel needed to operate SNC's maintenance department. Technical advisors will also assist in establishing road and equipment maintenance standards and improving SNC's management and reporting systems. Loan funds will purchase equipment, spare parts and tools for SNC districts in the Departments of La Paz, Cochabamba and Santa Cruz. This equipment will be used to maintain the road network in those departments, including local roads to be improved under Rural Roads I.

The IBRD's analysis of Bolivia's road maintenance needs has led to the conclusion that their proposed program should first concentrate in strengthening SNC's capabilities, that provision of equipment alone would not be sufficient to assure the longer term objective of an adequate standard of road maintenance. The Mission agrees with the IBRD's analysis and conclusions and will support their institution building efforts by provision of a training advisor and training monies in this program, as well as through appropriate policy discussions during the implementation of both Rural Roads I and II. The Mission also supports the IBRD's tentative plans for a follow on highway maintenance loan 3-4 years in the future.

6. Construction Costs

Average construction costs per kilometer are shown below. These costs are higher than those under Rural Roads I, primarily because of rougher terrain and increased costs for equipment and materials. Further details are provided in Annex H, Exhibit 3.

GEOGRAPHIC AREAS

	Mountains US$	High Valley US$	Flat Land US$
Cost/kilometer	$ 13,700	$ 12,500	$ 9,400

7. Equipment Requirements

Equipment requirements are based on an analysis of SNC's present equipment inventory (Annex H. Exhibit 4), including the overall condition, expected useful life remaining, etc., plus the requirements to upgrade a minimum of 1,200 kms. over a four-year period and maintain these roads during and following the project. The equipment will be provided to four district offices and ten residencias. Cost estimates for equipment and materials are based upon purchases by SNC and private contractors in Bolivia and include a 7 per cent inflation factor to bring them up to date. Procurement should begin in early 1979. Detailed equipment lists and cost estimates are contained in Annex H, Exhibit 5.

8. Future Prospects

This project and the previous Rural Roads I loan in other departments will bring up to all-weather standards less than 10 per cent of the existing minimum tertiary road network of the country. However, the project will provide impetus to the nation-wide program of providing adequate access to markets and inputs to the small farmers.

For the following reasons, the program can be expected to continue and expand: (i) the responsible institutions will be created, their duties defined, and the process of coordination between the SNC and planning and promoting entities such as the Departmental Committees, SNDC and MACA, established and working; (ii) the Caminos Vecinales Department will have an expanded budget, separately identified and providing the necessary funding for maintenance and operations; (iii) the DDCs will be paying for 50% of SNC's costs of road improvement. (iv) in addition to the small national office, the various regional units

of this new department will be established and functioning for four to six years, experienced in the use of equipment and with trained local manpower on board; (v) the system of voluntary labor for road maintenance will be well established, presumably with a spread effect as communities learn from the experience of others; (vi) vested political interests will be created among small farmers who will be demanding access roads from the institutions created to provide service to them; and (vii) the demonstrated cost per kilometers and accompanying economic return will be attractive to GOB planners. In summary, the institutional base and financial support for a continuing program of rural road construction and maintenance will be well established.

The equipment pool provided under both this project and the earlier project will continue to have considerable useful life after project completion, but the machinery eventually will have to be replaced. It is expected that Bolivia will continue to have access to international credit which probably will be required for replacement or addition to this equipment. The SNC has long viewed its mission as the completion of the national primary road network linking the major parts of the country. It is the Mission's belief, however, that through the establishment of the Caminos Vecinales Department and by increasing the DDC's role in planning and implementation, the GOB will continue to support a rural roads construction and maintenance program.

9. Engineering Conclusions

The engineering studies, preliminary information and reports, and other data indicate that this is a feasible and sound project. The estimated cost of equipment and materials have been carefully and realistically developed based upon the most reliable data available and taking into consideration probable escalation costs. These estimates are considered reasonably firm. All materials and equipment are available and the acquisition of these items possess no special problem. It is the judgement of the Project Committee that the requirements of Section 611 (a) (1) of the Foreign Assistance Act of 1961, as amended, have been met.

10. Environmental Conclusions

An Initial Environmental Examination has been conducted. The data search, interviews and general observations in preparation of this IEE have been as thorough as possible and the assumption and conclusions reached do not indicate that any further investigation is necessary. Thus, this project should not require either an

Environmental Assessment (EA) or an Environmental Impact Statement (EIS) as defined and prescribed in AID regulation 16. The IEE has been approved and is on file in AID/W.

B. Financial Analysis

1. Introduction

The estimated cost of activities to be financed under this project is $25,150,000. The AID contribution will be $15,800,000 of which the loan will provide $15,500,000 and the grant will provide $300,000. The disbursement period will be 5 years.

Technical assistance will be grant financed. The loan funds will purchase equipment, vehicles, hand tools and materials, provide training and funds for cement structures and for project evaluation. The GOB contribution through SNC will be mainly for salaries of additional personnel to staff the district and residencia offices in Potosí, Tarija and Tupiza. SNC will also provide funds for personnel in their central office, operating costs and facilities.

The DDCs will pay 50% of the cost of SNC's personnel and SNC's equipment operating expenses directly attributable to road improvement activities in each of their respective departments. The DDC's will also be providing personnel to carry out the feasibility studies for each potential road segment.

2. Burden on Beneficiaries

There will be no financial burden placed on the beneficiaries of sub-projects under this loan since their contribution will be "in kind." Their only burden will be a small opportunity cost. It has been estimated that each farm family will be expected to provide about four days of labor per kilometer for road improvement activities and one day per kilometer per year for road maintenance.

3. Recurrent Budget Analysis of Implementing Agencies

a. National Highway Service (SNC)

During the disbursement period of the loan, approximately 1,200 kilometers are expected to be upgraded to all-weather standards by the Rural Roads Department.

USAID has been assured that funds to support SNC's Rural Roads Department will be forthcoming from the GOB. The loan application letter, signed by the Minister of Transportation commits the GOB to finance the upgrading and maintenance of rural access roads during the life of the project. A covenant will be included in the loan agreement by which the GOB commits itself to provide adequate budgetary support for the following: a) operating expenses for SNC's Rural Roads Department; b) maintenance of equipment; and, c) maintenance of roads improved under this loan. The following table shows the estimated SNC budgets and expenditures during the period of rural access roads upgrading (1979-1983). Its purpose is to demonstrate that only a small budget increase will be needed for SNC to carry-out its responsibilities during and after the loan. It is estimated that SNC receipts will be augmented through increased National Treasury contributions, customs duties and tax revenues due to the increasing use of the Bolivian Highway system. From this schedule, it can be seen that allocating funds for the operation of the Rural Roads Department should not place an undue financial burden on SNC.

SNC Budget Analysis (US$000)

Year	Receipts from Nat'l Treasury & Taxes 1/	Est. Expenditures for Access Roads II	Percentage Budget Increase Needed
1977	30,648		
1978	37,325		
1979 2/	52,890	350	.66
1980	39,654	766	1.93
1981	48,218	1,050	2.18
1982	59,099	1,076	1.82
1983	73,087	1,118	1.53
1984	84,781	1,788 3/	2.11
1985	98,346	1,967	2.00
1986	113,848	2,164	1.90
	637,896	10,279	1.77

1/ Source: SNC executed budget and projections. Excludes external receipts and other loans.

2/ Starting 1979 assumes 16% annual increment as per SNC projections.

3/ Assumes 10% annual increment after project since rural roads activities will continue.

b. Departmental Development Committee (DDC's)

The following table showing the total estimated budgets and expenditures of the DDC's of Chuquisaca, Potosí and Tarija indicates that only a minimum budget increase will be required by these organizations to fulfill their project responsibilities. Expenditures, receipts from National Treasury and their own sources revenues (royalties, taxes, etc.) are expected to increase yearly. Therefore, no undue financial burden would be placed on the DDC's.

Department Development Committees

Budget Analysis

($000)

Year	Receipts from Nat'l Treasury & Own Source 1/	Est. Expenditures for Access Roads II	Percentage Budget Increase Needed
1976	10,529	-	-
1977	13,083	-	-
1978 2/	14,392	-	-
1979	15,831	40	.25
1980	17,414	720	4.13
1981	19,156	972	5.07
1982	21,072	974	4.62
1983	23,179	974	4.20
1984	25,497	1,071 3/	4.20
1985	28,047	1,179	4.20
1986	30,852	1,296	4.20
	219,052	7,226	3.86

1/ Source: DDC's and GOB budgets. Excludes external receipts and other loans.

2/ Starting 1978 assumes 10% annual increment.

3/ Assumes 10% annual increment after project since rural access roads activities will continue.

SUMMARY COST ESTIMATE AND FINANCIAL PLAN

(US$ 000)

	AID GRANT	AID LOAN FX	AID LOAN LC	GOB	LOCAL	TOTAL
AID						
Technical Assistance	275					275
Training			300			300
Equipment and Vehicles:						
Road construction equipment		7,500				7,500
Road maintenance equipment		1,600				1,600
Equipment for workshops		1,030				1,030
Four wheel drive vehicles		240				240
Surveying instruments		65				65
Radios		80				80
Hand tools		140				140
Materials		570	900			1,470
Cement structures (contract)			900			900
Evaluation		75	25			100
Sub-Total	275	11,300	2,125			13,700
GOB						
SNC - Construction and engineering personnel				2,473	2,472	4,945
SNC - Overhead - Personnel				340		340
Operating Costs				75		75
Materials				330		330
Equipment operating costs				575	575	1,150
Training				60		60
Road Maintenance				160		160
Facilities improvement				300		300
Sub-Total				4,313	3,047	7,360
DDCs and Local Communities						
Community labor					540	540
DDC - Personnel					200	200
- Operating expenses					30	30
Right of way access					200	200
Road maintenance					150	150
Sub-Total					1,120	1,120
Sub-Total	275	11,300	2,125	4,313	4,167	22,180
Inflation/Contingency	25	1,750	325	437	433	2,970
TOTAL	300	13,050	2,450	4,750	4,600	25,150

Total AID Loan: $15,500,000
Total AID Grant:$ 300,000

NOTES TO SUMMARY COST ESTIMATE AND FINANCIAL PLAN

A. AID Funds

1. Technical Assistance ($ 275,000) - Technical assistance will be provided under host country contracts and will consist of a long term (24 - 30 months) engineering advisor to Caminos Vecinales, a training advisor for 12-18 months, and an economist for 6 months to assist SNC and the DDCs in developing guidelines for analyzing the road segments.

2. Training ($ 300,000) - Funds will be used to pay travel and per diem expenses of SNC personnel to attend IBRD sponsored road maintenance program as well as to train equipment operators, mechanics and drivers at existing SNC facilities; and to purchase training materials.

3. Road Construction Equipment ($ 7,500,000) - Funds totaling $ 6,250,000 for equipment and $ 1,250,000 for spare parts will be used to equip the basic and support groups in four district offices. Detailed equipment lists are found in Annex H, Exhibit 5.

4. Road Maintenance Equipment ($ 1,600,000) - Funds totaling $ 1,400,000 for equipment and $ 200,000 for spare parts will be used to equip ten residencias.

5. Equipment for Workshops ($ 1,030,000) - Loan funds totaling $ 900,000 for equipment and $ 130,000 for spare parts will be used to equip ten residencias and four district workshops.

6. Four wheel drive vehicles ($ 240,000) - Funds will purchase 25 vehicles for district and resident engineers and construction supervisors.

7. Surveying Instruments ($ 65,000) - Funds will be used to purchase three sets of surveying instruments for district surveyors.

8. Radios ($ 80,000) - Funds will be used to provide radio communication in the field at the district, residencia and work group level.

9. Hand Tools ($ 140,000) - Funds will be used to equip the residencias with hand tools for use by the communities providing labor for road construction and maintenance. Additional funds may be used toward the end of the project to purchase a second tranche of hand tools for subsequent road maintenance requirements. This will depend on the physical condition of the tools after the roads are improved.

10. Materials ($ 1,470,000) - Funds will purchase explosives, concrete pipe and cement.

11. Cement Structures ($ 900,000) - Funds totaling $ 600,000 will be used to contract with local suppliers of concrete slabs for culverts and small bridges. The remaining $ 300,000 will be used for small bridges under Rural Roads I. (No funds were provided for bridge work under that loan.)

12. Evaluation ($ 100,000) - Funds will be used to assess the impact of road improvement on increased agricultural production and small farm income and to evaluate the program's success in strengthening SNC, the DDCs, and local communities.

B. GOB Contribution

1. SNC Construction and Engineering Personnel ($ 2,473,000) - SNC will provide the field personnel for engineering, surveying, and supervising the road improvement and maintenance activities. SNC and the DDCs will share the cost.

2. SNC Support Personnel and Office Support ($ 415,000) - SNC will provide personnel such as an economist, secretaries, accountants, timekeepers, and payroll tellers ($ 340,000) as well as related office support ($ 75,000).

3. Materials ($ 330,000) - SNC will provide crushed rock from its quarries where a natural local source is not available.

4. Equipment Operating Costs ($ 575,000) - SNC will provide all fuel, lubrication, and spare parts not loan-funded. SNC and the DDCs will share the costs.

5. Road Maintenance ($ 160,000) - SNC will perform all major road maintenance such as grading, clearing land slides and resurfacing after roads are upgraded. Costs are related to equipment operating expenses.

6. Facilities Improvement ($ 300,000) - SNC will upgrade facilities (workshops and office space) at four districts ($ 50,000 each) and ten residencias ($ 10,000 each) prior to arrival of loan-funded equipment.

C. DDCs and Local Communities

1. Community Labor ($ 540,000) - Participating communities will provide hand labor necessary to upgrade roads.

2. DDC Personnel and Operating Expenses ($ 230,000) - The DDCs will provide personnel and support costs necessary to carry out feasibility studies as well as promote and mobilize community labor for construction and maintenance activities.

3. Right-of-Way Access ($ 200,000) - Local communities will contribute necessary right-of-ways to project.

4. Road Maintenance ($ 150,000) - Communities will perform necessary minor road maintenance such as patching and cleaning ditches and culverts after roads are upgraded. Costs are value of community labor.

5. SNC Personnel Costs ($ 2,472,000) and Equipment Operating Costs ($ 575,000) - DDCs will pay one half of the total costs of SNC personnel and equipment operating expenses.

D. Inflation/Contingency

An inflation/contingency factor of approximately 10% is included in the $ 300,000 grant and a 15 per cent factor in the $ 15.5 million loan. A 10 per cent factor is included in the GOB and local contributions.

DISBURSEMENT SCHEDULE
(US$ 000)

	Calendar Year						Total
	1978	1979	1980	1981	1982	1983	
AID							
Technical Assistance	25	70	85	70	25		275
Training		50	100	75	75		300
Equipment and Vehicles							
Road Construction		6,000	1,500				7,500
Road Maintenance		1,280	320				1,600
Equipment for Workshops		824	206				1,030
Four Wheel Drive Vehicles		192	48				240
Surveying Instruments		65					65
Radios		64	16				80
Hand Tools		140					140
Materials		365	365	365	375		1,470
Cement Structures			180	240	240	240	900
Evaluation				50		50	100
Contingency/Inflation		1,000	425	225	225	225	2,100
Sub-Total	25	10,050	3,245	1,025	940	515	15,800
GOB							
CNC - Construction and Engineering Personnel			493	660	660	660	2,473
CNC - Overhead-Personnel			70	90	90	90	340
Operating Costs			15	20	20	20	75
Materials			66	88	88	88	330
Equipment Operating Costs			113	154	154	154	575
Training		10	20	20	10		60
Facilities Improvement		300					300
Road Maintenance				26	52	82	160
Contingency/Inflation		50	75	100	100	112	437
Sub-Total		360	852	1,158	1,174	1,206	4,750
DDCs and Local Communities							
Construction and Engineering Costs			492	660	660	660	2,472
Operating Costs of Equipment			113	154	154	154	575
Community Labor			108	144	144	144	540
DDC - Personnel		40	40	40	40	40	200
Operating Expenses		6	6	6	6	6	30
Right of Way Access			50	50	50	50	200
Road Maintenance				24	48	78	150
Contingency/Inflation			75	118	120	120	433
Sub-Total		46	884	1,196	1,222	1,252	4,600
TOTALS	25	10,456	4,981	3,379	3,336	2,973	25,150

C. Social Analysis

1. Rural Social Organization and Socio-Economic Profile - An Overview

Currently, the social organization of the Bolivian rural sector is in a state of flux. The once stagnant hierarchial structure based on the latifundio-minifundio land holding arrangement and associated patron-peon social relations and rigid ethnic and social class divisions was seriously disrupted by the agrarian reform program initiated by the 1952 revolution. In some cases the former white, Spanish-heritage elites have abandoned the rural areas, leaving a power vacuum which either has not been filled or is being filled by upwardly mobile mestizos (white and Indian social mixture), and a new type of power broker, the outside professionals (doctors, lawyers, teachers and the like who live and work in the country-side although they are from or were trained in urban areas). In other instances, campesinos, who were once relegated to peonage on haciendas and in mines or subsistence farming in isolated free communities, are moving into rural towns where they are taking up artisan and small scale merchant positions once denied them.

The vast majority of the rural inhabitants continue to be poor. In the main, they are small scale farmers who live in conditions of poverty which have improved little since pre-revolutionary days. A more complete socio-economic profile of the target group can be found in Annex L of this PP and pages 52-66 of the Agriculture Sector II, PP; No. AID-DLC/P-2247.

2. Socio-Cultural Feasibility

The socio-cultural feasibility of the project depends on gaining the participation, in the form of labor contribution, of the beneficiaries in the improvement and maintenance of the access roads. Project related field research undertaken for this analysis indicates a high level of enthusiasm and an eagerness to participate among the target group. Nevertheless, there are social and cultural factors which could inhibit progress. Strategies which take these factors into account must be employed in order to avoid potential blockages.

a. Cultural Distance

Even though high levels of enthusiasm were observed among the beneficiaries, it must be remembered that there is considerable social and cultural distance between them and the implementing agencies. Campesinos have had relatively little contact with the urban sector and are unfamiliar with the workings

of bureaucracies. Moreover, the campesino is essentially now oriented. Compared to urban dwellers, his time horizons are much more limited, often spanning only the current crop cycle. The enthusiasm exhibited initially can be replaced by skepticism and reluctance to participate unless relations are handled delicately and implementation progress can be demonstrated relatively rapidly. This is particularly critical with respect to the indigenous population in the target area. Past abuses at the hands of outsiders from higher social and economic positions have led to a certain level suspicion regarding the motives of outsiders.

The use of promotors by the project implementing agencies can be an effective method of dealing with these socio-cultural factors. Each DDC will have at least one promotor on their staff whose principle task will be to establish and maintain positive working relationships between the target communities and the DDCs and SNC for the carrying out of the project. These promotors will need to exercise considerable caution in order to avoid creating excessive enthusiasm among rural inhabitants in the early stages of planning for each road to be improved under the project. In this manner, unrealistically high expectations among the campesinos at the outset can be avoided and interest can be maintained over the relatively lengthy planning, analysis and construction process. The promoters will also be expected to cultivate community interest and enthusiasm in the small number of communities where reticence and suspicion about the program and its requirements may occur.* Additional duties will include explaining to recipients the benefits of all-weather access roads, discussing with local leaders the contributions to construction of the respective parties (the community and SNC/DDC), and assisting local leaders in the preparation of any information required for the analysis and/or design of the road subproject, including drawing up of crude maps of road segments to be upgraded and socio-economic characteristics of the area to be influenced by the road.

Timing is a key factor in this promotional work. Initial contact should take place within a relatively short period prior to the building of the road. Although it is difficult to judge the exact permissible time lapse, any delay beyond six to eight months

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* These cases are likely to be few since the communities must first request participation in the project in order for a road to be improved there.

would be not only difficult for the campesinos to accept, but also would arouse suspicions concerning the sincerity of the assistance.

Finally, it is essential that the promotors have a facility with Quechua in order to eliminate unnecessary problems of communication.

b. Community Participation

Field research in connection with the social analysis for this project indicated that there is likely to be little difficulty in obtaining construction labor contribution from the beneficiaries. As noted above, levels of enthusiasm are high, the small farmer target group in the area participates actively in the marketing process, and the rural inhabitants generally perceive that upgrading access roads will lead to economic gains. Moreover, in indigenous communities there are a variety of organizational structures (reciprocal labor exchanges, communal work groups, sharing of common pasture) upon which to base a joint labor effort. Moreover, there is a leadership structure (curaco and/or sindicato) to serve as the responsible party on behalf of the community.

In mestizo settlements unifying elements are considerably less prominent. Therefore, it would appear to be more difficult to organize community labor. However, the system of appointing ad hoc managers for community development projects functions well in most areas. The SNDC has successfully employed this system for providing labor on health, education and small rural infrastructure projects, and the DDC's of Tarija and Chuquisaca have used it on a variety of development efforts. Moreover, the fact that mestizos are more closely assimilated to the national mainstream (e.g., coincidence of language and general culture) and participate actively in the market economy, suggests that they will be attracted by the potential for monetary gain provided by the road project. This, in turn, should serve as an inducement for cooperation.

Finally, the availability of community labor for road improvement and maintenance in both types of communities is also influenced by a Bolivian law (Prestación Vial) which requires each citizen over the age of eighteen to contribute either in money or labor (three days per year) to road maintenance. In the countryside, compliance among campesinos occurs typically through labor.

c. Food for Work

A precedent has been set in Bolivia of providing food to campesinos in exchange for labor on self-help projects. The

food supplies come from a variety of sources, principally World Food Program, and are channeled through local organizations - ALDE and, to some extent, the DDC's. The absence of food-for-work element in this project might appear to be a constraining factor. This is especially so in areas where campesinos have had direct personal experience (or know of it by word of mouth) with such an arrangement.

However, there are several factors which diminish the magnitude of this potential constraint. The types of projects in which food-for-work is being used (road building, school and health-post construction) are labor intensive. For the most part, they require significant labor contributions over a relatively long period of time. Rural Roads II has a substantial machinery component. Although the recipients under the project will be required to contribute hand labor, estimates place the amount of labor per household at 4 work days per kilometer for the construction phase and 1 work-day per year per kilometer for maintenance. This amount is far below what is currently being spent on labor intensive projects. Given the small quantity of work time required, it is not anticipated that the recipients will balk at participating for the lack of food remuneration. Moreover, because the estimated work time is so small, other income generating activities will not be hindered by participation in project activities. If this were not the case, compensation for missed economic opportunities would be a strong inducement for providing food. Moreover, field research in potential beneficiary settlements (both indigeneous and mestizo) where no food-for-work program exists, indicated that the matter is not of major concern among these campesinos. They were primarily interested with obtaining technical assistance to improve access to their communities. They expressed a willingness to contribute to road improvement construction activities without the provision of food or any other type of compensation.

d. Work Cycle.

The existing work cycle could present a constraint if road construction were to conflict with the peak agricultural activity periods during the year. It is unlikely that the campesinos will leave planting and harvesting responsibilities - tasks upon which depends their survival - to work on roads on a voluntary basis. This potential barrier will be avoided by conducting the majority of the manual road labor during the period of minimal agricultural activity, i.e. May thru September, with a slight variation (delay of one month) for Tarija. Moreover, these months constitute the dry season in the southern valleys. Planning road activities for this period not only meshes with

the campesino work cycle but reduces the probabilities of delays on account of inclement weather and corresponds to the period of the year when the road construction machinery will be able to work in the area.

Migration to work in the sugar harvest during the dry season is likely to drain-off some of the labor force. However, the magnitude of such migration does not appear to be large enough to adversely effect the project. The AID/MACA Southern Valleys Survey shows that only 28 per cent of the farm households in the project area had family members who emigrated for temporary work during the 1976-1977 agricultural years.

e. Organization of Manual Labor

Organization of work crews, scheduling of labor days, dispersement and collection of tools, and the keeping of attendance records are all necessary ingredients to successful implementation of the project. To function well, these matters require the full time attention of a qualified person.

Consideration was given to assigning this job, with a salary paid by community members, to the local monitor (curaca, sindicato secretary general, or ad hoc appointee). Upon closer inspection, this type of arrangement was judged to be potentially counterproductive. As described in the target group profile (Annex L), community leaders are not set off into a distinct class, but rather are the first among equals, and only for the period for which they are in office. Positions are accepted voluntarily, provide the incumbent with relative levels of prestige, and are based on giving public service to the community. This, in turn, means that community offices are not only without salary, but, in the case of the cargo system, the incumbent "pays" via a fiesta for the position. To expect community members to pay for a service which is given freely is to fly in the face of culturally defined leadership patterns and is likely to meet with little success. Moreover, to pay a local monitor with "outside" funds would be to elevate him to a distinct class; an event which in a relatively closed, poverty-stricken society could very well be the source of envy, bickering and dissension.

The appointment of an objective "outside" person, a capataz (work leader), will avoid the pitfall. This person(s) will be a salaried employee working for the SNC under the direction of the Resident Engineer. In effect, he will serve as a liaison between the engineer and the communities. His primary function will be to tend to the details of work organization during the road improvement stage, such as attendance recording, dispersement and collection of tools, and coordination of work crews.

3. Social Benefit Incidence - Direct Benefits to Target Group

The principal benefit which will accrue to the target group is the increased income derived from improved marketing arrangements. It is estimated that incomes for all beneficiary households will increase by an average of 36 per cent beginning the first year after subproject completion, through decreased wastage and spoilage of the agricultural products marketed and increased production brought about by positive responses to these improved marketing opportunities. Even higher increases are possible for those farmers who most actively respond to market incentives.

In addition, direct benefits will accrue to the participants in the form of increased access to social services in health and education. Further, they will have the opportunity to increase income through the increased availability of agricultural technical assistance and modern inputs. Finally, all weather roads will draw the recipients, closer to the national mainstream by facilitating communications and the flow of information between rural areas and the urban sector.

4. Impact on Women

In Bolivian rural areas, women participate in economic activity at least on an even-footing with men. They not only are responsible for a share of the agricultural and cottage industry tasks required to sustain the household, but they also take on a full complement of domestic chores. Moreover, it is not uncommon for women to work alongside of men on the physically demanding construction work of self-help projects. Because of their extensive involvement in all phases of family activity, women will receive those benefits which accrue to the household as a unit. For instance, they will enjoy the

increases in farm family income, and any reduction in physical farm labor brought about by the penetration of modern technology. Further, they will benefit from improvements in marketing arrangements since they normally manage most of the small scale commercial activity for the family. Finally, they will benefit from any improvement in social services which occur in rural areas because of upgraded access roads, and a general broadening of horizons coming from increased contact with the urban sector.

5. Conclusions

The project is socially sound as designed. It will impact principally on small campesino farmers in one of the poorest geographic regions of Bolivia. Judged against a variety of relevant indicators (per capita income, level or education, and health status) the three departments in the target area consistently rank in the bottom half of all departments in the country. Further, the project is responding to an expressed priority need of the beneficiaries. The campesinos are aware of the constraints placed on their commercial efforts by an underdeveloped transportation system. They also perceive the monetary gain which can accrue to them by upgrading access roads.

In addition to enhancing the economic situation of the small farmer, the project will generate other benefits which will improve the general quality of life of the campesino. It will facilitate access to social services such as schools and health centers, while at the same time improving the flow of information between urban centers and the countryside.

Finally, the project has considered potential social constraints (cultural distance between beneficiaries and implementing agency, organization of labor, food-for-work, and yearly work cycle) to implementation. The project has been designed in such a way as to address these potential constraints and minimize any adverse impacts from them on the implementation of the project.

D. ECONOMIC ANALYSIS

1. Benefit - Cost Analysis

Individual road segments proposed for project financing will be analyzed in terms of their probable farm income impact. Anticipated costs and benefits will be discounted at 15 per cent, and roads will then be ranked on the basis of their benefit/cost ratio. Accepting only roads with a benefit/cost ratio of 1.0 or better will insure an internal rate of return to the project of at least 15 per cent. Since most roads are expected to have B/C ratios greater than 1.0, the actual rate of return is expected to be substantially higher than 15 per cent.

a. Assumptions

Equipment is assumed to have a salvage value at the end of the fourth year when project construction is completed of 37 per cent of initial purchase price. Road construction is expected to take place at a rate of 1,200 kms. during the five-year loan disbursement period. Each road segment is assumed to require one year to construct, costs being accrued evenly over the construction. For analytical purposes, construction costs are therefore discounted one-half year. Road maintenance costs, which increase with time, are calculated at an average of $ 360 per kilometer per year, including $ 16 of voluntary, unskilled labor. The shadow price of foreign exchange is equal to its official market value since project equipment is imported duty-free and because there is a free market in foreign exchange. The salvage value of roads was estimated at 20 per cent of cost after 15 years. This is highly conservative since roads with proper maintenance should last 20 to 30 years, or until embankments, drainage structures and fords deteriorate. With adequate maintenance the salvage value of project roads could continue to be up to 100 per cent of their construction cost. For the purpose of economic appraisal, prices are held constant on the assumption that benefits and costs would be equally affected by inflation.

b. Shadow Price of Labor

The Target Group Analysis cites the median annual on-farm net income per family at $ 287. Off-farm income averages about 55 per cent of total farm income in Bolivia. 1/ Therefore, the median farm family income is about $ 327. An estimated 40 per cent of this income results from labor contributed by the male head of household, while the other household members, including women and children and older dependents, contribute the remainder of farm labor. We assume that 70 per cent of this income is earned during the growing season and about 30 per cent is earned during the dry season.

1/ AID/MACA Small Farm Survey, 1977.

Based on these assumptions, the opportunity cost of adult male labor during the three month non-growing season would be about $ 40 or $ 13.33 per man-month. Assuming 24 work days per month, the opportunity cost of rural labor would be $ .56 per day. This is the shadow wage rate for labor during the non-growing season used in the economic analysis of this project. Non-local labor rates are about $ 6.00 per day, while local labor costs are $ 2.89 per day, according to the SNC.

The project is so planned that the small farmer will be able to devote an average of 4 days of labor per kilometer to the project which would not conflict with normal on-farm responsibilities. Furthermore, other members of the farm family, also under-employed, would help to fill any gap created by the temporary absence of one family member. Consequently, we do not anticipate a reduction in agricultural production as a consequence of the use of voluntary unskilled labor on the project.

Skilled labor is shadow priced at its market wage owing to shortages of skilled labor in Bolivia.

c. Costs and Benefits

Project costs are relatively straightforward in terms of equipment, labor, and operating costs for construction and maintenance. Economic costs are equivalent to financial costs with the exception of unskilled labor, which is shadow priced.

Economic benefits attributable to this Project will accrue initially to the small farmers who reside within the area of influence of the 1,200 kms. of rural access roads which will be constructed or improved. Secondary benefits will accrue from income generated by increased small farmer expenditures, and from lower consumer prices for some products to the extent that user/cost savings for transportation are passed on to the consumer. Further, non-quantifiable benefits are likely to occur both at the small farm level, in terms of nutrition benefits and access to schools and social services and at the level of the national economy, in terms of lower agricultural prices and transport costs as well as increases in per capita food production, which declined by 13 per cent between 1964 and 1972. While these secondary benefits are significant, only primary economic benefits accruing to small farmers living in the project area and user-cost savings for transport will be included as project benefits.

1) Benefits

Roads that are often impassible to animal-drawn as well as to motorized vehicles can cause farmers to cultivate less land than they are capable of cultivating, to forego the use of improved inputs that would raise productivity, and to develop a cropping pattern that

reduces the risk of loss when roads are closed. For example, farmers may emphasize livestock that can be "walked" to market, crops that can be easily stored for lengthy periods without substantial loss, or semi-processed products. Even when credit is available to purchase inputs that would increase the productivity of existing crops or which would facilitate change to a more profitable cropping pattern, farmers are often not willing to do so because they perceive the risk of not being able to market the goods as too high. The high cost of operating vehicles on poor roads can also be an inhibiting factor. Finally, accessibility between the rural and urban areas, also affects agricultural productivity by reducing the amount of technical and marketing information available to the farmers.

Road improvement should alleviate the problems cited above and lead to increased small farmer incomes. Specifically, road improvement under this project will reduce the risk of moving production to market, will make technical information more readily available to the small farmer, will reduce transport costs, and will lead to more efficient utilization of other agricultural inputs such as credit and agricultural extension. These changes, in turn, will lead to increased farmer income from various combinations of: (1) reduced spoilage and wastage, and increased quality (as well as the reduced transport cost) of existing production; (2) increased productivity; (3) increased land under cultivation; and (4) changes in cropping patterns.

The results of a small farmer survey provide the basis for estimating the incremental income impact of improving rural access roads to all-weather status. From the survey, net farm income levels were compared at different time-to-market intervals. Time-to-market is defined as the time needed for a farmer to reach the point where he sells his products. This could be at the farm, the nearest road, or in the nearest market town. Time-to-market can reflect the actual physical distance to a market town and/or accessibility due to the farm's proximity to an improved all-weather road. Improved roads reduce farm-to-market time by permitting truckers easier access or by reducing the time the farmer himself needs to transport his goods to market. As might be expected, the farm survey data, summarized in Tables 4 and 5, indicates an inverse relationship between time-to-market and net farm income; farmers needing less time to reach the marketing point for their produce generally have higher incomes than those needing more time.

Since the primary effect of road improvement is to increase the accessibility between the farm and the market, the income differences by time-to-market intervals found in the survey may be used as proxies for projecting the income impact of road improvement under this project. Improving road access is thus considered equivalent to moving farmers from a more distant time-to-market interval to one

TABLE 4

FARM INCOME BY TIME-TO-MARKET AND FARM SIZE

(Income in Bolivian Pesos)

Time-to-Market		0 - .99 Ha	1 - 1.99 Ha	2 - 4.99 Ha	5 - 9.99 Ha	10+Ha	Overall Farm Average (Total Observ.)
1 hr.	Income	2228	1575	3988	13470	8608	4805
	Observations	(28)	(31)	(24)	(16)	(14)	(113)
1 - 3 hrs.	Income	1375	3591	3339	4329	1995	3094
	Observations	(29)	(35)	(42)	(34)	(18)	(158)
3 - 6 hrs.	Income	1883	1527	3808	581	6352	2397
	Observations	(58)	(34)	(54)	(31)	(10)	(187)
6 + hrs.	Income	1450	1805	2480	4533	1766	2042
	Observations	(69)	(35)	(39)	(14)	(10)	(167)
All Farms	Income	1673	2107	3348	4676	4569	2884
	Observations	(188)	(136)	(163)	(95)	(52)	(634)

Source: AID/MACA Small Farmer Survey, 1977.

TABLE 5

POTENTIAL INCOME GAINS BY REDUCING TIME-TO-MARKET

			INCOME DIFFERENCE (BOLIVIAN PESOS)					
			Average for All Farm Sizes	FARM SIZE (Ha.)				
				0-.99	1-1.99	2-4.99	5-9.99	10+
1.	1- 3 hrs.	1 hr.	+ 1711	+ 853	- 2016	+ 649	+ 9141	+ 6613
2.	3- 6 hrs.	1- 3 hrs.	+ 697	- 508	+ 2064	- 469	+ 3740	- 4357
3.	6 + hrs.	3- 6 hrs.	+ 355	+ 433	- 278	+ 1328	- 3952	+ 4586
4.	3- 6 hrs.	1	+ 2408	+ 345	+ 48	+ 180	+12689	+ 2256
5.	6 + hrs.	1-3 hrs.	+ 1052	- 75	+ 1786	+ 859	- 204	+ 229

Source: Derived from Table 4.

that is closer. It should be noted that if land quality or climate were more favorable on lands closer to markets, then the observed income changes could not be attributed exclusively to variation in time-to-market, and the time-to-market income changes could not be used as proxies for road improvement impact. However, no significant correlation between climate, land quality and market location appears to exist.

2) Factors Underlying Income Impact

The factors underlying the inverse relationship between time-to-market intervals and income are presented in Tables 6 and 7. Table 6 clearly shows a significant change in cropping pattern from less perishable, lower valued, to more perishable, higher valued crops as distance to market decreases. At less than one hour, 63.8 per cent of agricultural income is derived from perishable vegetables and fruits while 29.8 per cent comes from tubers and grains. At the one to three hour interval there is a reversal with 30.5 per cent of agricultural income resulting from perishable vegetables and fruits, and 54.9 per cent from tubers and grains. For the three to six hour interval, only 5 per cent of agricultural income is derived from perishable vegetables while 78 per cent is derived from tubers and grains.

TABLE 6

PERCENTAGE OF NET FARM INCOME FROM VARIOUS CROPS BY TIME-TO-MARKET 1/

CROP	TIME-TO-MARKET		
	LESS THAN ONE HOUR (%)	1 HOUR TO LESS THAN 3 HOURS (%)	3 HOURS TO LESS THAN 6 HOURS (%)
Perishable Vegetables	8.8	4.8	2.1
Fruits	55.0	25.7	2.9
Non-Perishable Vegetables	3.4	9.3	15.5
Tubers	13.5	19.2	34.1
Grains	16.3	35.7	43.9
Others	3.0	5.3	1.5
TOTAL	100.0	100.0	100.0

1/ The six-hour plus time-to-market interval is omitted because of inconsistant cropping pattern results. However, farms in this category are the smallest in terms of hectarage cultivated and net farm income. Source: AID/MACA Small Farm Survey, 1977.

Table 7 reveals that farm costs rise along with gross and net farm income as time-to-market decreases, reflecting the use of larger quantities of inputs and/or more expensive inputs on farms closer to the market. In addition, though other farm income (e.g. processed products, animals, dispersed crops) also rises as time-to-market decreases, it becomes a smaller proportion of gross and net farm income, probably reflecting the switch to more high valued perishable products as discussed above. Conversely, as time-to-market increases, farmers switch to less perishable and more highly processed products to overcome such factors as spoilage and higher transport costs. Finally, hectarage under cultivation increases as time-to-market decreases. Farmers with better market access need be less concerned with spoilage losses and other factors which discourage intensive farming.

Table 7 indicates the shares of increased income that result from changes in value of production per hectare (VP/HA) and from changes in hectarage cultivated. The change in VP/HA is assumed on the basis of Table 6 to occur as a result of the change in cropping pattern from less perishable to more perishable products. For the $b 1,711 income difference between the first and second intervals, increased VP/HA accounts for $b 902 (53%), while the extra one-half hectare accounts for the remaining $b 809 (47%). For the income difference of $b 698 between the second and third intervals, the increased VP/HA accounts for only $b 32 (5%) with the extra one-half hectare accounting for $b 666 (95%).

In summary, those factors that are claimed to lead to increased income as a result of improved accessibility due to road improvement appear also to explain the change in income by time-to-market intervals. The changes in cropping pattern and hectarage were explicitly shown to occur over the intervals, in Tables 6 and 7, and from the survey it is known that the use of technical assistance, credit, and more sophisticated inputs increase as time-to-market decreases. Data support the thesis that changes in transport costs and spoilage influenced the decision making process of the farmer.

3) Computation of Income Impact

Using the time-to-market interval income differences as proxies for road improvement impact, Table 5 indicates the range of income impact that could occur under this project due to increased accessibility resulting from road improvement. The one-interval movements (Table 5, lines 3, 2, 1) lead to 18 per cent, 29 per cent, and 55 per cent changes in net farm income. For the two-interval movements (Table 5, lines 4 and 5), the changes in income are 52 per cent and 100 per cent.

TABLE 7

GROSS AND NET FARM INCOME COMPARISONS BY TIME-TO-MARKET 1/

(Pesos)

	TIME-TO-MARKET			
	AVERAGE	LESS THAN ONE HOUR	1 HOUR TO LESS THAN 3 HOURS	3 HOURS TO LESS THAN 6 HOURS
1. Gross Ag. Income	3,914	7,917	3,515	2,254
2. Other Farm Income	2,204	3,285	1,985	1,372
3. Gross Farm Income	6,118	11,202	5,500	3,526
4. Farm Costs	3,235	6,396	2,405	1,229
5. Net Farm Income (Pesos)	2,883	4,806	3,095	2,397
6. Farm Costs as % of Gross Farm Income (%)	52.9	57.1	43.7	33.9
7. Gross Ag. Crop Income as % of Gross Farm Income (%)	64.0	70.7	63.9	62.2
8. Hectares Cultivated (Ha) 2/	2.1	2.9	2.3	1.8
9. Value of Production/Ha (VP/Ha)		1,657	1,346	1,332
10. Net Farm Income Difference Between Intervals (Pesos) (Line 5)		1711	698	

1/ Source: AID/MACA Small Farm Survey, 1977.

2/ Because the 6 + hours category is omitted, the average of the three intervals doesn't equal 2.1: Including the omitted category:
(2.9 + 2.3 + 1.8 + 1.6) ÷ 4 = 2.15

If sufficient information existed for income differences by narrower time-to-market intervals in a given area than is available, and if the change in time-to-market resulting from road improvement in the same general area could be estimated, this time-to-market interval information would provide an excellent estimate of road improvement income impact. However, since such detailed time-to-market interval income differences data are not available, a second best approach is adopted using the regional time-to-market interval results to estimate an average percentage change in income expected to occur for any farm with the area of influence of an improved road. It is assumed that road improvement will have the effect of moving farmers one time-to-market interval closer to the market, except as noted below, and will bring all farmers to at least within 1 - 3 hours of the market (defined as point of sale). To meet the last condition, it is assumed that for those farmers six or more hours from market, the effect of road improvement will be to move them two-time intervals; representing a potential 55 per cent income change. These assumptions reduce the range of percentage income changes to 29 - 55 per cent.

Realistically, farms that experience a dramatic reduction in time-to-market to one of less than one hour, as represented by the 52 - 100 per cent changes, may not be able to attain the income level stated in the time-to-market intervals in Table 5. These high incomes were earned by farmers who have been established at these time intervals for some years, and who have slowly acquired all the skills, etc., needed to attain their given income levels. As Table 3 illustrates, there is a rather dramatic change in cropping pattern as the time-to-market becomes less than one hour. To assume that a farmer could within a few years change his habits so drastically and acquire all the skills necessary to realize a 52 - 100 per cent change in income seems highly doubtful. It is thus more reasonable to assume that the income change on farms within an improved road's area of influence lies between 29 per cent and 55 per cent. To be conservative, we assume the average change to be 36 per cent which is one-quarter the distance toward 55 per cent from 29 per cent.

The use of a constant percentage value implies that those farms with higher current net farm incomes will benefit more in absolute terms from road improvement than these with smaller incomes. While such an occurrence does not necessarily follow, it would seem plausible that those farmers with higher incomes would be better prepared to take advantage of all those things increased accessibility via road improvement makes available.

The results from a new and larger AID/MACA farm survey will be available by November 1978 to the SNC economist for updating the current data, and possibly for providing a more detailed analysis at the farm size level for income differences by time-to-market intervals.

This 36 per cent change figure is multiplied by the current net farm income figure to obtain the income change figure per farm expected to result from road improvement under this project. For the feasibility analysis of each individual road segment, the current AID/MACA farm survey provides average farm incomes by farm size for each department as shown in Table 8. As discussed below, a weighted average income figure is obtained based on the farm size distribution of the farms within a road's area of influence. The 36 per cent figure is then applied to this weighted average income figure to obtain the average income change expected for the average farm. This latter figure is then multiplied by the total number of farms within the road's area of influence to obtain the total income change expected.

The 36 per cent change reflects all those factors discussed in the road impact section that can lead to income changes including reduced transport cost.

It is assumed that the income impact will begin one year after completion of road improvement (the second year of the B/C analysis) and will increase in a linear fashion at the rate of 12 per cent for 3 years until the 36 per cent figure is reached. From that point on income is assumed to remain constant.

2. Evaluation of Sub-Projects

a. Benefit Cost Analysis to be Used During Project Implementation

Because the DDCs will be actively helping communities prepare applications for improvement of roads in their areas, and because the roads to be improved will be low cost, it is anticipated that there will be a large number of roads to analyze and that a majority of these will have B/C ratios of at least one. There already exists a tentative list for the three departments of 82 roads amounting to a total of 1,670 kms. (See Annex I, Exhibit 1.) This anticipated high number of rural road improvement requests combined with their low construction cost/low traffic count makes it impractical to conduct extensive surveys for each candidate road as is frequently done to analyze more expensive road projects. The conventional type of analysis would not only be extremely costly, both absolutely and relatively, but time consuming as well. While such cost is not justified, it still is necessary to develop a method that adequately discriminates between proposed subprojects on the basis of net economic benefits. For this project, the recently completed farm survey covering the regions where roads are to be constructed and excellent aerial photographic and topographic maps, provide the DDCs with excellent data sources which can be used to prepare reasonably accurate and cost effective estimates of the income changes expected to occur as a result of road improvement.

TABLE 8

NET FARM INCOME BY DEPARTMENT AND FARM SIZE 1/

DEPARTMENT	FARM SIZE									
	LESS THAN .99 Has.		1 - 1.99 Has.		2 - 4.99 Has.		5 - 9.99 Has.		MORE THAN 10 Has.	
	$b	US$	$b	US$	$b	US$	$b	US$	$b	US$
Chuquisaca	4,094	205	9,584	479	18,022	901	40,046	2,002	5,786	289
Tarija	3,766	188	3,986 2/	199	4,184	209	4,466	223	7,484	374
Potosí	3,108	155	2,796	140	4,094	205	6,116	306	14,044	702

1/ These net income figures are double the actual values from the 1977 AID/MACA Farm Survey. Later analysis by BAB and AID revealed that the results of the one-time survey taken in 1977 were affected by the severe drought of 1976 - 1977, and thus very seriously understated the norm. See Agricultural Sector II Project Paper, AID-DLC/P-2247, page 73. The new AID/MACA Farm Survey to be available in November 1978 will clarify and update the current data.

2/ The survey figure has been adjusted due to questionable responses for this farm size category. The new survey will update this figure.

As discussed elsewhere, the project design is based on the premise that road improvement decision should be made at the departmental rather than the national level. A principal component of this decision making process is the economic feasibility analysis. A simplified benefit/cost procedure described below, which will be used by DDC technicians in each of the three departments, was developed so that the DDC economist could conduct the analysis with a minimum of supervision and training. It is a "cook book" approach requiring that only a few numbers and calculations be supplied by the DDC technicians in order to obtain the B/C ratio for each road. Compounded discount factors have already been calculated and the major algebraic manipulations completed. Values for the major variables that will be used during the first six months have already been calculated and are utilized in the two typical road cases presented below. The economist in the Caminos Vecinales division of SNC will periodically review and update these values and make needed changes in the basic equations used by the departmental technicians. As a condition precedent to disbursement, the economist will develop a manual based on these procedures for use by the departmental technicians. He will also conduct seminars within the first six months to teach the technicians how to use the manuals. He will receive copies of all analyses performed by the technicians, and will make at least bimonthly visits to each regional office to inspect the work being done by them, and to offer assistance where needed.

The simplification of the B/C analysis does not imply that its integrity has been reduced or impaired as a tool for road selection. Rather, by simplification we mean a reduction of the conventional tabular B/C presentation (with rows representing each year of a project's life, with the costs and benefits appropriately discounted, their yearly present values added, and the B/C rates determined) to a simple algebraic expression.

The equation that will be used by the departmental technicians will be of this general form (see Annex I, Exhibit 2 for derivation):

$$B/C = \frac{PVB}{PVC} = \frac{dY\ (4.3)}{Rc\ (.870) + maint.\ (5.1)}$$

Where:

PVB = Present value of benefits
PVC = Present value of costs
dY = Change in annual income
Rc = Economic construction cost of road
Maint. = Annual road maintenance cost

The manual developed by the economist at Caminos Vecinales will provide a step-by-step procedure for determining the values for dY and Rc.

b. Procedures for Implementation

1) Data Collection

a) Using aerial photographic maps and field interviews, the Economist/Agrónomo will estimate the zone of influence of each candidate road, the number of farms within the zone, and their farm size.

b) The engineer will travel each road segment and obtain the estimated cost of construction and its length.

2) Feasibility Analysis

a) Using a prepared income table similar to Table 8 and the number of farms estimated in each farm size, the technician will estimate the total farm income in area affected by road and the total income impact of road improvement, i.e. the dY in the B/C equation.

b) The figure used for construction cost will be the financial cost exclusive of any DDC or SNC overhead, or shadow priced volunteer labor. As shown in Annex I, Exhibit 3, these costs are offset by the salvage value of the road. Thus, excluding those costs and the salvage value simplifies the B/C calculation without distorting the results.

c) An average maintenance cost figure of $ 360/km. will be used. (For derivation, see Annex I, Exhibit 4.)

d) With the estimated total income impact (dY), cost of construction, maintenance cost, and number of kilometers, the B/C equation can be solved.

To further simplify the analysis during implementation, the tables included in Annex I, Exhibit 6 were prepared. Table A shows on a per kilometer basis the level of increased farm income required to yield various benefit-cost ratios when the construction cost per kilometer is known. For example, a road costing $ 9,000/km. would need to generate $ 2,380/km. of increased farm income to generate a B/C of 1.0, i.e. to meet the very minimal economic criteria. Table B shows what the total pre-project farm income would need to be to yield various B/C levels if it is assumed that the road will increase incomes by 36 per cent.

c. Evaluation of Two Sub-Projects

In order to test the economic feasibility of constructing rural access roads in the project area, and to demonstrate the procedure to be used during the implementation phase, two representative sub-projects were analyzed. The sub-projects selected for analysis are typical of conditions currently existing in areas where project resources will be utilized.

The two analyses indicate benefit/cost ratios of 1.3 and 1.1 respectively (see Annex I, Exhibit 5 for details). The first road segment analyzed is 12 kilometers in length located in the department of Potosí connecting three small towns with an all-weather road at Betanzos. They are situated in a fairly wide valley with a population of some 658 farm families cultivating vegetables, cereals, and tubers. The farm size distribution is estimated to be: 100 at less than 1 hectare; 398 between one and two hectares; and 160 between two and five hectares. The construction cost is estimated at $ 12,000/km. The second example is located in the department of Tarija in a valley somewhat similar to the previous example. The road segment is 19 kms. in length connecting 678 farm families in six small villages to an all weather road leading to the capital city, Tarija. Potatoes, vegetables, and corn are the principal crops along with some livestock. The average farm size is estimated at 5 hectares with a cost per kilometers estimated at $ 10,000.

Since it is assumed that these roads are representative of existing economic conditions, and since there are approximately 400 roads segments already identified by SNC as potential candidates covering some 12,000 kms., it is anticipated that the potential number of economically feasible sub-projects will substantially exceed the availability of project funds.

E. Institutional Analysis

1. National Highway Service (SNC)

a. Brief History

Prior to 1955, the Republic of Bolivia had no national highway department. On August 3, 1955, through an agreement between the Government of Bolivia and the United States, the Servicio Cooperativo Boliviano Americano de Caminos was created with the task of improving and maintaining 3,232 kms. of roads. The Servicio Nacional de Caminos was formed in January 1961 upon the expiration of this agreement. In February of 1964 the SNC assumed all responsibilities related to the Bolivian national road system.

b. General Organization

SNC is organized under the Ministry of Public Works, Communications and Transportation with autonomous administrative and technical activities. The functions delegated to SNC include the regulation, control, and supervision of all activities related to the study, construction, improvement, conservation, maintenance, and administration of the Bolivian road system. This organization is headed by a director assisted by a Board of Directors. Under the Director there is a Deputy Director who supervises the following departments: Rural Roads, Maintenance, Planning, Construction, Bridges, Equipment, Finance, and Administration. The Deputy Director also has nine District Offices and three specific projects under his direct supervision. An SNC organization chart is included as Annex K, Exhibit 1.

c. Management Capability

Since 1961, SNC itself has constructed 1,586 kilometers of primary and secondary road, and between 1963 and 1974, 545 kms. of local roads in La Paz, Chuquisaca, and Potosí. Nine hundred kilometers of primary and secondary roads are currently under construction.

The SNC also has the responsibility for maintaining over 35,000 kms. of road and supervisory responsibility over private sector contractors who execute public road contracts.

Over the past 10 years, SNC has had the reputation of being one of the best managed agencies within GOB. This has been achieved by hiring qualified individuals. Promotions are based on performance and academic merits. SNC professionals are highly qualified and experienced professionals, most of whom have many years of service at SNC.

2. Central Rural Roads Office (Caminos Vecinales)

a. Organization

Loan 511-T-056, Rural Access Roads I, provides for the creation of a Rural Roads Department within SNC to implement program objectives. However, this Department has not as yet been fully organized and staffed at either central office or field office levels. The Department is expected to be operational in mid-1978 when the road construction equipment needed for the Rural Roads I project arrives in Bolivia.

The Chief of the Rural Roads Department reports to SNC's Deputy Director and is assisted by an engineer specialized in rural road construction. Under the Manager of the Rural Roads Department there is a Deputy Manager who supervises the following Divisions: Engineering, Construction, and Equipment. There is also an advisor to assist the Equipment Division.

The Rural Roads Department has at the present time four field offices within the SNC Highway Districts in La Paz, Cochabamba, Chuquisaca, and Santa Cruz. The proposed project intends to organize field offices in three additional Highway Districts: Potosí, Tarija, and Tupiza.

The organization chart of the Rural Roads Department is included as Annex K, Exhibit 2.

b. Responsibility Under the Project

The Rural Roads Department will be in charge of: (i) overall management and coordination of project implementation, (ii) procurement and distribution of project heavy equipment, hand tools, and materials, and (iii) the training programs.

The different SNC Departments will lend technical support to the Rural Roads Department whenever necessary.

c. Capability to Carry Out the Project

This Department is staffed at present with qualified and experienced professionals. It has four professional engineers, one secretary and one messenger; it is expected that the remaining two engineer positions will be filled in mid-1978. Annex K, Exhibit 3 contains a list of the Central Rural Roads Office personnel. With the experience being gained in the implementation of the Rural Roads I project the performance of this Department is expected to improve greatly and no problems are expected with regard to their ability to carry out well their responsibilities under the project.

3. District Highway Office

a. Organization

The organization and locations of the SNC District Highway offices do not necessarily follow departmental boundaries. Therefore, under the proposed project work in the departments of Chuquisaca, Potosí, and Tarija will be implemented by four SNC District Highway Offices located at Sucre, Potosí, Tupiza, and Tarija. Annex K, Exhibit 4 presents the organization chart of a typical District Highway Office. Each District Highway Office has approximately 230 - 260 employees, including those of its Highway residencias.

b. Profile of a District Highway Office

The Potosí District Highway Office is typical of the four Districts included in the project area. Total personnel of this district office (including four residencias) is 239 employees distributed as follows: 72 at the District Office itself, 40 at the Otavi residencia office, 51 at the Retiro residencia office, 34 at the Yocalla residencia office, and 31 at the Uyuni residencia office (11 posts are vacant).

Management of the District Office is in the hands of a District Chief (civil engineer), Assistant District Chief (civil engineer), and four department chiefs. The Administrative Chief is an accountant, the chiefs of the Engineering and Maintenance Departments are civil engineers, and the Equipment Department Chief is a mechanical engineer. At the head of each residencia office there is also a civil engineer. Some of these residencias' heads have assistants who are also civil engineers.

The rest of the staff is composed of technicians, including 1 draftsman, 3 topographers, 1 radio operator, 7 mechanics, 2 electricians, 3 welders, 1 carpenter, 3 masons, 35 equipment operators, 29 assistant equipment operators, 42 drivers, and 5 watchmen, assigned to the various departments. In addition, the Administrative Department has 1 accountant, 3 bookkeepers, clerks, and secretaries.

c. Responsibility Under the Project

The District Highway Office, under the proposed project, will be in charge of: (i) overall management and direction of project activities within the district, (ii) overall supervision of basic and support equipment groups working in the districts, and (iii) heavy equipment maintenance and repair at district workshops. It will also be a member of Departmental Rural Roads Interagency Planning Committee.

d. Capability to Carry Out the Project

An analysis of the District Highway Office organization chart shows that adequate and effective lines of responsibilities have been established. The District Highway Offices are staffed with qualified and experienced personnel. The field staff is also considered capable as evidenced by the number of equipment operators and mechanics employed by private industry.

Administrative activities are conducted by the present District Highway Offices in an effective manner. They have an acceptable and uniform accounting system which provides good control and information on expenditures and investments by office and by project. It facilitates the preparation of consolidated financial statements. The control of fixed assets has been improved considerably in recent years. Sound procurement and warehousing systems exist. However, due to the different sources and brand names of equipment, an unusual amount of spare parts have to be kept in District warehouses which, at the present time, are over-crowded. The District Highway Offices also need additional parking space for the large number of equipment and vehicles in operation and being repaired. These needs will be addressed by the GOB counterpart contribution under the project for facilities improvement.

4. Highway Residencias

a. Organization

The Highway residencias are under the supervision of the District Highway Offices and each residencia, in turn, will control the activities of the field camps plus the basic and support groups under the project. There are four residencias under each of the Highway District Offices of Chuquisaca, Potosí, and Tarija, and two under the Tupiza District Office. The chief of a residencia is always a civil engineer.

Two residencias were analyzed in detail during project preparation. The Sucre residencia appeared to be adequately staffed for its present activities, but lacks adequate workshop facilities. The buildings at the Retiro residencia urgently need roof and wall repair. The workshop facilities at this residencia also lack the necessary tools and equipment to properly maintain and carry out simple repairs on heavy equipment and vehicles. Funds for improvement of these facilities are also provided as part of the GOB contribution for facilities improvement.

b. Profile of Sucre Residencia

The total number of employees in this residencia is 92. There are two civil engineers (the chief and his assistant), four mechanics for light equipment, one mechanic for heavy equipment, twenty-two equipment operators, fourteen equipment operators assistants, and nineteen drivers. The rest of the personnel is composed of six camp supervisors, six drill operators, three compressor operators, ten watchmen, three firemen. This residencia supervises the following camps: Totacoa, Ravelo, Janina, Tarabuco, La Palma, and Taurita. The camps are in charge of the maintenance and improvement of roads.

c. Responsibility Under the Project

The Highway residencia will be responsible for the following: (i) maintenance of rural roads within the residence; (ii) supervision of community labor used in improvement of rural roads within the residence; and (iii) maintenance and minor repair of road maintenance equipment at the residence workshop.

d. Capability to Carry Out the Project

SNC, based on its organization, facilities, road construction, and maintenance experience, has the capability to implement the proposed project. The problems of inadequate parking space and small warehouses will be corrected during the initial stages of implementation of the project. In addition, maintenance and repair equipment will be provided to District and residencia workshops under the project.

5. Departmental Development Committees

a. DDCs - General Description

A DDC is located in each of the nine departments of Bolivia. The president of the DDC is usually appointed by the President of Bolivia. The DDC operates under the general guidance of the Ministry of Planning and Coordination (MPC).

Each DDC is comprised of a planning, technical, and administrative staff. The number of staff vacancies, quality of staff, and the amount of construction equipment and maintenance facilities available varies among departments according to the DDC's financial status. In general, DDCs are dependent on proceeds from taxes, minerals, and royalties levied within the department for their revenues. Most of the DDCs also receive limited funding from the central government to supplement these resources. The DDCs design, fund, and implement a wide range of projects such as street paving, access and penetration road construction, school and hospital construction, and agro-industry investments.

b. Chuquisaca Development and Public Works Committee (CODESA)

1) General Organization

CODESA, created by Law No. 337 of 1967, is the official agency in charge of the development of the department of Chuquisaca. Its main functions are: (i) planning, design, and execution of projects; (ii) procurement and administration of external and internal loans; and (iii) coordination and implementation of projects with other agencies.

The CODESA organization chart, Annex K, Exhibit 6, shows that this agency is headed by a Board of Directors and a President. Under the President there is a Technical Chief who supervises the Administrative, Planning, and Project Departments. Analysis of the CODESA organization chart disclosed that adequate lines of responsibility have been established. Two deficiencies were noted. In spite of the large volume of CODESA activities, there is no Internal Audit Department. Secondly, at the present time the Planning Department is spending much more time on social development activities and the collection of statistical data rather than on planning.

CODESA has approximately 200 employees which include senior professional staff, chiefs of section, technicians, and workers. A list of senior staff including profession, position, and years of service is included in Annex K, Exhibit 9.

The technical departments of CODESA have prepared numerous studies in recent years. The principal studies include: Departmental Assessment of Chuquisaca-Tarija prepared with the assistance of UNICEF (1972), Chuquisaca Departmental Assessment prepared with the assistance of the U.N. (1975), Chuquisaca Five-Year Development Plan 1976 - 1980, Annual Operational Plans, and various socio-economic, pre-feasibility and feasibility studies.

Important projects being carried out currently include:

a) Development program for pig production and pork marketing, financed by BID and CODESA (US$ 3.3 million).

b) Cattle development program.

c) Reforestation program (4 million trees at an estimated cost of US$ 450 thousand for 1978).

d) Collecting pens for cattle in H. Siles and L. Calvo Provinces.

e) Integrated Social Rural Development Program financed by UNICEF (US$ 4 million for 1977).

CODESA has an extensive new rural roads construction program, executed by SNC using the Committee's equipment. Of a total of six roads programed over a five year period (451 kms.), two have been completed (261 kms.), and four are in process. The Committee's program for 1978 includes a fruit processing plant (Camargo), an animal food processing plant, and a hot sauce plant, among others. CODESA has experience in external financing since it is currently executing projects being financed by UNICEF and BID.

2) Organization for the Project

The planning and socio-economic study functions will be included in the Planning Department. The Assistant Project Engineer will report to the Chief of the Infrastructure Section of the Projects Department within the Committee.

3) Responsibility Under the Project

(i) Take the lead in planning the rural roads program in the department; (ii) chair meetings of Departmental Rural Roads Interagency Planning Committee; (iii) carry out socio-economic studies of roads proposed for improvement; (iv) provide an engineer to SNC to act as Assistant Project Engineer at the district level; (v) provide local currency budget support to SNC for the project in the form of 50 per cent of the operating costs of road improvement within the department; and (vi) undertake community-level promotional activities to help organize the community labor needed for road improvement work.

4) Capability to Carry Out the Project

CODESA has an adequate organizational structure with capable professionals at the head of its departments. The list of projects completed by CODESA demonstrates efficient management and technical capability.

The administrative support of the Committee is very effective. The mechanized accounting and budgeting control system provides the necessary information for management use in a timely fashion.

Based on this analysis, the Project Committee has concluded that CODESA has an overall capability to carry out its responsibilities under the project.

c. Potosí Development and Public Works Committee (CODEPO)

1) General Organization

Supreme Decree No. 09147 of March 1970 created CODEPO with the main objectives of: (i) promoting departmental economic development and (ii) performance of public works.

The top management of the Committee is composed of a Board of Directors, a President, and Consulting and Executive Councils. The following three directorates are under the supervision of the President: Administrative-Finance, Project Execution, and Planning. (See Annex K, Exhibit 7 for the CODEPO organization chart.)

The organization of CODEPO is adequate for its present activities, although there is no Internal Audit Department. CODEPO has approximately 148 employees, of which 43 are professionals. The senior staff is listed in Annex K, Exhibit 9, including profession, position, and years of service.

CODEPO has performed pre-feasibility and feasibility studies as well as a Departmental Assessment (1975). The activites of CODEPO increased beginning in 1975. Prior to that year CODEPO's participation was limited to urban works, e.g., street paving and construction of health posts. The Directorate of Planning was organized in 1976.

At the present time, CODEPO has a Rural Roads Office staffed by two civil engineers, two administrators, and one warehouseman. This office has completed the construction of two new rural roads; twelve additional roads are in process and thirty more are planned for 1978. The length of these new rural roads varies between 15 kms. and 100 kms. For the construction of these roads, CODEPO has promoted community voluntary labor. CODEPO is receiving external financing from UNICEF and BID for some projects and studies.

2) Organization for the Project

The planning and socio-economic study functions will be included in the Directorate of Planning. The Assistant Project Engineer will report to the Chief of the Rural Roads Office of the Project Execution Office within the Committee. Promotional activities will be located within the Rural Roads Office.

3) Responsibility Under the Project

CODEPO's responsibilities under the project will be the same as those described above for CODESA.

4) Capability to Carry Out the Project

The analysis of CODEPO revealed that its offices are well organized and adequately staffed. Technical and administrative activities are gradually improving in effectiveness. The Planning Directorate began operations in 1976 and, at the present time, some assistance in project planning and programming is needed. This assistance is contemplated under the proposed Rural Development Planning project.

Committee accounting and budgeting activities also require some improvement. The procurement and warehousing systems are satisfactory. CODEPO has an adequate organizational structure to carry out its responsibilities under the project. The additional technical personnel required for the proposed project will have to be experienced professionals.

d. Tarija Development Committee (CODETAR)

1) General Organization

CODETAR was created on April 13, 1971, by Supreme Decree No. 09657. A later Supreme Decree No. 10143 issued in March 1972, established the objectives and organization of CODETAR. The following are the objectives of this Committee: (i) study and promote the utilization of departmental natural resources; (ii) promote capital investment in all economic activities; (iii) prepare pre-feasibility studies of profitable projects.

The Organization Chart of CODETAR shows a Board of Directors and President, and under the latter's supervision the following five directorates: Administration, Production, Social Development, Planning, and Execution and Natural Resources Utilization. The organization structure of CODETAR differs somewhat from the organization of the two committees analyzed previously (see Annex K, Exhibit 8). This committee has no Technical or Consulting Councils to assist in decision-making nor an Internal Audit Department to control its activities. CODETAR has 174 employees including 52 professionals. However, some of the professionals have not completed the requirements for their academic degrees yet and have very limited experience. A list of the directorate and department chiefs including position, profession, and years of service is included in Annex K, Exhibit 9. The administrative activities of accounting, budgetting, fixed assets control, procurement, and warehousing are being conducted in an acceptable manner. Improvement in systems, records, and forms is needed.

CODETAR has also been involved in the promotion of departmental projects as well as the organization of semi-private companies. The 1978 Operational Plan is now being prepared. Some CODETAR projects are being financed by UNICEF, BID, and CARE.

CODETAR has a Rural Roads Office which has completed the construction of eight new rural access roads (a total of 91 kms.) and has twelve new roads planned for 1978. CODETAR's road construction projects utilize community voluntary labor, usually together with Food for Work.

2) Organization for Project

The planning and socio-economic study functions will be included in the Planning Directorate. The Assistant Project Engineer will report to the Execution and Natural Resources Utilization Directorate.

3) Responsibility Under the Project

CODETAR's responsibilities under the project will be the same as those described above for CODESA.

4) Capability to Carry Out the Project

CODETAR compared to CODESA (Chuquisaca) and CODEPO (Potosí), is an organization in need of improvement in its administrative and technical activities and systems. Senior personnel, although they have a university education, seem to be young and inexperienced. Their involvement in projects goes back to 1972, but their participation has been in many cases as promotors and coordinators. Therefore, CODETAR would need technical and administrative assistance as well as training for the fulfillment of its project responsibilities. This assistance will be provided as part of the proposed Rural Development Planning project, as well as specific technical assistance under the Agriculture Sector II project. CODETAR should gain considerable experience in the administration and operation of heavy equipment through the execution of the Agricultural Sector II project's land clearing program in the Humid Chaco.

PART IV - IMPLEMENTATION

A. Schedule of Major Events

Date	Description
4/30/78	Project authorized
6/15/78	Project Agreement signed with GOB
7/31/78	Equipment specifications prepared
8/15/78	Initial conditions precedent met
8/31/78	TA economist arrives for two months
9/30/78	GOB/IEC operating agreements signed
10/31/78	Subsequent conditions precedent met
10/31/78	IFB finalized and published
1/01/79	TA training advisor arrives for 12 months
2/28/79	Bids on equipment awarded
3/31/79	Equipment ordered
7/31/79	DICs and SNC begin analyzing road segments
11/30/79	DICs begin promotional work
12/31/79	SNC completes district and residencia facility upgrading
12/31/79	DICs and SNC schedule road improvement activities for first year
1/31/80	All road and maintenance equipment arrives
2/28/80	SNC fully staffed
3/31/80	Road construction begins
12/31/80	240 kms. roads improved
6/30/83	1200 kms. roads improved

B. Disbursement, Procurement, and Contracting Procedures

Disbursements

The Project Committee has investigated the possibility of applying the fixed amount reimbursement system (FAR) to the proposed project and has concluded that its application is not feasible given the structure of the project. The FAR system requires prior agreement on a fixed cost per unit of work with subsequent reimbursement for a percentage of the cost for each unit completed. Although calculating a cost per unit of work is feasible, the GOB will finance operating expenses while the AID loan will finance the procurement of equipment and materials. The AID costs are therefore a prerequisite to the initiation of road construction. Therefore, neither the project nor any of its components are suitable for financing using the FAR approach.

The financial analysis (Part III, B) provides current estimates of scheduled project expenditures for the loan disbursement period. According to current projections, 85 per cent of the loan funds (primarily for heavy equipment and materials) will be disbursed during the

first two years of the disbursement period. Given the long lead time in the procurement of equipment which will delay road construction for one year, the committee has decided that a five-year disbursement period is appropriate for the completion of the Project.

No deviation from AID established disbursement procedures is anticipated. Materials and equipment procured in the United States or other AID geographic Code 941 countries as well as costs for technical assistance contracts will be paid through standard letter of commitment/credit procedures. Disbursements for local currency costs will be made from a US government owned RDO account held in the Central Bank of Bolivia.

2. Contracting

The contracts for technical assistance will all be host country contracts, approved by AID in accordance with Handbook 11, Country Contracting.

3. Procurement

Road construction and maintenance equipment, materials, tools, radios, and surveying instruments procured with loan funds will have their source and origin in US Geographic Code 941 countries and Bolivia. All procurement will follow the procedures outlined in AID Handbook 11. All procurement documentation will be prepared by SNC and reviewed by USAID.

The first Invitation for Bid (IFB) will be issued on or about October 31, 1978, (immediately after the Conditions Precedent are met) covering vehicles (from Code 000), road construction and maintenance equipment, spare parts, shop tools, radios, hand tools, surveying instruments, and materials. A second IFB will be issued shortly thereafter for explosives. All equipment, tools, and materials should arrive in Bolivia by January 1980 in order to begin construction by March.

C. Monitoring and Evaluation Plans

USAID/Bolivia's Engineering and Transportation Division will have the prime monitoring responsibilities for this program, as they do for Rural Roads I. Monthly loan reports will provide the basis for periodic tracking of the project's progress and problems. Mission staff will make regular field trips to the project area to inspect road upgrading and maintenance activities.

Periodic evaluations will be performed for the principal purpose of assessing the project's progress toward its objectives, including the performance of SNC, the DDCs, and the local communities in planning,

analyzing, designing, and implementing a rural road upgrading and maintenance program. An end of project or perhaps post project evaluation will be conducted to determine the program's impact on agricultural production and incomes. The second farm survey scheduled for late 1978, together with the production and income information obtained in the economic analysis of individual road segments, will provide the baseline data necessary for such an evaluation.

In general, the following measures of performance will be assessed during the periodic evaluations:

(i) Construction progress

- Number of kilometers of roads upgraded (planned vs. actual schedule)
- Quality of work (as measured in part by subsequent maintenance requirements).
- Costs of upgrading
- Effectiveness of basic and support groups.

(ii) Road and equipment maintenance

- Number of kilometers of roads maintained (planned vs. actual schedule)
- Quality of maintenance work
- Frequency of maintenance work
- Cost of maintenance work
- Downtime of equipment

(iii) SNC (Caminos Vecinales) central management

- Budgetary support to overall program
- Logistical and procurement support to field
- Training programs (quality and number of personnel trained)
- Guidance to DDC economists
- Procurement capabilities

(iv) SNC district office management

- Supervisory and logistical support to residencias.
- Recruitment of personnel for residencias
- Equipment repair record in district workshop

(v) SNC residencias management

- Supervisory and logistical support to work groups
- Supervision and transportation of community labor
- Equipment repair record in residencia workshop
- Support to communities for road maintenance work

(vi) DDC capabilities

- Analytical work on road segments
- Promotional work with communities
- Engineering/supervisory work on road upgrading
- Budgetary support
- Organizational work with communities for road maintenance needs

(vii) Community contribution

- Availability of hand labor for road upgrading and maintenance
- Leadership and organizational skills in managing labor crews

(viii) Technical assistance advisors contribution

- Counterpart relations
- Performance as measured against scope of work

One hundred thousand dollars of loan funds have been budgeted for evaluations.

D. Conditions, Covenants, and Negotiating Status

The project has been reviewed with key personnel in SNC, Caminos Vecinales, the Ministry of Transportation, and the DDCs. No problems are anticipated in signing the Project Agreement.

In addition to the standard conditions and covenants, the Project Agreement will include the following:

1. Conditions Precedent to Disbursement

a. Prior to disbursement or the issuance of documents pursuant to which disbursement will be made for other than technical assistance activities, the Government of Bolivia shall furnish to AID, in form and substance satisfactory to AID:

(i) The staffing pattern for the personnel to be employed in the central, district and residencia offices under the project.

(ii) A time-phased plan for upgrading the facilities of the district and residencia offices participating in the project.

(iii) A time-phased implementation and evaluation plan for all components of the project.

b. Prior to any disbursement or to the issuance of commitment documents under the loan for the purchase of equipment, the Government shall furnish to AID, in form and substance satisfactory to AID:

(i) A co-signed letter of understanding between SNC and the Development Committees in the Departments of Chuquisaca, Potosí, and Tarija, which detail their respective financial and implementation responsibilities in carrying out the project.

(ii) A handbook detailing the procedures to be followed in analyzing, selecting, and ranking individual subprojects, including a description of the role of the subproject selection committee.

(iii) Evidence of the formation of subproject selection committees in the Departments of Chuquisaca, Tarija, and Potosí.

2. Special Covenants

The Borrower shall covenant:

(i) To provide budgeting support to the rural roads division at a level adequate to permit satisfactory maintenance of the equipment to be procured and the roads to be improved under the project.

(ii) To use the equipment financed under the loan exclusively for the purposes of the project during the disbursement period of the project and thereafter only for the improvement and maintenance of rural access roads.

(iii) To continue after project completion, the improvement of rural access roads in the same geographic focus of the project as defined in Annex I of the ProAg using the Rural Roads Department as the implementing agent.

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TAGS:

SUBJECT: RURAL ROADS II PRP DEAC REVIEW

1. AS DISCUSSED WITH MISSION DIRECTOR, SUBJECT LOAN WILL NOT BE CONSIDERED FOR FY 77.

2. THE MISSION MAY WANT TO PUT FORWARD THIS LOAN PROJECT FOR CONSIDERATION FOR FY 78. THIS IS NOT TO BE CONSTRUED, HOWEVER, AS AN IMPLICIT APPROVAL OF THIS LOAN FOR FY 78. WHEN PRP IS RE-SUBMITTED, THE PROJECT WILL BE CONSIDERED ON ITS OWN MERITS, ESPECIALLY IN LIGHT OF PROGRESS ACHIEVED AND INSTITUTIONAL CAPABILITY DEVELOPED WITHIN SNC UNDER RURAL ROADS I.

3. IN GENERAL TERMS, GUIDANCE PROVIDED MISSION BY AID/W FOR RURAL ROADS I PP ALSO APPLIES TO THIS PROJECT.

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SUBJECT: RURAL ACCESS ROADS PP - DAEC REVIEW

1. AS A RESULT OF NOVEMBER 20 DAEC REVIEW OF SUBJECT PROJECT, CERTAIN AREAS OF ADDITIONAL INFORMATION AND ANALYSIS WERE IDENTIFIED AS NECESSARY TO DEMONSTRATE ECONOMIC SOUNDNESS. THIS ADDITIONAL WORK IS DESCRIBED IN PARAS 2-4 BELOW. BUREAU RECOMMENDATIONS ON APPROVAL OF THE PROJECT WILL DEPEND UPON DETERMINATION THAT THESE ISSUES SATISFACTORILY ADDRESSED.

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2. SUB-PROJECT SELECTION CRITERIA: PP SHOULD BE REVISED TO REFLECT UNDERSTANDING WITH GOB THAT IN SELECTING ROADS FOR FINANCING (FROM AMONG ROADS FOUND ELIGIBLE) GOB WILL GIVE POSITIVE WEIGHT TO THOSE ROADS WHICH WOULD SERVE PORTIONS OF TARGET GROUP WHOSE INCOME IS AS LOW ON THE INCOME SPECTRUM AS POSSIBLE (WHILE STILL MEETING BASIC ECONOMIC VIABILITY TEST). INFORMATION TO ENABLE GOB TO IMPLEMENT THAT UNDERSTANDING WOULD BE COLLECTED DURING ECONOMIC FEASIBILITY STUDY FOR EACH ROAD.

PP SHOULD ALSO REFLECT UNDERSTANDING WITH GOB RE CRITERIA AND METHODOLOGY WHICH GOB WILL APPLY IN SELECTING ROADS FOR PRIORITY ATTENTION FROM AMONG THOSE ELIGIBLE FOR FINANCING.

3. TARGET GROUP: THE PP SHOULD PROVIDE ADDITIONAL DESCRIPTIVE SOCIO ECONOMIC CHARACTERISTICS OF THOSE FARM FAMILIES WHO WILL BE GENERATING THE ESTIMATED 3.1 MILLION INCREMENTAL PRODUCTION PER ANNUM, (AVERAGING 205.00 DOLLARS), AS CONTRASTED WITH THE SOCIO ECONOMIC CHARACTERISTICS (LEVELS OF PRODUCTION, ASSETS, ETC.) OF THE TARGET GROUP AS A WHOLE. MISSION SHOULD ALSO ADD TO PP MATERIAL MORE FULLY EXPLAINING THE ASSUMPTIONS AND ANALYTICAL PROCESS LYING BEHIND INCOME BENEFITS PROJECTED TO RESULT FROM THE PROJECT.

4. CHOICE OF TECHNOLOGY AND ECONOMIC SOUNDNESS: ANALYSIS IN SUPPORT OF PROPOSED LABOR/CAPITAL CONSTRUCTION TECHNOLOGY NEEDS TO BE REVISED AND AMPLIFIED. REVISED ANALYSIS SHOULD DEMONSTRATE OPTIMAL LABOR/CAPITAL MIX IN TERMS OF FACTOR ENDOWMENTS AND PRICES, AGGREGATE INCOME EFFECTS ON TARGET GROUP AND EFFICIENCY IN ACHIEVING PROJECT PURPOSE.

AS TO APPROACH, THE MISSION SHOULD FIRST EXAMINE THE AVAILABILITY OF UNSKILLED LABOR FOR WORK ON THE ROADS. THAT ANALYSIS SHOULD BE TAILORED TO FULLY CONSIDER AND TEST (1) THE SEASONALITY AND OFF-FARM AVAILABILITY (2) THE LEVEL OF UNDER EMPLOYMENT AND UNEMPLOYMENT IN THE RURAL SECTOR (3) THE POSSIBLE FOREGONE PRODUCTION IN AGRICULTURE GIVEN THE COINCIDENCE OF TIMING OF INTENSE FARM ACTIVITIES TO ROAD CONSTRUCTION AND THE VALUE OF

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PAID CONSTRUCTION LABOR COMPARED TO FOREGONE PRODUCTION AND (4) THE SKILLED LABOR PREMIUMS WITHIN THE RURAL SECTOR. THE OUTCOME SHOULD PROVIDE THE BASIS FOR THE SHADOW PRICE CALCULATIONS FOR THE UNSKILLED LABOR AS WELL AS THE PREMIUM FOR SKILLED LABOR.

WITH REGARD TO THE ROAD CONSTRUCTION TECHNIQUE, ALTERNATIVES SHOULD BE DEVELOPED TO COMPARE VARIOUS LABOR CAPITAL RATIOS. TO THAT END, THE FOLLOWING COMPARATIVE ANALYSIS SHOULD BE CONDUCTED: (1) DEVELOP A TRADITIONAL MACHINE-INTENSIVE ROAD CONSTRUCTION UNIT, BY ACTIVITIES (I.E. MOBILIZATION, CLEAR & GRUB; EARTHWORK ETC.) TO IDENTIFY SPECIFIC MACHINE AND LABOR CATEGORIES, (2) SUBSTITUTE HAND LABOR FOR SPECIFIC EQUIPMENT PIECES, FROM TWO POINTS OF VIEW, (A) THE SPECIFIC ACTIVITY (B) THE CONSTRUCTION UNIT AS A WHOLE.

UPON COMPLETION, THE RESULTS SHOULD FORM THE BASIS OF PROTO-TYPE LABOR INTENSIVE AND CAPITAL INTENSIVE CONFIGURATIONS FOR FURTHER USE IN THE COMPARATIVE ANALYSIS. AT THAT JUNCTURE, THE LABOR INTENSIVE PROTO-TYPE SHOULD BE UTILIZED TO DETERMINE THE MAXIMUM LABOR INPUT WITH A

MINIMUM REDUCTION OF PRODUCTIVITY, WHILE HOLDING THE 17.8 MILLION PROGRAM LEVEL CONSTANT AND KEEPING THE LABOR COMPONENT REALISTIC RELATIVE TO SUPPLY THEREOF.

RESULTS FROM ABOVE ANALYSIS SHOULD THEN BE COSTED BOTH FROM A FINANCIAL (I.E., MARKET PRICES) AND ECONOMIC (I.E., ACCOUNTING PRICES) POINT OF VIEW. THE BASES FOR THE RESPECTIVE INPUT PRICES, AND OTHER ECONOMIC SHADOW ADJUSTMENTS (SUCH AS CEMENT, STEEL & ECT) SHOULD BE EXPLAINED.

SUBSEQUENTLY, THE VARIOUS MIX OF ALTERNATIVES AND THEIR RELATED INCREMENTAL INCOME EFFECTS, SHOULD BE TESTED IN THE BENEFIT-COST ANALYSIS. THE COMPARATIVE OUTCOME WOULD BE USED FOR MEASURING THE FINAL ECONOMIC WORTHINESS OF EACH ALTERNATIVE.

OTHER RELEVANT INPUTS SUCH AS THE SOCIOLOGICAL, CULTURAL

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AND GOB POLICY CONSIDERATIONS THAT AFFECT THE CHOICE OF TECHNOLOGY SHOULD BE OVERLAID ON THE ECONOMIC ANALYSIS TO JUSTIFY THE OPTIMAL LABOR/CAPITAL MIX.

IN ORDER TO ASSIST THE MISSION WITH THIS ANALYSIS, AID/W WILL SUPPLY THE TDY SERVICES OF A TRANSPORTATION ECONOMIST LATE FEBRUARY AND WILL, BY SEPARATE CABLE INFORM THE MISSION OF ANY INFORMATION WHICH THE MISSION SHOULD GATHER BEFORE ARRIVAL OF THE ECONOMIST, IN ORDER TO FACILITATE HIS WORK. FURTHER, DEMETRE WILL PREPARE ILLUSTRATIVE ANALYSIS OF CONSTRUCTED ALTERNATIVES AND POUCH TO MISSION ASAP.

RURAL ACCESS ROADS PRP WAS ALSO REVIEWED BY DAEC ON NOVEMBER 20, AND APPROVED FOR INTENSIVE REVIEW. SEPTEL CONTAINING INTENSIVE REVIEW GUIDANCE FOLLOWS ASAP. KISSINGER

STATUTORY CHECKLIST

1. COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?	Yes.
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?	No.
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?	Yes.

4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or constested by such government? No.

5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? No.

6. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique or Angola? No.

7. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? No.

8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No.

9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?	Bolivia has instituted the investment guaranty program.
10. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters, a. has any deduction required by Fishermen's Protective Act been made? b. has complete denial of assistance been considered by AID Administrator?	Bolivia has taken no such actions.
11. FAA Sec. 620(q); App. Sec. 503. (a) is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default?	No.
12. FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).)	The CY 1978 Budget for military purposes represents approximately 17% of total budgeted expenditures of the GOB.

13. FAA Sec. 620(t): Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?	No.
14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?	Bolivia is not in arrears
15. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?	No.
16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?	No.
17. FAA Sec. 669, 670. Has the country, after Aug. 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after Aug. 3, 1977 although not a "nuclear-weapon State" under the non-proliferation treaty?	No.
18. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate?	No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

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

Yes.

b. FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor?

Yes.

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

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

Bolivia is making appropriate efforts with respect to food production, storage and distribution. AID Loans 511-L-042, 511-T-050, 511-T-052, 511-T-053, 511-T-056 and this loan will contribute to these efforts.

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

The GOB program emphasized creation of a favorable climate for selected foreign and domestic private enterprise and investment. It is seeking special exemption within the Andean Economic Market for certain investments.

(3) Increasing the public's role in the developmental process.	The GOB continues to take in active role in the development process and in so doing to increase popular participation.
(4) (a) Allocating available budgetary resources to development.	The GOB appears to be allocating as much as it is able to development.
(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.	The GOB is not interferring in the affairs of other free and independent nations.
(5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.	The GOB is making these efforts.
(6) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.	The GOB appears to be doing this in an increasingly effective manner.
d. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?	Yes.
e. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance, or Middle East peace funds? If so, has Congress specifically	No.

authorized such use of funds, or is assistance for population programs, humanitarian aid through international organizations, or regional programs?

2. Security Supporting Assistance Country Criteria

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

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

c. FAA Sec. 533(c)(2). Will assistance under the Southern African Special Requirements fund be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President determined (and reported to the Congress) that such assistance will further U.S. foreign policy interests? N.A.

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

e. App. Sec. 113. Will security assistance be provided for the purpose of aiding directly the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? N.A.

II. PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

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

(a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure plus 10%)?

Committees will be notified using special Congressional notification.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

Such planning has taken place and cost estimates made.

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

Ratification of loan agreement by GOB will follow shortly after signature as in all cases of past agreements.

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?

N.A.

FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	Yes.
6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?	No.
7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.	(a) Major dollar component of Project is for construction equipment. (e) Opening of farm-to-market roads will increase productivity of agriculture.
8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).	U.S. suppliers will compete to supply equipment being financed under the loan.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.	Bolivia will make contribution in excess of 25% of project costs.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?	The U.S. does not own excess foreign currency in Bolivia.
11. ISA 14. Are any FAA funds for FY 78 being used in this Project to construct, operate, maintain, or supply fuel for, any nuclear powerplant under an agreement for cooperation between the U.S. and any other country?	No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?	Project is specifically designed to extend access to economy to the now-isolated small farm sector. Local selection committees will encourage citizen and local government participation.
b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)	

(1) (103) for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; (103A) if for agricultural research, is full account taken of needs of small farmers;	Road program has been specifically designed to increase productivity and income of small farm sector rural poor.
(2) (104) for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;	N.A.
(3) (105) for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;	N.A.
(4) (106) for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:	N.A.
(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;	
(b) to help alleviate energy problem;	
(c) research into, and evaluation of, economic development processes and techniques;	

(d) reconstruction after natural or manmade disaster;

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

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

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

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)? — Bolivia has agreed to provide at least 25% of the costs of the project and agreed project budget so reflects.

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? — N.A.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; — Local and regional community organizations will play an important role in project implementation.

(3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

Road program will improve Bolivian transportation system.

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

Project will encourage local participation in the development process and will help integrate isolated areas into the national economy.

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

Yes, Project is basic element of Bolivian rural development plans.

h. FAA Sec. 201(b)(6); Sec. 211 (a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.	U.S. suppliers will be eligible to supply commodities for the Project.
2. Development Assistance Project Criteria (Loans only)	
a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.	No other financing sources available for this Project.
b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.	Lending terms are legal under U.S. and Bolivian law. Loan is within debt-carrying capacity of Bolivia.
c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?	Yes.
d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?	Yes.

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?	10-12 million dollars will be spent on procurement from private sources.
f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	N.A.
3. Project Criteria Solely for Security Supporting Assistance	
a. FAA Sec. 531. How will this assistance support promote economic or political stability?	N.A.
b. FAA Sec. 533(c)(1). Will assistance under the Southern African Special Requirements Fund be used for military, guerrilla, or paramilitary activities?	N.A.
4. Additional Criteria for Alliance for Progress (Note: Alliance for Progress projects should add the following two items to a project checklist.)	
a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?	Yes. Integration effect is minimal.
b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries	Yes.

by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

III. STANDARD ITEM CHECKLIST

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?

Yes, loan agreement and implementation procedures will so provide.

2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?

Yes.

3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?

Bolivia does not so discriminate.

4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?

N.A.

5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?

Yes.

6. MFA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	Yes, loan agreement will so provide.
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?	Yes.
8. International Air Transport. Fair Competitive Practices Act, 1974 If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?	Yes.
B. Construction	
1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?	Yes.
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	Yes.

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

C. Other Restrictions

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

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

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

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

5. Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to practice sterilization? — Yes.

b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? — Yes.

c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? — Yes.

d. FAA Sec. 662. for CIA activities? — Yes.

e. App. Sec. 103. to pay pensions, etc., for military personnel? — Yes.

f. App. Sec. 106. to pay U.N. assessments? — Yes.

g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). — Yes.

h. App. Sec. 112. to finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields? — Yes.

i. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? — Yes.

CERTIFICATION PURSUANT TO SECTION 611 (e) OF THE

FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Frank B. Kimball, the principal officer of the Agency for International Development in Bolivia, having taken into account among other factors the maintenance and utilization of projects in Bolivia previously financed or assisted by the United States, do hereby certify that in my judgement Bolivia has both the financial capability and human resources capability to effectively maintain and utilize the capital assistance project: RURAL ROADS II.

Frank B Kimball

Frank B. Kimball
Director, USAID/Bolivia

DRAFT

AID Loan 511- -

PROJECT AUTHORIZATION AND REQUEST FOR AUTHORIZATION OF FUNDS

Name of Country: Bolivia
Name of Project: Rural Roads II
Project Number :

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, and in furtherance of the Alliance for Progress, I hereby authorize a loan in an amount not to exceed Fifteen Million Five Hundred Thousand United States Dollars ($15,500,000) (the "Loan") to the Republic of Bolivia ("Government of Bolivia") to assist in financing certain foreign exchange and local currency costs of goods and services for a project (the "Project") which consists of improving access to the small farm sector by upgrading a minimum of 1200 kilometers of local roads to all-weather standards and by strengthening the capability of the Rural Roads Division of the National Road Service ("SNC") and three Departmental Development Committees to carry out rural roads improvement programs.

I approve the total level of A.I.D. appropriated funding planned for the grant-funded portion of the Project of not to exceed Three Hundred Thousand United States Dollars ($300,000) (the "Grant"), which will be incrementally funded during the period FY 1978 through FY 1979 subject to satisfactory compliance with Congressional notification requirements and the availability of funds in accordance with A.I.D. allotment procedures. Subject to these conditions, I approve obligation of the initial increment of the Grant in the amount of $25,000 at the time of the signing of the Project Agreement in FY 1978 and subsequent increments thereafter.

I hereby authorize the negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and delegations of authority, subject to the following essential terms, covenants and major conditions together with such other terms and conditions as A.I.D. may deem appropriate:

1. Interest Rate and Terms of Repayment (Loan)

The Government of Bolivia shall repay the Loan to A.I.D. in United States Dollars within thirty (30) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Government of Bolivia shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

2. Source and Origin of Goods and Services (Loan)

Except as A.I.D. may otherwise agree in writing, goods and services financed by the Loan shall have their source and origin in countries included in A.I.D. Geographic Code 941 or in Bolivia.

3. Source and Origin of Goods and Services (Grant)

Except as A.I.D. may otherwise agree in writing, goods and services financed by the Grant shall have their source and origin in countries included in A.I.D. Geographic Code 000.

4. Conditions Precedent to Initial Disbursement

Except as A.I.D. may otherwise agree in writing, prior to the first disbursement or to the issuance of documents pursuant to which disbursement will be made, the Government of Bolivia will furnish to A.I.D., in form and substance satisfactory to A.I.D.:

(a) an opinion of the Attorney General of Bolivia or of other counsel acceptable to A.I.D. to the effect that the Project Agreement has been duly authorized and/or ratified by and executed on behalf of the Government of Bolivia and that it constitutes a valid and legally binding obligation of the Government of Bolivia in accordance with all of its terms; and

(b) a statement of the name of the person authorized to act under the Project Agreement and specimen signatures of such persons duly certified as to their authenticity.

5. Conditions Precedent to Disbursement for Other Than Technical Assistance

Except as A.I.D. may otherwise agree in writing, prior to disbursement or the issuance of documents pursuant to which disbursement will be made for other than technical assistance activities, the Government of Bolivia will furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) the staffing pattern for the personnel to be employed in the Central, District Highway and Resident Highway Offices, respectively, under the Project;

(b) a time-phased plan for upgrading the facilities of the District Highway Offices and Resident Highway Offices participating in the Project; and

(c) a time-phased implementation and evaluation plan for all components of the Project.

6. Conditions Precedent to Disbursement for Construction Equipment

Except as A.I.D. may otherwise agree in writing, prior to disbursement or the issuance of documents pursuant to which disbursement will be made for construction equipment, the Government of Bolivia will furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) a co-signed letter of understanding between SNC and the Departmental Development Committees in the Departments of Chuquisaca, Potosi and Tarija, respectively, which detail the financial and implementation responsibilities of each in carrying out the Project;

(b) a handbook covering the procedures to be followed in analyzing, selecting and ranking individual sub-projects, including a description of the role of the sub-project selection committees; and

(c) evidence of the formation of sub-project selection committees in the Departments of Chuquisaca, Potosi and Tarija.

7. Special Covenants

Except as A.I.D. may otherwise agree in writing, the Government of Bolivia will covenant:

(a) to provide budgetary support to the Rural Roads Division of SNC at a level adequate to carry out satisfactory maintenance of the equipment to be procured and the roads to be improved under the Project;

(b) to use the equipment financed under the Loan exclusively for the purposes of the Project during the disbursement period of the Project and thereafter only for the improvement and maintenance of rural access roads; and

(c) to continue after Project completion the improvement of rural access roads within the same geographic focus as the Project using the Rural Roads Division of SNC as the implementing agent.

_____
Administrator

_____
Date

AID 1020-28 (7-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

Life of Project:
From FY 1978 to FY 1983
Total U.S. Funding $ 15.7 million
Date Prepared: 5/1/78

Project Title & Number: Rural Roads II

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes:	**Measures of Goal Achievement:**		**Assumptions for achieving goal targets:**
a. Goal: Increase the per capita income and improve the standard of living of Bolivia's rural people.	a. Achievement of sustainable average rate of growth of real per capita income in rural area of 3 per cent per year by 1983.	a. AID-financed farm policy studies.	a. Price inventives for food production continue to be favorable.
b. Increase small farmer incomes in Southern Bolivia, namely the Departments of Chuquisaca (southern part), Potosí, and Tarija.	b. Increase in income of small farmers living within the zone of influence of improved rural roads by 36 per cent per year.	b. Reports and special studies carried out under various AID-financed agriculture projects.	b. GOB provides adequate budget support for food production programs.
		c. Data, reports and special studies of MACA Offices of Planning, Economics and Statistics.	c. No major downturn in general economic conditions.
		d. National account data of Ministry of Planning.	d. Current political stability continues.

AID 1020 38 (7-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX F

Life of Project:
From FY 1978 to FY 1983
Total U.S. Funding $ 15.6 million
Date Prepared: 3/1/78

Project Title & Number: Rural Roads II

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	**Conditions that will indicate purpose has been achieved: End of project status.**		**Assumptions for achieving purpose:**
a. Improve access to and from the small farm subsector in selected areas of the Departments of Potosí, Chuquisaca, and Tarija by upgrading farm-to-market roads to all-weather standards.	a. At the end of the project 1200 kms. of rural access roads will have been improved, thereby directly impacting on approximately 44,000 small farm families.	a. SNC and technical advisor periodic and final reports on Project.	a. DDCs obtain required budgetary contribution to road construction
b. Expand and improve the capacity of the Bolivian implementing agencies, particularly the Caminos Vecinales Department of SNC and the participating DDCs, to carry out a rural roads program.	b. In addition, at the end of the project SNC's Caminos Vecinales Department will have expanded its roads improvement and maintenance program into the Departments of Potosí, Chuquisaca, and Tarija: - Four District Offices at the cities of Sucre, Tarija, Potosí, Tupiza will be capable of (1) managing and directing road improvement activities within their respective jurisdictions, (2) supervising six basic and four support equipment groups working in the districts, and (3) performing heavy equipment maintenance and repairs at the district workshops. - Ten highway residencias will be capable of (1) supervising community labor used in the improvement of rural roads within the residencias,	b. USAID Project Manager periodic site visits.	b. GOB provides SNC with adequate budget to maintain rural roads in project area. c. GOB provides SNC with adequate budget to maintain and repair rural road improvement and maintenance equipment within Project area.

AID 1020 38 (7-71)
SUPPLEMENT I

ANNEX F

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1978 to FY 1983
Total U.S. Funding $ 15.8 million
Date Prepared: 3/1/78

Project Title & Number: Rural Roads II

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose:	**Conditions that will indicate purpose has been achieved: End of project status.** (2) maintaining the roads, and (3) performing maintenance and minor repairs at the residencia workshop. - The three Departmental Development Committees (DDCs) located in Chuquisaca, Potosí, and Tarija will be capable of analyzing, performing socio/economic studies, planning, coordinating, promoting, implementing, and evaluating road improvement activities in their jurisdictions. - At least 100 local communities will be able to provide and organize the necessary labor for road improvement and continuing minor road maintenance activities. Finally, by the end of project SNC's Caminos Vecinales office in La Paz will be able to plan and coordinate rural road project activities as well as manage the improvement and maintenance activities. The office will also be able to procure and distribute heavy equipment, hand tools, and materials, and conduct the training programs necessary to insure the availability of supervisory and technical personnel.		**Assumptions for achieving purpose:**

AID 1020-2B (7-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1978 to FY 1983
Total U.S. Funding $ 15.8 million
Date Prepared: 7/1/78

Project Title & Number: Rural Roads II

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS					MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	**Magnitude of Outputs:**						**Assumptions for achieving outputs:**
	1979	1980	1981	1982	1983		
a. SNC District Offices (4)						a. SNC and technical advisor periodic and final reports on Project.	a. GOB and Chuquisaca, Potosí and Tarija Development Committees make budget provision for and provide their inputs on a timely basis.
1) Increased supervisory and maintenance capability.	-	4	4	4	4		
2) Staff (cumulative)	12	24	24	24	24		
b. SNC Residences (10)						b. USAID Project Manager periodic site visits.	b. Adequate number of qualified personnel available for training.
1) Increased construction and maintenance capability	-	10	10	10	10		
2) Staff (cumulative)	35	75	75	75	75		
c. Basic Groups (6)							
1) Increased construction capability	-	6	6	6	6		
2) Staff (cumulative)	100	210	210	210	210		
d. Support Groups (4)							
1) Increased operating capability	-	4	4	4	4		
2) Staff (cumulative)	25	52	52	52	52		
e. DDCs (3)							
1) Increased analytical ability	3	3	3	3	3		
2) Staff (cumulative)	7	14	14	14	14		
f. Beneficiary Communities							
1) Providing community labor	-	20	46	74	100		
2) Community roads monitors trained (cumulative)	-	20	46	74	100		

AID 1020-28 (7-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

ANNEX F

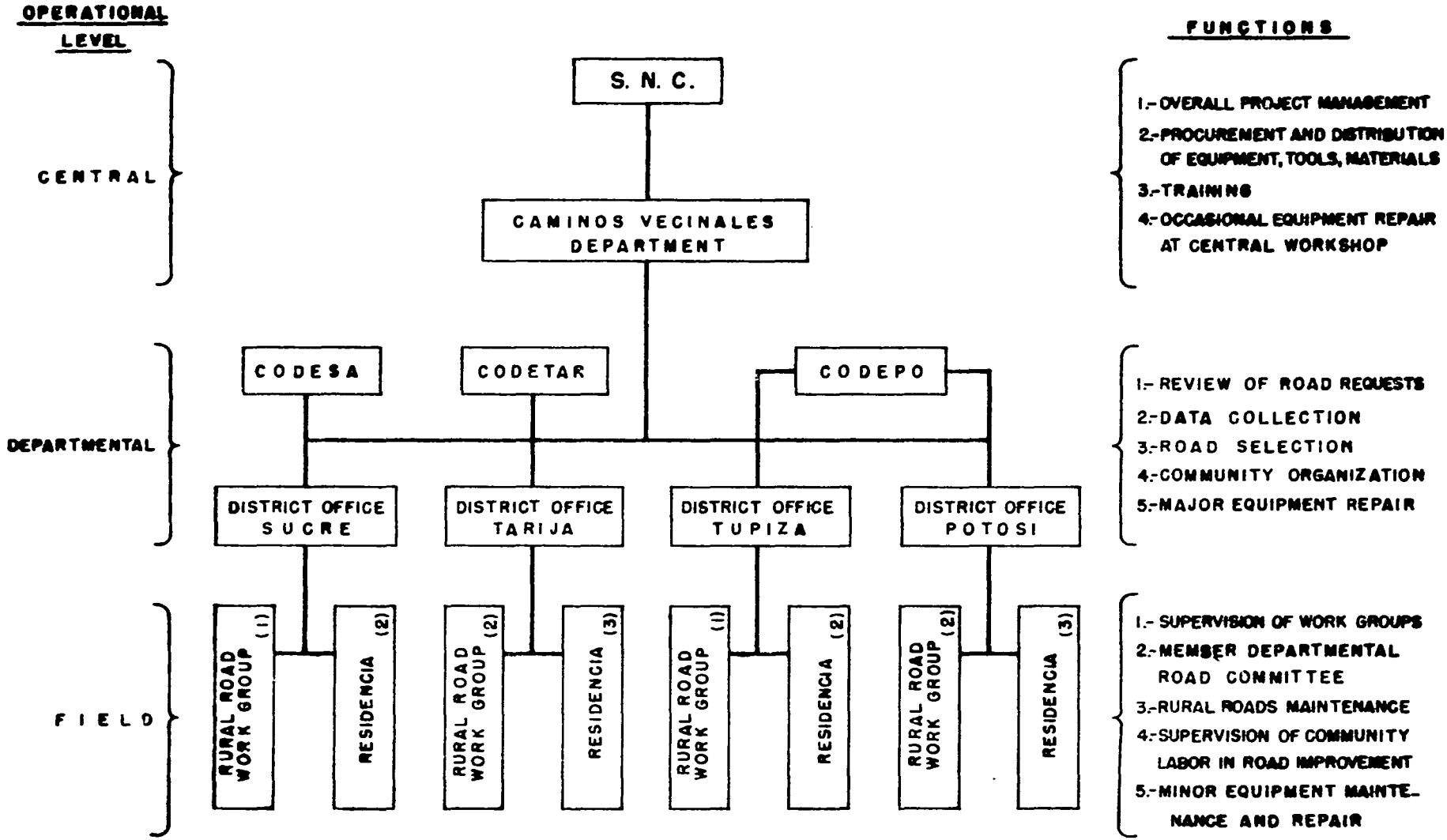
Life of Project:
From FY 1978 to FY 1983
Total U.S. Funding $ 15.6 million
Date Prepared: 3/78

Project Title & Number: Rural Roads II

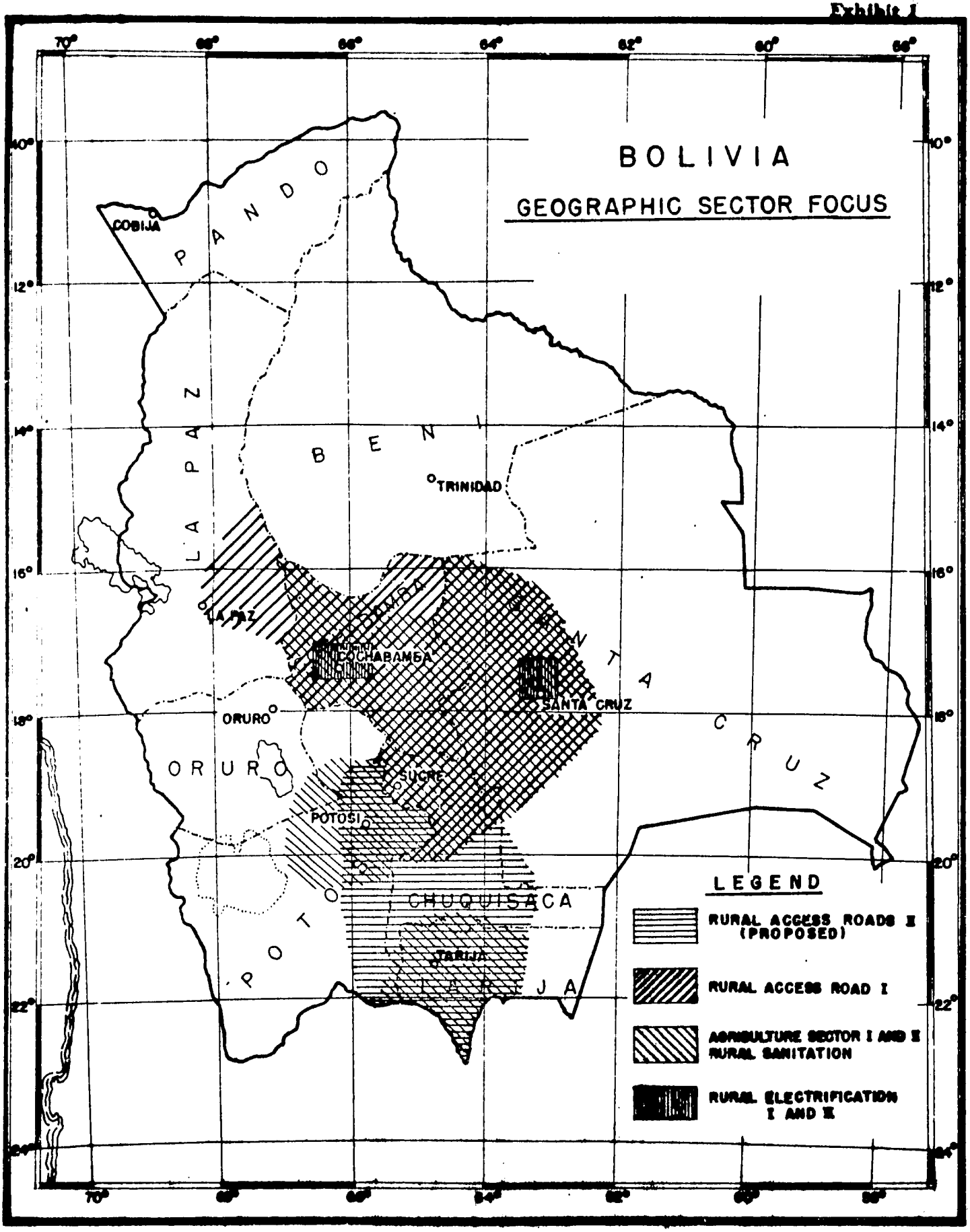
NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs:	**Magnitude of Outputs:**		**Assumptions for achieving outputs:**
g. Rural Roads Improved	1979: - ; 1980: 240 ; 1981: 560 ; 1982: 880 ; 1983: 1,200		
(Cumulative kilometers completed)			
h. Rural Roads Maintained			
(Cumulative kilometers)	1979: - ; 1980: - ; 1981: 300 ; 1982: 600 ; 1983: 1,200		
i. SNC and TA advisor complete manual for economic analysis	x		
Inputs:			
See financial plan.			

Annex G

ORGANIZATIONAL FRAMEWORK



Annex H
Exhibit I

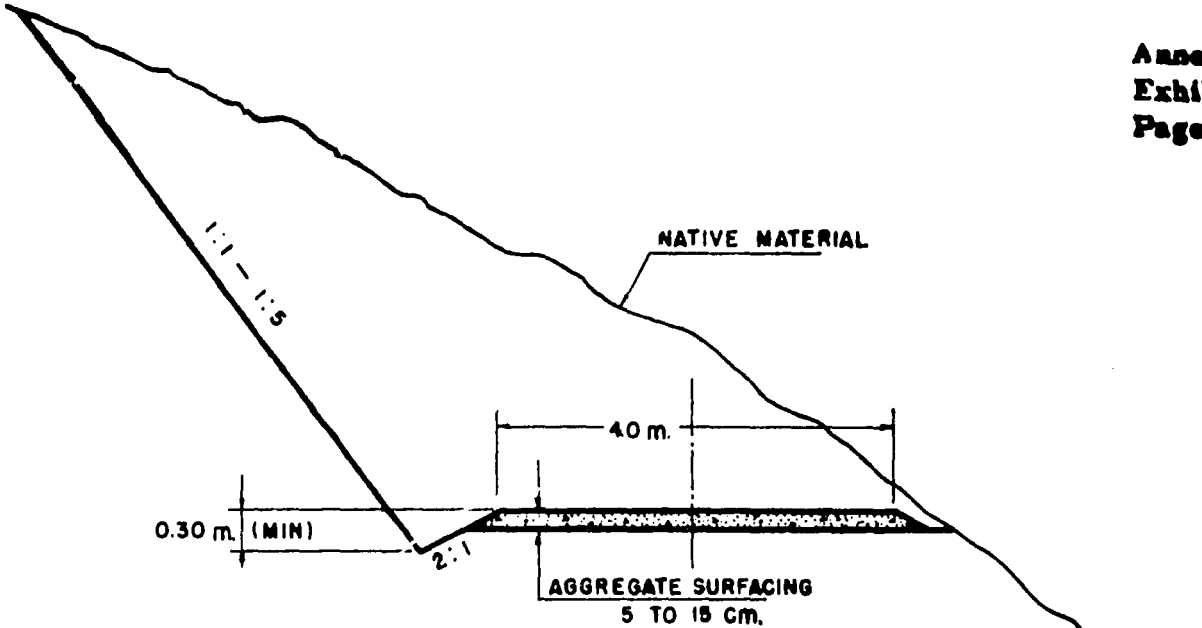


DESIGN CRITERIA

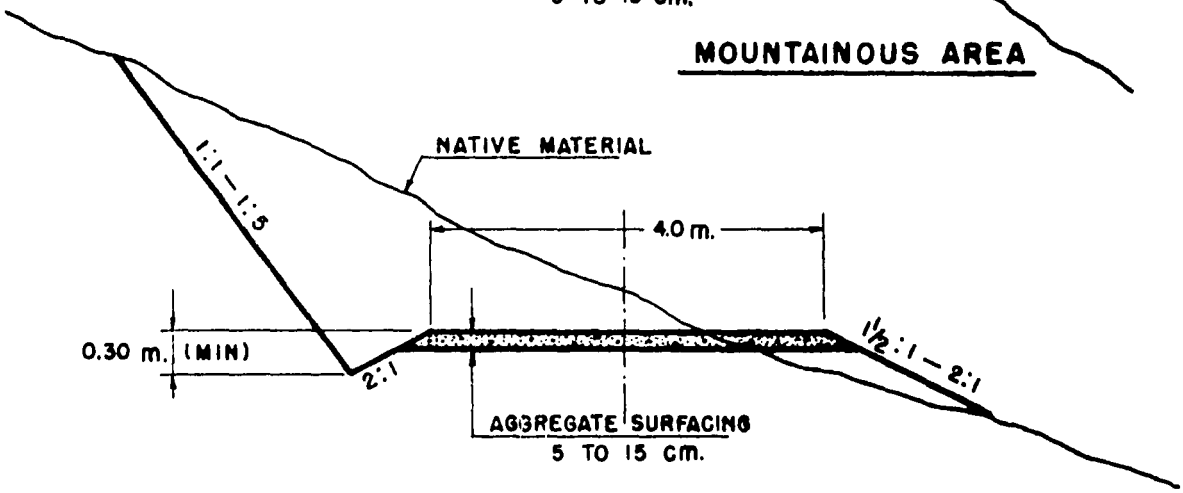
The Rural Access Roads will be designed for H-10 to H-15 (AASHO) loading, with a minimum of 4 meters roadbed and gravel surfacing of 5 to 15 cms. of thickness to provide all weather access. The project area involves flat lands, high valleys and mountainour terrain. No major drainage structures will be constructed. Concrete pipes, masonry arches and stone fords will be used for minor drainage. Concrete beam bridges will be considered on a cost comparative basis with masonry arches.

The roads serving river valleys will be aligned along the bottom of such valleys outside of the flood plain of the rivers.

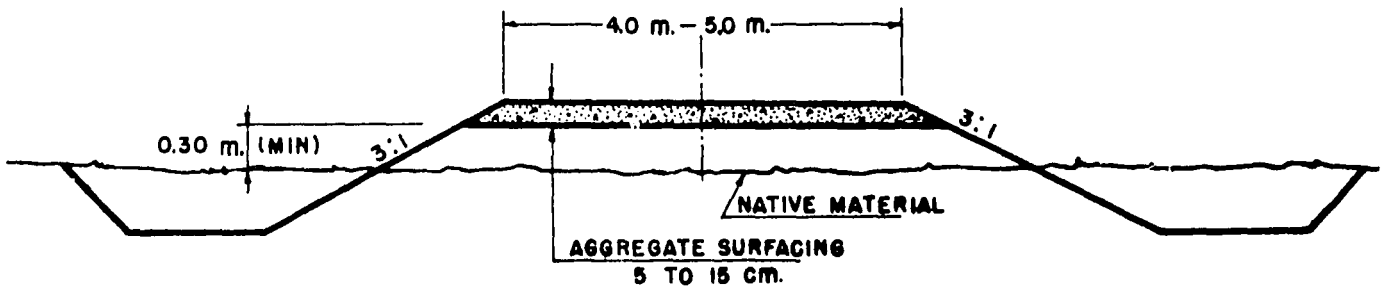
	Designed Standards	Min.	Max.
1.	Roadway width	4 m.	5 m.
2.	Surface thickness	5 cms.	15 cms.
3.	Capacity (AASHO)	H-10	H-15
4.	Radious of curves	20 m.	-
5.	Fill slopes	1 1/2:1	3:1
6.	Cut slopes	1 : 5	1:1
7.	Grades: cut	0.3%	12%
	fill	0%	10%
8.	Cross slopes	2%	4%



MOUNTAINOUS AREA



HIGH VALLEY



FLAT AREAS

TYPICAL ROAD SECTIONS

AVERAGE CONSTRUCTION COST PER KILOMETER 1/

I. Mountainous

	Item	AID	GOB	Regional Committees	Community Hand Labor	Total
A.	Excavation	3,905	3,352	-	137	7,394
B.	Drainage	1,525	108	-	237	1,870
C.	Surfacing	1,583	1,604	-	99	3,286
D.	Engineering	28	915	-	-	943
E.	Feasib. Studies	-	-	189	-	189
						13,682

II. High Valley

A.	Excavation	3.254	2,794	-	114	6,162
B.	Drainage	1,525	108	-	237	1,870
C.	Surfacing	1,583	1,604	-	99	3,286
D.	Engineering	28	915	-	-	943
E.	Feasib. Studies	-	-	189	-	189
						12,450

III. Flat Land

A.	Excavation	1,627	1,397	-	57	3,081
B.	Drainage	1,525	108	-	237	1,870
C.	Surfacing	1,583	1,604	-	99	3,286
D.	Engineering	28	915	-	-	943
E.	Feasib. Studies	-	-	189	-	189
						9,369

1/ Average of 63% of the equipment useful life will be utilized in the project; 20% of workshop equipment, 70% of tools and 50% of surveying instruments.

RURAL ACCESS ROADS II

Unclassified excavation per kilometer:

Type of road	Percentage of the total length	Volume of excavation m3	Average Volume m3
Horse trail	6%	10,000	600
Jeep Trail	56%	6.000	3.360
Truck Trail	38%	4.500	1.710
			5.670

Common Excavation (equivalent)

Common excavation	0.80 x 5670	=	4,536
Rock excavation equivalent to common excavation	0.20 x 5670 x 1.3	=	1.474
			6.010 m3
	Rounded		6.000 m3

Total Equipment Production in four years

12 D7:	12 x 60 m3/h x 6.000 h.	=	4.320.000 m3
12 D6:	12 x 40 m3/h x 6.000 h	=	2.880.000 m3
			7.200.000 m3

Number of kilometers to be improved

$$7.200,000 \text{ m3} \text{ ./. } \frac{6.000 \text{ m3}}{\text{Km}} = 1.200 \text{ Km}$$

Small Structures - (Basis of Calculations)

Small structures (concrete slab culverts and small bridges) will be built in places where the construction of fords are not an appropriate drainage solution.

1. Concrete Slab Culverts

It is estimated that 300 meters of concrete slab culverts with cyclopean abutements will be built with spans going from 3 m. to 6 m. That is to say approximately 75 small structures or one structure per every 16 kilometers.

Estimated cost per meter, $ 1,000.00. Total cost, $ 300,000.00

2. Small Bridges

One hundred fifty meters of one-way small bridges will be constructed.

Considering an average span of 10 meters, 15 bridges will be constructed, or one bridge per every 80 kilometers.

Estimated cost per meter, $2,000.000. Total cost, $ 300,000.00

EXISTING EQUIPMENT AND PROJECTIONS OF SNC DISTRICTS
IN CHUQUISACA, TARIJA, POTOSI AND TUPIZA

EQUIPMENT	CHUQUISACA District				TARIJA District				POTOSI District				TUPIZA District			
	1978	1979	1980	1981	1978	1979	1980	1981	1978	1979	1980	1981	1978	1979	1980	1981
Heavy																
Tractors	25	27	30	33	15	16	18	20	17	19	20	23	8	9	10	11
Motorgraders	20	22	24	27	21	23	25	28	19	21	23	25	13	14	16	17
Compressors	8	9	10	11	6	7	7	8	6	7	7	8	3	3	4	4
Loaders	7	8	8	9	8	9	10	11	6	7	7	8	4	4	5	5
Light																
Station Wagon, Pick-ups, jeeps	20	22	24	27	19	21	23	25	14	15	17	19	9	10	11	12
Trucks	8	9	10	11	6	7	7	8	7	8	8	9	4	4	5	5
Dump Trucks	31	34	37	41	35	38	42	46	24	26	29	32	12	13	15	16
Other	14	15	17	19	10	11	12	13	8	9	10	11	4	4	5	5

Cost Summary

Equipment, Vehicles, & Spare Parts
(US$ 000)

Road Improvement Equipment	7,500
Road Maintenance Equipment	1,600
Equipment for Workshops	1,030
Four wheel Dr ive Vehicles	240
Surveying Instruments	65
Radios	80
Hand Tools	140
	10,655

Note: Prices based on actual quotations received from suppliers of equipment for Rural Roads I plus an inflation factor of 7% not included in detailed equipment lists. Seven percent is the estimated increase in prices since receiving earlier price quotations.

1. Road Improvement Equipment

Item No.	Description	Sucre District		Potosi Dissrict			Tupiza District		Tarija District			Total	Unit Price (000's $)	Cost (000's) US$
		Basic Gp.	Supp. Gp.	Basic Gp. A	Basic Gp. B	Support Gp.	Basic Gp.	Supp. Gp.	Basic Gp. A	Basic Gp. B	Support Gp.			
1.	D-7 type Tract. w/ripper	2	-	2	2	-	2	-	2	2	-	12	89.5	1.074.0
2.	D-6 type Tract. w/ripper	2	1	2	2	1	2	1	2	2	1	16	60.0	960.0
3.	Motorgraders	1	-	1	1	-	1	-	1	1	-	6	52.0	312.0
4.	Front End Loaders	1	-	1	1	-	1	-	1	1	-	6	44.5	267.0
5.	Agriculture Tractors	1	-	1	1	-	1	-	1	1	-	6	9.5	57.0
6.	Sheep's foot rollers	1	-	1	1	-	1	-	1	1	-	6	7,0	42.0
7.	Com pressors 350 cc-	1	1	1	1	1	1	1	1	1	1	10	20.5	205.0
8.	Compressors 600 cc	1	-	1	1	-	1	-	1	1	-	6	30.5	183.0
9.	Jack Hammers	3	3	3	3	3	3	3	3	3	3	30	.9	27.0
10.	Wagon Drills	1	-	1	1	-	1	-	1	1	-	6	35.0	210.0
11.	Aggregate Screening Mach.	1	-	1	1	-	1	-	1	1	-	6	55.0	330.0
12.	Portable Rock, Crusher	-	1	-	-	1	-	1	-	-	1	4	30.5	122.0
13.	Dump Trucks	6	2	6	6	2	6	2	6	6	2	44	15.0	660.0
14.	6 Ton Trucks	1	-	1	1	-	1	-	1	1	-	6	14.5	87.0
15.	4 Ton Trucks	-	1	-	-	1	-	1	-	-	1	4	10.0	40.0
16.	Pick-up trucks	2	-	2	2	-	2	-	2	2	-	12	8.0	96.0
17.	Water trucks	-	1	-	-	1	-	1	-	-	1	4	18.5	74.0
18.	Fuel Tank Truck	-	1	-	-	1	-	1	-	-	1	4	27.0	108.0
19.	Tract. Trailer w/Low-Boy	-	1	-	-	1	-	1	-	-	1	4	57.5	230.0
20.	Lube/Shop Truck	1	-	1	1	-	1	-	1	1	-	6	55.0	330.0
21.	Arc Welding Equipment	-	1	-	-	1	-	1	-	-	1	4	6.5	26.0
22.	Oxy-Acetylene Wlding Equip.	-	1	-	-	1	-	1	-	-	1	4	2.5	10.0
23.	Power Generators	1	-	1	1	-	1	-	1	1	-	6	15.0	90.0
24.	M obile camps	1	-	1	1	-	1	-	1	1	-	6	50.0	300.0
	Sub-Total													5.840.0
	Spares (20%)													1.168.0
	Total													7. 008.0

2. Road Maintenance Equipment

For ten maintenance residencias

Description	Number	Unit Price	Cost (000's)
D-4 type tractor	10	52,000	520.0
Ag. Tractors	10	9,500	95.0
Sm. Front end Loaders	5	40,000	200.0
Sm. Motor Graders	10	35,000	350.0
Dump Trucks	10	15,000	150.0
Sub-Total			1,315.0
Spares (15%)			197.3
Total			1,512.3

3. Workshop Equipment

DESCRIPTION	Chuquisaca District		Tarija District		Potosi District		Tupiza District		Total	Unit Price (000's) US$	Cost (000's) US$
	Distr. Shop	Resid. Shop	Distr. Shop	Resid. Shop	Distr. Shop	Resid. Shop	Distr. Shop	Resid. Shop			
Lathe (2 m. point to point)	1		1		1		1		4	23.0	92.0
Crankshaft Rectifier					1				1	62.0	62.0
Univ. milling machine					1				1	50.0	50.0
Yoke rectifier					1				1	18.0	18.0
Engine cylinder rectifier	1		1				1		3	16.0	48.0
Valve seat grinder	1		1		1		1		4	1.85	7.4
Valve grinder	1		1		1		1		4	4.15	16.6
Hydraulic systems tester	1		1		1		1		4	7.0	28.0
Injector tester	1		1		1		1		4	0.6	2.4
Vise for hydraulic nipples	1		1		1		1		4	9.0	36.0
Tools for straightening body working equipment	1		1		1		1		4	1.05	4.2
Break repairing tools	1		1		1		1		4	8.05	32.2
Wheel alignment equipment	1		1		1		1		4	4.6	18.4
Electric testing equipment	1		1		1		1		4	5.75	23.0
Electronic tune-up equip.	1		1		1		1		4	9.2	36.8
Open end winch (2 Ton)	1		1		1		1		4	1.27	5.1
Grease and spray equip.	1		1		1		1		4	8.05	32.2
Steam cleaners	1		1		1		1		4	3.45	13.8
Stand type grinder wheel	2		2		2		1		7	0.6	4.2
Electric driven compressors	1		1		1		1		4	5.75	23.0
Portable compressors	1		1		1		1		4	8.05	32.2

DESCRIPTION	Chuquisaca District		Tarija District		Potosi District		Tupiza District		Total	Unit Price (000's) US$	Cost (000's US$
	Distr.	Resid.	Distr.	Resid.	Distr.	Resid.	Distr.	Resid.			
Arc Welders 500 Amp.	1		1		1		1		4	4.4	17.6
Arc Welders 300 Amp.		4		4		4		2	14	1.85	25.9
Oxy-acetylene welding equip.	1	4	1	4	1	4	1	2	16	0.85	13.6
Cont. type welding equip.	2		2		2		1		7	2.3	16.1
Hydraulic jacks 12-20 Ton.	1	4	1	4	1	4	1	2	18	0.45	8.1
Drill press	1		1		1		1		4	1.15	4.6
Hydraulic Press 100 Ton	1		1		1		1		4	1.85	7.4
Bench type press	2	4	2	4	2	4	2	2	22	0.1	2.2
Battery chargers	1		1		1		1		4	0.35	1.4
Hand drills	2	4	2	4	2	4	2	2	22	0.15	3.3
Portable grinders	2	4	2	4	2	4	2	2	22	0.35	7.7
Generator sets 2.800 watts	1		1		1		1		4	0.4	1.6
Winch (6 Ton.)	1	4	1	4	1	4	1	2	21	1.1	23.1
Pneumatic tools									L.S.		6.0
Hand tools and tool chest									L.S		46.0
Special hand tools									L.S.		17.3
Extractors both hand and hydraulically operated									L.S		27.6
Precision measuring tools									L.S.		20.0
									Sub-Total		835.0
									Plus Spares		125.0
									Total		960.0

4. Other Vehicles

Description	Recipient	Number	Unit Price	Cost (000's)
4-wheel drive Station Wagon	Deputy Head of C.V.Dept.	1	10,000	10.0
4-wheel drive Station Wagon	District Engineers	4	10,000	40.0
Pick-up truck	Res. Engr.	10	8,000	80.0
Sm. Jeep type Vehicle	Rural Roads Const. sup	10	6,500	65.0
Sub-Total				195.0
Spares (15%)				29.3
Total				224.3

5. Surveying Instruments

Description	Number	Unit Price	Cost (000's)
Set of Surveying Instruments	3	20,000	60.0
Total			60.0

6. Radio Equipment

Description	Number	Unit Price	Cost (000's)
Mobile Units			
a. District Office	4	2,700	10.8
b. Basic Groups	6	2,700	16.2
c. Support Groups	4	2,700	10.8
d. Residencies	10	2,700	27.0
Sub-Total			64.8
Spares (15%)			9.7
Total			74.5

Specs: Mobile and stationary transceiver, 150 watts, 2-15 Mhz, 110/220 volts AC 50/60 Hz. (12v DC for mobile); channels, single side band, microphone, headphone, antenna.

7. Hand Tools

Description	Unit	Quantity	Cost (000's)
Hand shovels	ea.	5,500	9.90
Picks w/wood handles	ea.	5,500	27.5
Wheel barrows	ea.	2,600	77.5
Machetes	ea.	600	1.2
Steel bars	ea.	300	13.2
Hand drilling hammers	ea.	200	0.7
Total			130.0

8. Materials

1. Explosives

Description	Unit	Quantity	Cost (000's)
Ammonium nitrate	MT	300	100.0
Dynamite	MT	400	330.0
Fuse and Cord	LS		130.0
Sub-Total			560.0

2. Concrete Pipes

0.60 m. Diameter	m.	18,000	380.0
1.00 m. Diameter	m.	6,000	390.0
Sub-Total			770.0

3. Cement

Portland Cement	MT	2,250	125.0
Sub-Total			125.0
Total Materials			1,455.0
		Say	1,470.0

GOB PERSONNEL DISTRIBUTION

	Main Office	Districts	Residencias		
			Caminos Vecinales	Basic Group	Support Group
Resident Engineer			6		
Assistant Resident Engr.			6		
Transit Men			3		
Level Men			3		
Cross sectioner			3	6	
Rod Men			12	6	
Draftsman	1		3		
Soil & Lab Technicians			3		
Foremen				12	
Masons				12	
Field Mechanics			6		
Mechanics Ass't			6		
Shop Mechanics		8			
Welders		4			
Heavy Equip. Operators				42	4
Aggregate Mach. Operators				6	4
Compressor Operators				12	4
Operators Assistants				42	4
Drillers				24	12
Drivers			12	42	24
Economist	1				
Secretary	1				
Camp Employees			6		
Watchmen			6		
Shop Employees		4			
Field Payroll Teller		4			
Accounting		4			

PRELIMINARY LIST OF CANDIDATE ROADS

Location	Road Type			Total Lenght	Length Requiring Improv. (kms)	Connects w/all weather roads yes/no	Community request	Economic Activity
	Horse Trail (kms)	Jeep Trail (kms)	Truck Trail (kms)					
CHUQUISACA DISTRICT								
Monteagudo Residencia								
Muyupampa-El Atunal-Ipaguazú	-	25	10	35	30	si	si	Agriculture and cattle
Monteagudo-Cerrillos-Rio Parapetí	-	20	30	50	40	si	no	"
Cañón de Heredia-San Juan del Piraí	20	30	10	60	50	si	si	"
Muyupampa-Vallecitos	-	5	18	23	20	si	si	"
Cr. Ruta 6--Coripatí	-	6	6	12	10	si	no	"
Taperillas-Ticucha	5	15	5	25	25	si	no	"
Padilla Residencia								
Mapasillos-Membrillar	5	15	-	20	20	si	si	Agriculture
San Julián-Millockaka	-	8	-	8	8	si	no	Agriculture & Cattle
Conchupata-ElVillar	-	25	30	55	50	si	si	Agriculture
TOTAL	30	149	109	288	253			

TUPIZA DISTRICT

Cotagaita Residencia

Tumusla-Toropalca	-	35	-	35	35	si	si	Agriculture
Cr. Rt. 702-Calcha	-	12	-	12	12	si	si	Agriculture
Tumusla-Patirana	-	15	-	15	15	si	si	Agriculture
Cr. Rt. 702-Pulaxi	-	35	-	35	35	si	no	Agriculture
Escara-Tocla-El Puesto	-	18	-	18	18	si	no	Agriculture
Cr. Rt. 702-Vichacla	-	16	-	16	16	si	no	Agric - Education
Peña Amarilla-Cornoca	-	12	-	12	12	si	no	Agriculture
Cazón-Almona	-	15	10	25	25	si	si	Agriculture

Tupiza Residencia

Tojo-Livi Livi	5	15	-	20	20	si	si	Agriculture
Impora-Villa Pacheco	-	15	10	25	25	si	no	Agriculture
Tupiza-Talina	-	30	-	30	30	si	si	Agriculture
Cuartos-Chosconti	-	15	-	15	15	si	no	Agriculture
Mojo-Selocha	-	15	-	15	15	si	si	Agriculture
Tupiza-Oploca	-	10	5	15	10	si	si	Agric. - Mining
Cr. Rt. 301-Sococha	-	15	5	20	20	si	si	Agriculture
Total	5	273	30	308	303			

POTOSI DISTRICT

Retiro Residencia

Azángaro-Candelaria	-	28	-	28	28	si	si	Agriculture
Candelaria-Chalviri	-	13	-	13	13	si	si	Agriculture
Chalviri-Huaylla	-	13	-	13	13	si	si	Agriculture
Huaylla Ckasa- Ckasa Tacobamba	-	19	-	19	19	si	si	Agriculture
Cr. Rt. 5-Tecoya-Quivi Quivi	-	10	-	10	10	si	si	Agriculture
Quivi Quivi-Mamahota-Siporo	-	28	-	28	28	si	si	Agric. & Cattle
Cr. Rt 5-Quivincha-Tarija Cuchu	-	11	11	22	22	si	si	Agriculture
Tarija Cuchu-Vila Vila	-	30	-	30	30	si	si	Agriculture
Cr. Rt. 7200 - Miculpaya	-	15	-	15	15	si	si	Agriculture
Sijllani-Ckochas-Esquiri	-	15	10	25	15	si	si	Agriculture
Loromayu-Esmeralda	-	10	-	10	10	si	si	Agriculture
Potosí Orcko-Duraznos	-	16	-	16	16	si	si	Agriculture
Mojón Ckasa-Jatun Rumi	-	15	-	15	15	si	si	Agriculture

Otavi Residencia

La Lava-Caiza "D"	-	10	6	16	10	si	si	Agriculture
Caiza "D"-Pancochi	15	5	-	20	20	si	si	Agriculture
Pancochi-Toropalca	20	-	-	20	20	si	si	Agriculture
Caiza "D"-Chacnacaya	-	5	-	5	5	si	si	Educational
Mojona-Tomola-Yavisla	-	16	-	16	16	si	si	Agriculture
Yavisla-Sauce Puncu	18	-	-	18	18	si	si	Agricultural

Padcoyo-San Lucas	-	9	10	19	19	si	no	Agriculture
Padcoyo-Ocuri-Palacio Tambo	-	20	-	20	20	si	no	Agric. &Mining
Palacio Tambo-Laja Ckasa	-	20	-	20	20	si	si	Agric. & Mining
Laja Ckasa-Huayllave Ckasa	-	20	-	20	20	si	no	Agriculture
Ocuri-Terrado	-	40	-	40	40	si	si	Agriculture
Chanchajili-Ñoquesa-Tusquiña	-	25	-	25	25	si	si	Agriculture
	53	413	37	503	487			

TARIJA DISTRICT

Villa Abecia Residencia

Las Carreras-Lime-Tárcana	-	20	-	20	20	si	si	Agriculture
Tárcana-Jailía	-	22	-	22	22	si	si	Agriculture
San Pedro-Uturungo	-	-	20	20	15	si	no	Agriculture
Uturungo-Culpina	-	-	23	23	15	si	no	Agriculture
Culpina-Incahuasi-Santa Elena	-	52	-	52	52	si	no	Agriculture
El Puente-Carrizal	-	-	22	22	22	si	si	Agriculture
Carrizal-Verdiguera-Palqui	-	20	-	20	20	si	si	Agriculture
Palqui-Ñoquera-Pasajes	-	22	-	22	22	si	si	Agriculture
Cr. Rt. 1 - San Mateo-Sella	-	-	22	22	18	si	no	Agriculture
San Lorenzo-Huacata	-	20	-	20	20	si	si	Agriculture
Huacata-León Cancha	-	13	-	13	13	si	si	Agriculture
Cuesta de Sama-Paicho	-	26	-	26	26	si	no	Agriculture
Aguaytoro-Tomayapo-Loros	-	-	22	22	22	si	no	Agriculture
Chaupiuno-Loros-Chinchilla	-	-	20	20	15	si	no	Agriculture

Rio Negro Residencia

Tarija-San Andrés	-	-	20	20	20	si	si	Agriculture
San Andrés-Pinos	-	-	7	7	7	si	si	Agriculture
Tarija-Churquis	-	20	-	20	20	si	si	Agriculture
Churquis-Alisos	-	20	-	20	20	si	si	Agriculture
Concepción-Chocloca	-	-	16	16	16	si	si	Agriculture
Chocloca-Chaguaya	-	-	20	20	20	si	si	Agriculture

Padcaya-Cañas	-	-	22	22	20	si	no	Agriculture
Cr. Rt. 1 (salado)-Conchas	-	23	-	23	23	si	si	Agriculture
Candado-Santa Rosa	-	20	-	20	20	si	si	Agriculture
Residencia Entre Rios								
Cr. Santa Ana-Yesera Norte	-	20	-	20	20	si	si	Agriculture
Yesera Norte-Alto Cajas	-	17	-	17	17	si	si	Agriculture
Junacas-Alto España	-	20	-	20	20	si	si	Agriculture
Narvaes-Huayco	-	-	17	17	10	si	no	Agriculture
Huayco-San Josesito	-	-	13	13	13	si	no	Agriculture
Entre Rios-La Cueva	-	-	23	23	23	si	si	Agriculture & Cattle
La Cueva-Salinas	-	-	15	15	15	si	si	Agric. & Cattle
San Simón-Saladito	-	-	20	20	20	si	si	Agric. & Cattle
Sereré Norte-Sereré Sud	-	16	-	16	16	si	si	Agric. & Cattle
Total	-	351	302	653	622			

DERIVATION OF B/C RATIO TO BE USED DURING IMPLEMENTATION

The change in income, dY, represents the total change due to road improvement. We assume for this project that the total change, dY, will not occur until the fourth year after road construction and that change begins in the second year after road construction and increases in a linear fashion until the fourth year when it reaches a maximum and stays at this level for the remaining project years as shown below:

Year	
1	Road is constructed
2	1/3 dY
3	2/3 dY
4	3/3 dY
.	
.	
15	3/3 dY

To simplify the calculation for the present value of the benefits from the change in income over the 14 year period, we perform the following manipulations:

Change in income x discount factor (DF) by year.

1	0		
2	1/3 dY (.756)	=	dY (.252)
3	2/3 dY (.658)	=	dY (.439)
4 - 15	3/3 dY (3.564)*	=	dY (3.564)
			dY (4.255)

Or rounded: dY (4.3)

* Sum of the discount factors (DF) from year four through year fifteen assuming a 15 % opportunity cost of capital.

These manipulations thus take into account the gradual increase in income to the total dY over the three-year period and allow the use of the total change, dY, in the B/C equation:

$$B/C = \frac{dY\ (4.3)}{(\text{Construction Cost/Km.})\ (\text{Km.})\ (.870) + \text{Annual Maint. Cost}\ (\text{Kms.})\ (5.1)}$$

The figure 5.1 represents the sum of the discount factors of years two through fifteen, assuming that maintenance begins one year after construction.

Cost Calculations During Implementation

Reason for Omitting Shadow Priced Volunteer Labor Cost, Administrative Cost, and Salvage Value From B/C Calculations During Implementation

Using estimated costs per kilometer for each of the three Road Categories:

A. Mountainous

1. Unskilled Labor

$ 473 at $ 3/day implies 158 man/days

Shadow priced :	$ .56 x 158	=	$ 88
Administrative:	Both DDC & SNC:		289
			$ 377
Discounted :	$ 377 x .870	=	$ 328

2. Salvage Value

$ .20 x $ 13,297 = $ 2,659
Discounted: $ 2,659 x .123 = $ 327

So they offset one another.

B. High Valley

1. Unskilled Labor

$ 450 at 3/day implies 150 man/days

Shadow priced :	$ .56 x $ 150	=	$ 84
Administrative:	Both DDC & SNC:		289
			$ 373
Discounted :	$ 373 x $ .870	=	$ 325

2. Salvage Value

$ .20 x $ 12,084 = $ 2,417
Discounted: $ 2,417 x $ .123 = $ 297

So they offset one another.

C. Flat Land

1. Unskilled Labor

$ 393 at $ 3/day implies 131 man/days

Shadow priced :	$ .56 x $ 131	=	$ 73
Administrative:	Both DDC & SNC:		289
			$ 362
Discounted :	$ 362 x $ .870	=	$ 315

2. Salvage Value

$ .20 x $ 9,046 = $ 1,809
Discounted: $ 1,809 x $ .123 = $ 223

Though there is some difference, the $ 92 difference is only 1 % of the total cost. The impact on the B/C equation would thus be insignificant.

NOTE: I have used $ 100 per kilometer as average SNC costs which implies a 4-year budget of $ 120,000: i.e.

$$\frac{\$\ 120.00}{1{,}200\ \text{kms.}} = \$\ 100.00$$

Even if this is somewhat understated, the same conclusions as above should pertain.

Maintenance Cost Estimate Per Year and Per Kilometer

A.	With Equipment		
	1. Grading	$ 18.95	
	2. Slide clearing	48.68	
	3. Graveling (20%)	153.36	
		$ 220.99	$ 220.99
B.	By Hand Labor(At $ 3/md)		
	1. Patching	$ 50.40	
	2. Culvert and side ditch cleaning	40.30	
		$ 90.70	$ 90.70
	Sub-Total		311.69
	Overhead 15%		46.75
	TOTAL		$ 358.44
	Say		$ 360.00
	Less hand labor		90.70
			$ 269.30
	Plus hand labor shadow priced at .56/md		16.80
			$ 285.10 *

* Using the shadow price for hand labor will raise the B/C about .05. This change is not significant, thus maintenance costs are estimated at $ 360 per kilometers per year.

Derivation of B/C Ratios for the Two Illustrative Road Segments

A. Potosí Road Segment

1. Average Size: Since there is detailed information we can use income by farm size from Table 5 of text to obtain total income change (dY):

Size	Number of Families		Income		
1/2 Ha.	100	x	$ 155	=	$ 15,500
1 - 2 Has.	398	x	$ 140	=	$ 55,720
2 - 5 Has.	160	x	$ 205	=	$ 32,800
	658				$104,020 x .36 = $37,447

Hence $ 37,447 = dY

2. Estimated Cost of Construction: $ 12,000/km.

3. Length of Road: 10 kilometers

4. Maintenance Cost: $ 360

$$B/C = \frac{(\$\ 37,447)\ (4.3)}{(\$\ 12,000)\ (10)\ (0.933) + \$\ 360\ (10)\ (5.1)} = \frac{161,022}{130,320} = 1.24$$

B. Tarija Road Segment

1. Average Farm Size: 5 hectares. From Table 3 of text the average income is $ 223.

   Change in income (dY) = 223 x .36 = $ 80.28

2. Number of Families: 678

3. Estimated Cost of Construction: $ 11,000/km.

4. Length of Road: 19 kilometers

5. Maintenance Cost: $ 360

$$B/C = \frac{(678)\ (\$\ 80.28)\ 4.3}{(\$\ 11{,}000)\ (0.933)\ (19\ \text{kms.}) + \$\ 360\ (19)\ (5.1)} = \frac{234{,}048}{229{,}881} = 1.02$$

TABLE A

INCREASED AGRICULTURAL INCOME REQUIRED PER KILOMETER OF CONSTRUCTION FOR VARIOUS BENEFIT-COST RATIOS

Construction Costs/km.	Constr. Costs Discounted (0.933)	Maint. Cost/km.	Maint./km. Years 2-15 Discounted	Total Costs/km. Discounted	Increased Income/km. Required for Benefit Cost Ratios										
					1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.8	2.0	2.2	2.4
7,000	6,531	360	1,836	8,367	1,945	2,140	2,335	2,530	2,723	2,918	3,112	3,501	3,890	4,279	4,668
7,500	6,998	360	1,836	8,834	2,054	2,260	2,465	2,670	2,876	3,081	3,286	3,697	4,108	4,519	4,930
8,000	7,464	360	1,836	9,300	2,163	2,379	2,596	2,812	3,029	3,244	3,461	3,893	4,326	4,759	5,191
8,500	7,931	360	1,836	9,767	2,271	2,499	2,725	2,952	3,179	3,406	3,634	4,088	4,542	4,996	5,450
9,000	8,397	360	1,836	10,233	2,380	2,618	2,856	3,094	3,332	3,570	3,808	4,284	4,760	5,236	5,712
9,500	8,864	360	1,836	10,700	2,488	2,737	2,986	3,234	3,483	3,732	3,981	4,478	4,976	5,474	5,971
10,000	9,330	360	1,836	11,166	2,597	2,856	3,116	3,376	3,636	3,896	4,155	4,675	5,194	5,713	6,233
10,500	9,797	360	1,836	11,633	2,705	2,976	3,246	3,517	3,787	4,058	4,328	4,869	5,410	5,951	6,492
11,000	10,263	360	1,836	12,099	2,814	3,095	3,376	3,658	3,940	4,221	4,502	5,065	5,628	6,191	6,754
11,500	10,730	360	1,836	12,566	2,922	3,215	3,506	3,799	4,091	4,383	4,675	5,260	5,844	6,428	7,013
12,000	11,196	360	1,836	13,032	3,031	3,334	3,637	3,940	4,243	4,547	4,950	5,456	6,062	6,668	7,274
12,500	11,663	360	1,836	13,499	3,139	3,453	3,767	4,081	4,395	4,708	5,022	5,650	6,278	6,906	7,534
13,000	12,129	360	1,836	13,965	3,248	3,572	3,898	4,222	4,547	4,872	5,197	5,846	6,496	7,146	7,795
13,500	12,596	360	1,836	14,432	3,356	3,692	4,027	4,363	4,698	5,034	5,370	6,041	6,712	7,383	8,054
14,000	13,062	360	1,836	14,898	3,465	3,811	4,158	4,505	4,851	5,198	5,544	6,237	6,930	7,623	8,316
14,500	13,529	360	1,836	15,365	3,573	3,930	4,288	4,645	5,002	5,360	5,717	6,431	7,146	7,861	8,575
15,000	13,995	360	1,836	15,831	3,682	4,050	4,418	4,787	5,155	5,523	5,891	6,628	7,364	8,100	8,837

Assumes 15% discount rate.

TABLE B

REQUIRED CURRENT AGRICULTURAL INCOME IN AREA AFFECTED BY EACH KILOMETER OF ROAD IMPROVEMENT FOR VARIOUS BENEFIT/COST RATIOS ASSUMING A 36% INCOME INCREASE

Construction Costs/km.	Constr. Costs Discounted (0.933)	Maint. Cost/km.	Maint./km. Years 2-15 Discounted	Total Costs/km. Discounted	Increased Income/km. Required for Benefit Cost Ratios										
					1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.8	2.0	2.2	2.4
7,000	6,531	360	1,836	8,367	5,402	5,944	6,486	7,028	7,564	8,106	8,672	9,725	10,806	11,886	12,967
7,500	6,998	360	1,836	8,834	5,706	6,278	6,847	7,417	7,989	8,558	9,128	10,269	11,411	12,553	13,694
8,000	7,464	360	1,836	9,300	6,008	6,608	7,211	7,811	8,414	9,011	9,614	10,814	12,017	13,219	14,419
8,500	7,931	360	1,836	9,767	6,308	6,942	7,569	8,200	8,831	9,461	10,094	11,356	12,617	13,878	15,139
9,000	8,397	360	1,836	10,233	6,611	7,572	7,933	8,594	9,256	9,917	10,578	11,900	13,222	14,544	15,867
9,500	8,864	360	1,836	10,700	6,911	7,603	8,294	8,983	9,675	10,367	11,058	12,439	13,822	15,206	16,586
10,000	9,330	360	1,836	11,166	7,214	7,933	8,656	9,378	10,100	10,822	11,542	12,986	14,428	15,869	17,314
10,500	9,797	360	1,836	11,633	7,514	8,267	9,017	9,769	10,519	11,272	12,022	13,525	15,028	1,653	18,033
11,000	10,263	360	1,836	12,099	7,817	8,597	9,378	10,161	10,944	11,725	12,506	14,069	15,633	17,197	18,761
11,500	10,730	360	1,836	12,566	8,167	8,931	9,739	10,553	11,364	12,175	12,986	14,611	16,233	17,856	19,481
12,000	11,196	360	1,836	13,032	8,419	9,261	10,103	10,944	11,786	12,631	13,750	15,156	16,839	18,522	20,206
12,500	11,663	360	1,836	13,499	8,719	9,592	10,464	11,336	12,208	13,078	13,950	15,694	17,439	19,183	20,928
13,000	12,129	360	1,836	13,965	9,022	9,922	10,828	11,728	12,631	13,533	14,436	16,239	18,044	19,850	21,653
13,500	12,596	360	1,836	14,432	9,32[illegible]	10,256	11,186	12,119	13,050	13,983	14,917	16,781	18,644	20,508	22,372
14,000	13,062	360	1,836	14,898	9,625	10,586	11,550	12,514	13,475	14,439	15,400	17,325	19,050	21,175	23,100
14,500	13,529	360	1,836	15,365	9,925	10,919	11,911	12,903	13,894	14,889	15,881	17,864	19,850	21,836	23,819
15,000	13,995	360	1,836	15,831	10,228	11,250	12,272	13,297	14,319	15,342	16,364	18,411	[illegible],456	22,500	24,547

Assumes 15% discount rate.

Analysis of Road Segments

Economic Selection Criteria

Individual road segments will be analyzed, and a B/C ratio determined by the same methodology used for the two sub-projects contained in Part III, D - Economic Analysis. This general methodology provides basic capital budgeting and investment analysis guidelines for those at the national level responsible for developing the simplified B/C equation used by the departmental technicians:

1. The time horizon of the benefits attributable to an individual road should be projected annually over a 15-year period after completion of the road improvement. The cash flow system of analysis should be adopted.

2. At the 15th year, a residual value should be assigned to the roads, culverts, bridges, etc.

3. Economic rather than financial costs are appropriate.

4. The with project and without project concepts of analysis should be utilized.

5. The value of outputs and inputs should be based on current baseline information and kept constant throughout the life of a given road project. This procedure makes the assumption that relative prices for the various road benefits and costs will be constant over the fifteen-year benefit time horizon.

6. Incremental benefits include among others:

   - The value of increased production due to more lands brought under cultivation;

   - The value of increased production due to the induced increase in productivity on old lands and new lands over the 15-year period;

   - The value of the reduction in spoilage, wastage, etc., of crops because of the improvement of the rural feeder road system;

- The value of the reduction in vehicle operating costs in the movement of commodities to and from a specific road area, i.e., user savings;

- Residual value of roads at 15th year.

7. Incremental costs may include among others:

   - The road construction costs for a specific road, and the increase in annual maintenance;

   - Administrative and overhead costs associated with road construction and maintenance.

8. A road's area of influence will be defined in each individual project taking into consideration terrain, influence of other roads, and natural boundaries such as rivers, mountains, etc. The area of influence is generally considered to be 2 kms. on either side of a road, though in the case of valleys served by one road the area of influence may be more extensive.

Simplified B/C Analysis for Initial Screening

If there are a tremendous amount of road requests, and if DDCs have access to information concerning number of farms within a roads area of influence - census, agrarian reform data, etc., a preliminary B/C analysis can be done as follows: Use the average income figure across all farm sizes and multiply this by .36 to give the average change in income per farm. Multiply this income change per farm by estimated number of farms to get total estimated income change. Then, according to type of terrain, use estimated construction cost/km. and estimated length of road to get total estimated construction cost. With this data a preliminary B/C ratio can be obtained. Road segments with a B/C less than one are eliminated in this first phase. Those remaining would then be subjected to the field inspections to obtain more adequate data for the second phase analysis.

Analysis of GOB Contribution

A. Road Improvement phase

1. Engineering and Technical Personnel

Position	Engineering No.	Total Man-month	Cost 000's
Resident Engineer	6	312	168.5
Asst. Res. Eng.	6	312	78.0
Transit men	3	156	28.1
Level men	3	156	23.4
Cross-sectioner	9 1/	468	60.8
Rod men	18 1/	936	107.6
Draftsmen	4 2/	208	33.3
Soil and Lab Tech.	3	156	31.2
Sub-Total		2.704	530.9
Seniority bonus 20%			106.2
Social Benefits (45%)			238.9
Food allowance (2704 x 45)			121.7
Transportation and per diem			25.0
Total			$ 1.022.7

1/ 6 for the construction crews

2/ 1 for the main office.

2. Skilled Labor

Position	No.	Total man-month	Cost ('000's)
Foremen	12	600	96.0
Masons	12	600	72.0
Field mechanics	6	300	49.5
Mech. assistants	6	300	40.5
Shop mechanics	8	400	66.0
Welders	4	200	29.0
Heavy Equip. Operators	46	2.300	368.0
Aggregate Mach. Operators	10	500	80.0
Compressor Operators	16	800	108.0
Operators assistants	46	2.300	276.0
Drillers	36	1.800	243.0
Drivers	78	3.900	565.5
Sub-Total		13.100	1.993.5
Seniority bonus (20%)			398.7
Social benefits (41%)			897.0
Food allowance (13.100 x 45)			630.0
Total			3.919.2

3. Support Costs

The support costs consist of SNC's operating expenses.

L A B O R

Position	No.	Total Man-Month	Cost (000's)
Economist	1	50	17.5
Secretary	1	50	7.5
Camp Employees	6	300	42.9
Watchmen	6	300	35.1
Shop Employees	4	200	26.0
Field Paying Teller	4	200	22.0
Accounting	4	200	34.0
		Sub-Total	185.0
		Seniority Bonus	37.0
		Social Benefits (45%)	83.3
		Food Allowance (600 x 45)	27.0
		Total	333.3

4. Operating Expenses

Expenses	Cost (000's)
Rent	8.0
Telephone and Cables	5.0
Printing	4.0
Office Supplies	10.0
General Supplies	39.0
Miscellaneous Charges	9.0
Total	75.0

5. Fuel and Lube Cost

	Description	Working Hours	Cost (000's)
12	Tractors (D-7 type)	6.000	155.5
12	Tractors (D-6 type)	6.000	129.6
4	Tractors (D-6 type)	4.000	28.8
6	Motor graders	6.000	55.8
6	Front end Loaders	4.500	41.0
6	Ag. Tractors	4.800	38.3
10	Compressors 350 cc.	2.700	33.2
6	Compressors 600 cc.	2.700	32.4
6	Aggregate Screening Mach.	5.000	39.9
4	Portable Rock Crusher	3.200	50.9
44	Dump trucks	6.000	345.8
6	Trucks (6 ton)	4.400	33.3
4	Trucks (4 ton)	2.000	9.2
12	Pick-up trucks	5.400	53.8
4	Water Trucks	4.800	24.0
4	Fuel Tank Trucks	4.000	20.2
4	Tractor Trailler w/Low B oy	2.400	26.4
6	Lube/shop truck	3.500	25.6
6	Power Generators	6.000	10.8
	Total		1,154.5

B. Road Maintenance Phase

Number of kilometers per year during project life:

Project Year		
3 = 1st. year after construction	300	Kms/Year
4 = 2nd. year after construction	600	Kms/Year
5 = 3rd. year after construction	900	Kms/Year
	1,800	Total Kilometers

GOB cost of Maintaining Raods:

Grading	$ 6.06
Slide Clearing	$23.50
Surfacing	$58.42
	$87.98/Km.

1800 x 87.98 = $ 158,364

Say $ 160,000 for equipment operating expenses and materials

ANALYSIS OF DDCs AND LOCAL COMMUNITY CONTRIBUTION

A. Road Improvement Phase

CODEPO

2 Promotors	$ 22,500
1 Engineer	$ 50,000
3 Sociologists or Economists	$ 20,000
Office Supplies	$ 4,500
Travel & Per Diem	$ 5,500
Sub-Total	$ 102,500

CODESA

1 Engineer	$ 33,500
3 Sociologists or Economists	$ 21,000
Office Supplies	$ 4,500
Travel & Per Diem	$ 5,500
Sub-Total	$ 64,500

CODETAR

1 Engineer	$ 33,500
3 Sociologists or Economists	$ 16,000
Office Supplies	$ 4,500
Travel & Per Diem	$ 5,500
Sub-Total	$ 59,500

B. Road Maintenance Phase

Number of kilometers per year during project life

Project Year

3	=	1st. Year after construction	300	Kms/Yr.
4	=	2nd. Year after construction	600	Kms/Yr.
5	=	3rd. Year after construction	900	Kms/Yr.
			1,800	Total Kms.

Local Community Costs of Maintaining Roads:

Patching	$ 45.00
Clearing Ditches & Culverts	$ 36.00
	$ 81.00

1800 x $ 81 = $ 145,800
Say $ 146,000 for Hand Labor

N A T I O N A L R O A D S E R V I C E

Organizational Chart for the Technical Administration of Rural Roads

Technical Administration for Planning

Technical Administration for Subsidiary Roads

Project Coordinator (Advisor)

Technical Assistant Manager

- Secretary

Engineering

Construction

Equipment

- Mechanical Advisor

RESIDENCIES

La Paz

Cochabamba

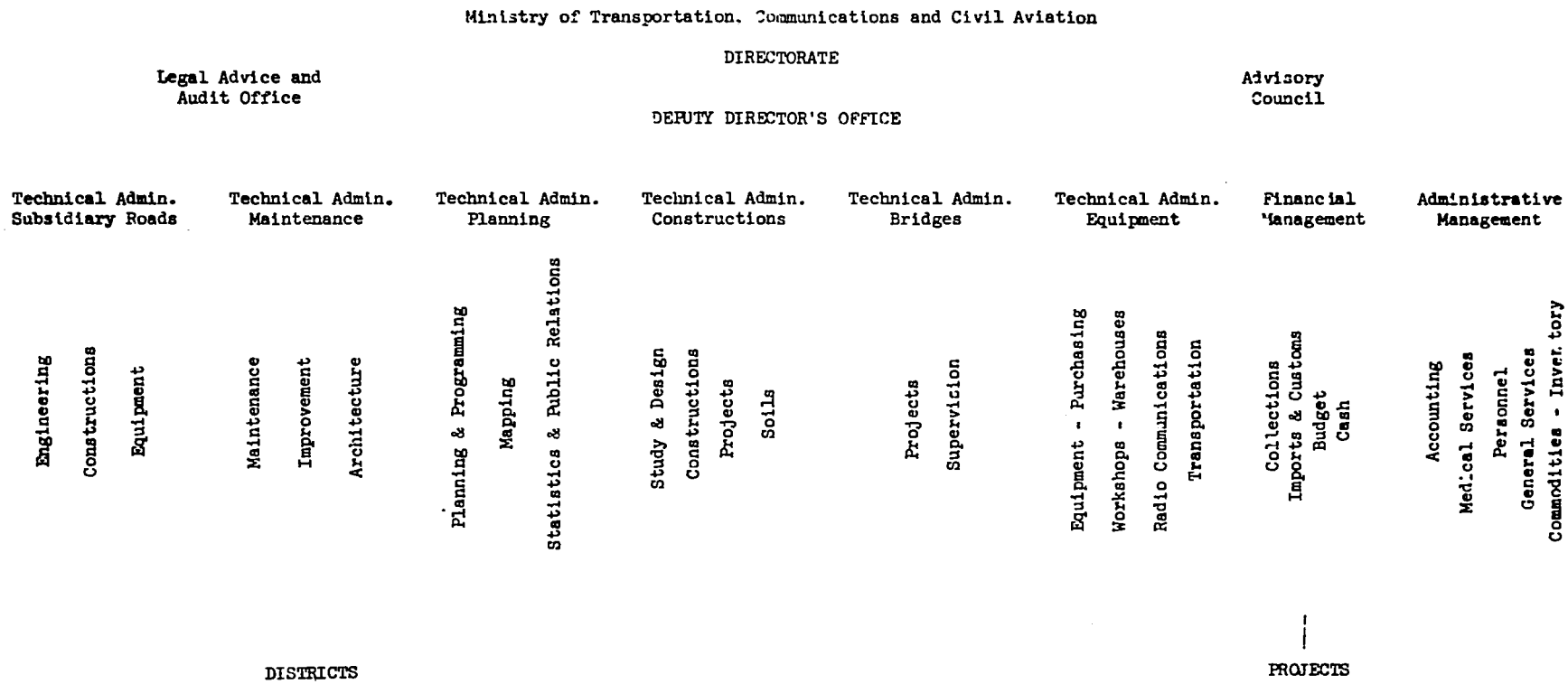
Chuquisaca

Santa Cruz

Potosí

Tarija

NATIONAL ROAD SERVICE



SNC

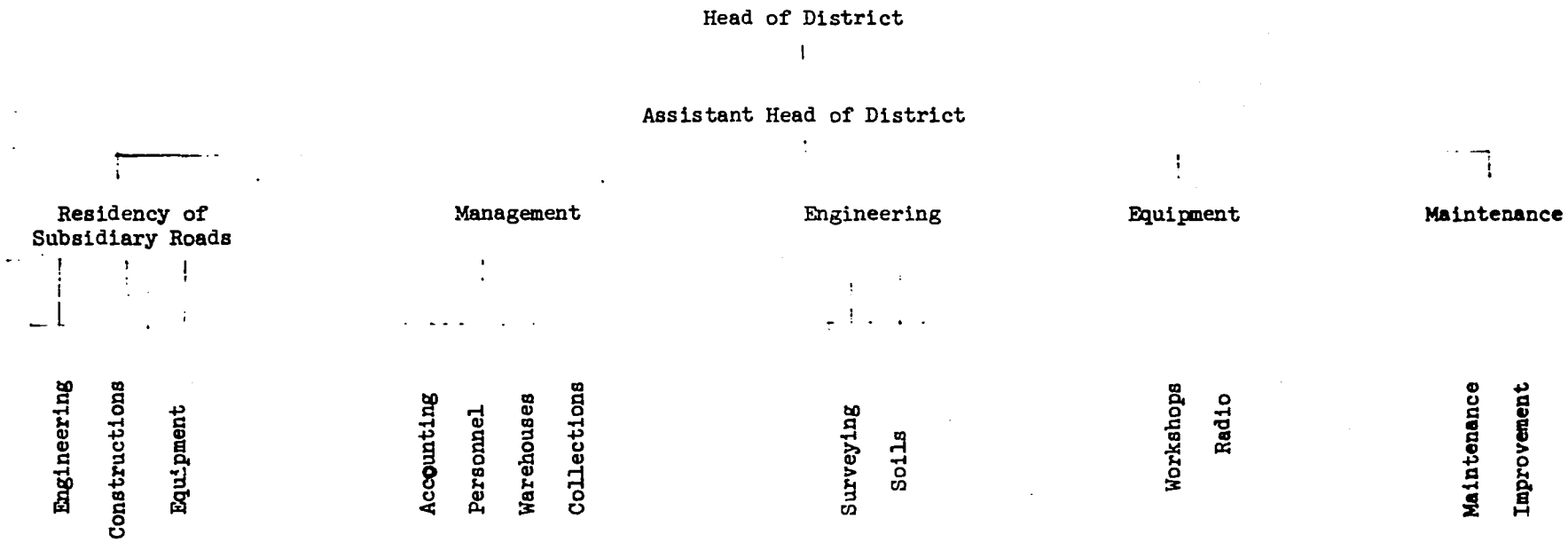
CENTRAL RURAL ROADS DEPARTMENT

PROFESSIONAL TRAINING AND YEAR OF SERVICES OF PERSONNEL

Position	N a m e	Profession	Years of Service
Manager	Domingo Márquez B.	Civil Eng.	22
Advisor	Hermann Castro C.	Civil Eng.	Contract
Division Engineer	Eduardo Gálvez V.	Civil Eng.	7
Division Engineer	Enrique Maldonado M.	Mechanic Eng.	4
Secretary	Teresa Excalier	Secretary	7 mos.
Messenger	Francisco Garay	-.-	9 mos.

N A T I O N A L R O A D S E R V I C E

Typical Organizational Chart of a District Office



N A T I O N A L R O A D S E R V I C E

Organizational Chart of Residency of Subsidiary Roads

RESIDENCY OF SUBSIDIARY ROADS

Engineering

- Surveying
- Design
- Soils

Construction

- Supervision
- Construction
- Maintenance

Equipment

- Light Equipment
- Heavy Equipment
- Warehouses and
- Workshops

ORGANIZATIONAL CHART OF THE CHUQUISACA DEVELOPMENT COMMITTEE
(CODESA)

Board of Directors

Chairman

Secretary General

Legal Advisor

Public Relations

Head of Technical Department

Secretary

Technical Council

Tourism

Administrative Department

Planning Department

Projects Department

Accounting Division

Social Development Division

Agriculture & Livestock

Industry

Infrastructure

Budgetary Contr

Programming & Control

Agriculture

Agro-Industry

Urban

Credits

Statistics

Cattle Breeding

Agro-Chemistry

Rural

Purchasing Division

Community Development

Metallurgic Chemistry

Roads & Communications

Warehouses

Forestry

Manufacturing

Personnel

Maintenance

ORGANIZATIONAL CHART OF THE POTOSI DEVELOPMENT COMMITTEE (CODEPO)

Board of Directors

Chairman

Advisory/Consultative/Decision Making Level

Advisory Council — Executive Council

Legal Advisor

Administrative Support Level

Administrative & Financial Management

Personnel Department

Accounting Department | Purchasing & Supplies Department | Financial & Budgetary Control Department | Workshops & Maintenance Department

Equipment Division | Commodities Maintenance Division | Workshops Division

Secretary General

Public Relations Department | Central Files & Documents Department

Programmes & Projects Executive Directorate

Supervision & Technical Coordination

Planning Directorate

Coordination of Extra-institutional Programmes

Operational Level

Infrastructure Department | Agriculture & Livestock Department | Programming & Evaluation Department | Projects Department | Natural Resources Department

Water & Sanitary Works Division | Agricultural Mechanization Division | Programme Development Division | Project Design & Development Division | Evaluation of Renewable Resources Division

Civil Construction Division | Pisciculture Division | Programme Evaluation Division | Project Evaluation Division | Evaluation of Non-Renewable Res. Division

Roads Division | Forestry Division | Statistics Division

Rural Electrification Division | Support for National Agricultural Projects Division

Deconcentrated Level

S.E.P.S.A.* | T.A.P.* | A.A.P.O.S.* | Bus Terminal

SEPSA - Servicios Eléctricos de Potosí
TAP - Teléfonos Automáticos de Potosí
AAPOS - Aguas Potables y Alcantarillado de Potosí

ANNEX K
EXHIBIT 8
Page 1 of 1 page

ORGANIZATIONAL CHART OF THE TARIJA DEVELOPMENT COMMITTEE
(CODETAR)

Chairman

Board of Directors

Secretariat
Legal Advisory Office
Press and Public Relations

Administrative Management

- Accounting Department
- Personnel Department
- Organization Department
- Purchasing & Supplies Department

Production Management

- Agriculture & Livestock Department
- Industrial Department

Planning Management

- Regional & Sectoral Planning Department
- Project Development & Evaluation Department
- Management Control Department

Executive & Natural Resources Management

- Infrastructure Department
- Roads & Equipment Department
- Natural Resources Department

Social Development Directorate

PROFESSIONAL TRAINING AND YEAR OF SERVICES OF SENIOR STAFF

CODESA

POSITION	HOME	PROFESSION	YEARS OF SERVICE
President	José Luis Aguirre	Economist	9
Administrator	Angel Ramos	Economist	9
Technical Chief	Hugo Ribera	Economist	2
Planning Chief	Vacant		
Project Chief	Gonzalo Villa	Economist	3
Agricultural Chief	Ronald Camacho	Economist	4
Industrial Chief	Edmundo Zelada	Chemical Engineer	8
Infrastructure Chief	Eloy Martínez	Mining Engineer	9
Social Development Chief	Saúl León	Economist	3

CODEPO

President	Cl. Mario Terán	Military Engineer	-
Administrative Director	David Villegas	Economist	2 yr. 5 mo.
Planning Director	Manuel Pacheco	Economist	5 yr. 5 mo.
Project Chief	Braulio Ore	Economist	3 yr. 6 mo.
Program Chief	Isaías Ríos	Economist	1 yr. 8 mo.
Program and Project Execution Director	José Luis Carvajal	Civil Engineer	1 yr. 6 mo.
Supervisor Engineer	Edwin Torrez	Civil Engineer	4 yr. 8 mo.
Agriculture Coordinator	Mario Cordero	Agric. Engineer	3 yr. 10 mo.

CODETAR

President	Jorge V. Blacud	Civil Engineer	1 yr. 2 mo.
Administrative Director	Jorge Paz	Economist	2 years
Production Director	Juan Navajas	Economist	1 yr. 3 mo.
Planning Director	Secundino Ugarte	Economist	4 yr. 7 mo.
Execution and Natural Resources Utilization Director	Oscar Vargas	Geologist	1 yr. 6 mo.

SOCIO-ECONOMIC PROFILE OF THE TARGET GROUP

A. INTRODUCTION

The wide diversity found among the rural poor (ethnicity, language, ecological niche, past land tenancy and the like) presents difficulties in drawing meaningful generalizations. In the target area, there are essentially two classes of small farming communities: (1) indigenous ex-hacienda locales; and (2) Spanish speaking mestizo peasant settlements. Although there are many similarities between the two, there are also relevant socio-cultural differences which dictate specific treatments with respect to achieving community participation. Indigenous ex-hacienda locales are concentrated in the Department of Potosí and to a limited extent in Chuquisaca, while mestizo peasant villages predominate in both Chuquisaca and Tarija.

It must be pointed out that there is a third peasant community type - the free-hold village - which was never attached directly to a hacienda. Although some of these settlements exist in the target area, their incidence is not high enough to be a meaningful factor in this project.

B. INDIGENOUS EX-HACIENDA COMMUNITIES

Of the two types of communities in the target area, indigenous ex-hacienda settlements are the least assimilated in the national mainstream. They are communities formed among peones on the haciendas which existed prior to the 1952 revolution, are below the canton administrative level. They consist of only one ethnic group - native Quechua speakers, although there is some facility with Spanish, especially among the men.

1. Social Organization

Within such communities, there are a number of cohesive factors, at both the family and village level, which can and should be utilized to achieve community participation. At the family level, the primary social unit is the extended domestic household. Generally, it is composed of parents, children (and their spouses if married), and grandchildren; the determining factor in its composition is the amount and quality of land in the holding. Commonly the individual households are linked to each other by ties of marriage and compadrazgo (ritual co-parenthood). These links in turn are the basis of the ayni practice - mutual work exchanges among related households during periods of peak activity (planting and harvesting), as well as loans of food and other essentials when circumstances so dictate.

At the community level, unifying factors include language (Quechua) and ethnicity (indian) which assume greater importance because of the minority status of each and the history of subservience under the latifundio system. In addition, although not universal, there are communal work groups (minka) to which all households are expected to contribute manpower - the threat of criticism in small face-to-face communities inhibits malingering - and, depending upon local circumstances, communal pasture land (59% in Potosí) to which all households have use rights.*

The system of community leadership exhibits considerable variation. In some cases, it consists of the traditional socio-political fiesta system, while in others the agrarian reform sponsored sindicato prevails, while in others the leadership system is a combination of the two - the determining factors in any particular settlement being the degree to which the particular landlord permitted the development of the fiesta system and the level of impact of the land reform.

According to the fiesta mechanism, adult men of the community pass through a ranked series of minor and major public offices. Attached to each office is an increased level of status and a local fiesta, the scale and cost of which are comensurable to the office and which must be financed by the incumbent. All offices are voluntary (again the pressure of public opinion in a small society discourages refusal to accept office), held for one year, and there is no right of succession. A man with sufficient ambition and resources (cash outlays for fiestas can become significant) continues through the system until he reaches the office of chief (caraca) after which he becomes a respected elder and is consulted on every important community level activity.

Within this system, the decision-making process is collegial. All major office holders, the respected elders, and in some cases all of the adult males, participate in the determination of important matters. Even though the caraca is the local leader for his term of office, he is in effect a first among equals. He does not make unilateral decisions and his performance is subject to the scrutiny of fellow villagers.

The sindicato is a product of the agrarian reform. Although formed as a political cadre, it has in some cases evolved into an efficient community leadership body; in other instances, it either never became an effective unit or it has dissolved as its primary function - lobbying for land expropriation - has become obsolete. Sindicato

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* See Riordan - Assessment of the Target Region for USAID/Bolivia's Agricultural Sector Loan II, 1977.

officials are either selected by the community members (adaptation of the cargo system) or appointed by national level representatives, according to local circumstances. The number of officers varies with the size of the community, but there is one office holder for every major community function. The leader holds the office of Secretary General and he, like the caraca, has overall responsibility for social control within the community and for dealing with representatives from the national government.

2. Economic Activity

For all families, agriculture is a major economic activity, and the conditions under which it is carried out give a clear indication of the poverty level. The individual household, in addition to being the primary social segment, is also the basic economic unit; reciprocal exchanges and communal work groups not withstanding. Division of labor occurs along both sex and age lines. In general, men perform the more physically demanding agricultural tasks (land preparation, harvesting) and a considerable share of the marketing. Women undertake the lighter field activities, generally tend the animals, perform some marketing and cottage industry activities, in addition to a full complement of domestic chores. Children contribute in accordance with their sex, age, and physical capabilities.

The size of farms is universally small. A recent survey revealed that the average size of a peasant holding in Potosí is 2.5 hectares. Moreover, the same study pointed out that more than two thirds of the farms have less than two hectares.* Further, not all of the available hectarage is utilized. Land left fallow (an average of .31 hectares) plus that which is not usable because of natural impediments reduces considerably the amount of land under cultivation at any one time.

Farms are not only small, but are divided into a number of scattered parcels. Inheritance practices (even division among heirs who remain in the community) and an effort to utilize the various environmental niches which exist in the southern valleys are the reasons for this pattern. Although the arrangement serves social (inheritance) and risk management (use of multiple micro-environments) functions, it may be prejudicial to long-term production capabilities.

Production techniques are extremely rudimentary. The primary orientation of produce is toward meeting subsistence requirements. In Potosí an average of 57% of farm production is consumed directly by the household and an additional 20% is reserved for seeds and animal feed. Nevertheless, there is significant (23% of production) market

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* Riordan 1977

involvement. The level of commercial participation is related inversely to the time from market. For example, those farmers living within one hour of the market sell 36% of their production, while those one to three hours distance 25%, those three to six hours 19%, and those more six hours only 13%.

Owing to the rugged topography of the area, the underdeveloped state of tertiary roads, the majority of farms (56%) are physically isolated and fall into the latter two categories of market participation. Trips of from six hours to two days, using animal and/or human transportation to reach a point to which produce carrying trucks can penetrate, are common. Equally common are losses for lack of motorized transport due to unpassable roads, and "bad road" fees charged farmers by truckers for penetrating to hinterland areas.

In general, the crop mix consist of grains (barley, wheat, and quinua) and potatoes. Farmers located in less hospitable environments (the wide majority of indigenous farmers are in such locations) and situated further from trunk roads tend to use the basic grain/potatoe mix. Those situated in more favorable environments and who are closer in time to markets use crop mixes which emphasize fruits and vegetables rather than grains and tubers.

Animal raising compliments crop production. It consists of both large herd animals (cows, oxen, goats, sheep) and the smaller barnyard types (chickens, pigs). Quantities tend to be limited and like crop production the major orientation is for subsistence (89%) rather than market (11%).

Like the crop mix, the work cycle is in large part determined by the environment. There are two periods of peak activity. First are the months of September thru November which are devoted to land preparation and planting in coincidence with the onset of the rainy season. The second consists of the months of April and May which are dedicated to harvesting. The intervening period between planting and harvest is spent in cultivation, animal care, household maintenance, and cottage industry chores. The same applies for the segment June thru August with the added activity of migration for causal day labor work in the sugar fields in the Santa Cruz area.

Whether primary or secondary to farming, off-farm and non-farm employment is a significant complementary activity. As noted above, the principal source of off-farm employment is day working on sugar plantations - a second source is working on modest scale mestizo farms in the immediate area.

In addition to field laboring, most households are engaged in some sort cottage industry and/or processing of animal by-products. As noted above, most of the processing is directed toward subsistence, while cottage industry spans a range of activities from semi-skilled artisanry to handicraft production for both subsistence and market ends. Although exact figures concerning levels of participation and earnings derived from such activities are not available, it is estimated that they add significantly to the average net farm household income.

3. Quality of Life Indicators

Like economic activity, indicators of general quality of life (educational attainment, health status) also reflect the substandard conditions among indigenous small farmers. According to a recent Mission survey* only 39 % of the small farmers in Potosí have completed three years of schooling, while only 17 % have progressed beyond the third grade. Overall illiteracy rates among the peasants stand at 33 %; a figure which does not account for those campesinos who have regressed to functional illiteracy by living in an environment which places little emphasis on reading and writing skills. Although exact data are not available, general impressions are that illiteracy rates are higher among indigenous campesino women. The combination of the heavy work load (economic and domestic tasks) which women bear, and a culturally defined attitude which sees little relevance in education for women, inhibits formal school attendance.

With respect to health, the sub-par status is a consequence of three factors: (1) poor nutrition; (2) inadequate environmental sanitation; and (3) deficient health services. The Campesino diet is closely related to the subsistence orientation of farming; that is, they eat generally what they produce. Consequently, the diet is heavily unbalanced in favor of carbohydrates (tubers and grains) while severely lacking in animal protein as well as other essential vitamins. Sanitation conditions are marked by a lack of privies, and potable water systems. Prevalent diseases include scabies (perhaps 50 % of the campesino population), intestinal parasites, and respriatory ailments.

The incidence and persistence of the diseases is in part attributable to deficient health services. In the countryside adequate facilities and trained personnel are the exception rather than the rule. Moreover, physical isolation and cultural dissonance inhibit indians from using urban/rural town health installations.

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* Riordan Ag. Sector II - 1977

C. MESTIZO PEASANT COMMUNITIES

Within the target areas, this type of community is predominant in Chuquisaca and Tarija. Residents are Spanish speaking, and because of the language and cultural affinity and historical facts (less dense indian population, less extensive hacienda system, recent arrival of mestizo migrants), they are closer to the national mainstream than their indigenous counterparts.

1. Social Organization

In general, the cohesive factors present in indigenous communities are reduced considerably in mestizo settlements. At the family level, the extended household is the primary social unit, but inter-familial kinship and compadrazgo links are much less influential (recent immigration is in part the reason). Reciprocal work exchanges do not exist and all additional field work requirements are met by hired labor.

At the community level, responsibility for social control is assumed by the corregidor - an administrative official appointed by the national government. In almost all instances, they (corregidores) are not members of peasant settlements, but rather are located in rural towns at the canton administrative level. Leadership within in the community is provided on an ad-hoc basis. A resident of a committee (generally an adult male(s)) is selected by community members to manage specific activities (school, health post construction, road building and the like). The appointment lasts for the duration of the project after which the position dissolves and the incumbent returns to being a common citizen of the community. Positions are voluntary and the force of public opinion makes refusal difficult.

2. Economic Activity

The economic activity of mestizo farmers in the target area is similar to that of their indigenous counterparts. They combine crop production and animal keeping with off-farm (day laboring) and non-farm (cottage industry) pursuits to gain a livelihood. In general, farm sizes of mestizos are larger than indians, and their levels of market participation and use of modern inputs tend to be higher - all of which suggests closer assimilation to the market economy of contemporary society. However, advances are slight; most mestizo farmers are extremely poor ($ 207 and $ 232 rural per capita incomes in Chuquisaca and Tarija respectively).

Although larger than indigenous holdings, the mestizo farms are small (6.34 and 4.75 hectares average in Chuquisaca and Tarija

respectively), and generally divided into a number of dispersed parcels. A considerable proportion of land is kept out of production (.31 hectares average in Chuquisaca and .43 nectares in Tarija), but land wastage for topographical reasons is notas severe as is the case with indigenous farmers.

Production techniques reflect the closer assimilation to the national mainstream. Crop mixes show slight variation. There is an increase in the production of corn and a decrease in potatoes (especially in Tarija where it is limited to 17 % of the farmers) and barley. As among the farmers in Potosí the mixes are dependent upon environmental factors and time from market.

Among mestizos there is greater commercialization of produce, although the portion directed toward subsistence ends is still substantial. In Chuquisaca, over 50 % of small farmer produce is sold, while in Tarija the average proportion reaching the market is 42 %. Time-from-market is inversely related to the proportion of produce which is sold. In Chuquisaca and Tarija respectively, farmers located within one hour of the market sell almost 75 % and 50 % respectively. In contrast, those situated more than six hours away market sell only 26% (Chuquisaca) and 29 % (Tarija) of their goods.

The work cycle is marked by the same peaks and troughs of activities as described above. The only notable exception is Tarija where the period of land preparation and planting occur later in the year (November-January) as does the harvest period (May-June).

3. Quality of Life Indicators

The education and health status of mestizo peasants is generally poor, showing only a slight improvement over farmers in Potosí. Available data indicate that 40 % of small farmers in Chuquisaca and 60 % in Tarija have completed three years of schooling, and only 13 % and 7 % have advanced to the third grade. Moreover, illiteracy rates among campesinos in the two departments are estimated to be 30 % and 26 % respectively, without considering the regression the functional illiteracy factor, which although high, is not as prevalent among indians.

Health conditions are marked by the same poor diet, lack of environmental sanitation, and deficient health facilities as found among indigenous peasants. Although it cannot be documented at the present time, the increased marked participation of mestizo small farmers could influence a more balanced diet, but differences would indeed be minor. A second difference is that mestizos are less reticent (less cultural dissonance) to make use of urban/rural town health facilities, although they face similar physical isolation and access problems.

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