

SEP 27 1979

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR (LAC)

FROM : LAC/DR, Marshall D. Brown 

SUBJECT: Rural Roads Maintenance and Rehabilitation  
Project Authorization

Your approval is required for a loan of \$10 million (\$3.3 million of which will be obligated in FY 1979) from the Agriculture, Rural Development and Nutrition (Section 103) appropriation to the Dominican Republic for the Rural Roads Maintenance and Rehabilitation project (517-0130).

Discussion: The purpose of this five year, \$27.3 million project is to develop the institutional capacity of the Directorate of Rural Roads (DGCV) to maintain and rehabilitate rural roads at the national, regional and local community levels. This purpose will be achieved within the context of an operational program which will: (a) establish a rural road maintenance department and planning unit at the national level; (b) construct and staff seven regional and seven subregional offices under the DGCV capable of managing rural roads maintenance/rehabilitation in their areas; and (c) engage approximately 700 local community organizations in the rehabilitation of 20 percent of the country's rural roads, and in a maintenance program covering nearly 60 percent of the rural road network. The project will finance technical assistance and training for DGCV staff and local community managers, the purchase of equipment and tools, labor expenses related to the rehabilitation/maintenance activities, administrative costs, and a rural roads inventory. Project implementation will be the responsibility of the DGCV in collaboration with the Office of Community Development, the Department of Rural Organization under the Secretariat of Agriculture, and community organizations.

The LAC Bureau's Development Assistance Executive Committee reviewed the project and recommended approval on August 23, 1979, subject to certain revisions in the Project Paper. The proposed revisions have been incorporated into the Project Paper. The IEE for the project, recommending a negative determination, was approved by the Assistant Administrator on July 12, 1979.

Waiver: The project requires the purchase with Loans funds of forty-eight 90 cc "street-trail" motorcycles to be used by the road maintenance supervisors, the community organizers, and the road inventory ground surveillance teams. The motor-

BEST AVAILABLE

cycles, with a total cost of approximately \$30,000, are not manufactured in the United States. Although they are available from suppliers in two AID Geographic Code 941 countries, country-wide maintenance and service for those suppliers in the Dominican Republic is considered to be inadequate for purposes of carrying out the project in an effective manner. Adequate maintenance and service is provided by a Japanese firm - a Code 899 country. A source waiver is therefore requested to allow procurement of these motorcycles from Code 899 - which includes Japan - and thereby allow for adequate country-wide maintenance and service of the motorcycles to be purchased. Authority to make specific exceptions to U.S. or Code 941 source and origin requirements permitting procurement of goods in any country included in AID Geographic Code 899 for transactions up to \$500,000 has been delegated to the Assistant Administrator under A.I.D. Delegation of Authority No. 40. A.I.D. Handbook 1, Supplement B, Chapter 5B4b, provides that a waiver of the authorized geographic code for purchase of commodities may be based on unavailability and on circumstances which are determined to be critical to success of project objectives. SER/COM concurs with this waiver request.

Justification to Congress: The project was not included in the FY 1979 Congressional Presentation. An Advice of Program Change notifying the Congress of A.I.D.'s planned FY 79 obligation of \$2.1 million for this project was forwarded on August 21, 1979. Subsequently, as a result of Hurricane David, a second notification was forwarded to Congress on September 13, 1979 increasing the FY 1979 funding level to \$3.3 million. Thus, the project can be authorized on September 28, 1979. Since the funding contemplated for this project in the current fiscal year exceeds by more than ten percent the amount of funding previously reported to the Congress for allocation to the Dominican Republic, a Section 653(b) Notification was transmitted to Congress on September 7, 1979. The ten day waiting period for this notification has also elapsed.

Recommendation: That you (1) sign the attached Project Authorization; and (2) approve the requested source and origin waiver permitting procurement of forty-eight, 90 cc motorcycles from any country included in A.I.D. Geographic Code 899 by signing below, certifying that the exclusion of procurement from free world countries other than the

Dominican Republic and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Approved: Edward W. Coy

Disapproved: \_\_\_\_\_

Date: Sept 28 1979

**DEPARTMENT OF STATE**  
**AGENCY FOR INTERNATIONAL DEVELOPMENT**  
WASHINGTON, D. C. 20523

ASSISTANT  
ADMINISTRATOR

PROJECT AUTHORIZATION

Name of Country: Dominican Republic

Name of Project: Rural Roads Maintenance  
and Rehabilitation

Number of Project: 517-0130

Number of Loan: 517-T-033

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Rural Roads Maintenance and Rehabilitation project for the Dominican Republic, involving planned obligations of not to exceed Ten Million United States Dollars (\$10,000,000) in loan funds over a two-year period from the date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.
2. The project consists of assisting in a program being implemented by the Secretariat of Public Works and Communication through the Directorate General of Rural Roads ("DGCV") within the Government of the Dominican Republic (the "Borrower") to develop the institutional capacity of the DGCV to rehabilitate and maintain rural roads (the "Project").
3. The Project Agreement, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with AID regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as AID may deem appropriate.
4. (a) Interest Rate and Terms of Repayment

The Borrower shall repay the Loan to AID in U.S. Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Borrower shall pay to AID in U.S. Dollars interest from the date of first disbursement of the Loan at the rate of (i) two percent (2%) per annum during the first ten (10) years, and (ii) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

(b) Source and Origin of Goods and Services

Goods and services, except for ocean shipping and except as set forth in Section 4(e) below, financed by AID under the Project shall have their source and origin in the Dominican Republic or in countries included in AID Geographic Code 941, except as AID may otherwise agree in writing. Ocean shipping financed by AID under the Project shall, except as AID may otherwise agree in writing, be financed only on flag vessels of the United States and the Dominican Republic.

(c) Conditions Precedent to Disbursement

1. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, the Borrower shall, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a. Evidence of its commitment to establish a fully staffed rural roads maintenance unit within the DGCV;

b. Evidence of its intention to create a separate line item in the national budget for the DGCV maintenance unit;

c. Evidence of a permanent rural roads maintenance budgeting objective of \$850 per km. (in present value) for rural roads brought into the maintenance system established under the Project; and

d. Evidence that a full time coordinator for the Project has been appointed.

2. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance procurement of equipment, the Borrower shall, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a. A plan for commodity procurement, delivery, distribution to regional centers and warehousing; and

b. A plan for a preliminary inventory system.

3. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, to finance rehabilitation and maintenance operations, the Borrower shall, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

a. A plan for rehabilitation and maintenance operations;

b. An executed contract for technical advisory services;

c. Evidence of the establishment of a maintenance management and reporting system within DGCV; and

d. Evidence of the delegation of authority and transfer of responsibility for equipment and staff by DGCV to Regional Centers necessary to implement decentralization of maintenance.

(d) Covenants

The Borrower shall covenant that, unless AID otherwise agrees in writing, it will:

1. Use equipment procured under the Project only for rural road rehabilitation and maintenance work; and

2. Recruit and maintain sufficient qualified personnel at all levels required to carry out the rural roads maintenance program effectively.

(e) Waiver

Motorcycles financed by AID under the Project and having a value of approximately \$30,000 may have their source and origin in countries included in AID Geographic Code 899.

Richard W. Coz  
Assistant Administrator  
Bureau for Latin America  
and the Caribbean

Sept 28, 1979  
Date

Clearances:

GC/LAC:JKessler	<u>[Signature]</u>	date	<u>9/25/79</u>
LAC/CAR:HBuckley	<u>[Signature]</u>	date	<u>7/25/79</u>
LAC/DR:LArmstrong	<u>[Signature]</u>	date	
LAC/DR:MBrown	<u>[Signature]</u>	date	<u>9/27/79</u>

GC/LAC:GMW/ter:ew:9/17/79:x29182

AGENCY FOR INTERNATIONAL DEVELOPMENT <b>PROJECT PAPER FACESHEET</b>	1. TRANSACTION CODE <input type="checkbox"/> A    A = ADD <input type="checkbox"/> C    C = CHANGE <input type="checkbox"/> D    D = DELETE	PP 2. DOCUMENT CODE 3
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3. COUNTRY/ENTITY Dominican Republic	4. DOCUMENT REVISION NUMBER <input type="text" value="1"/>
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5. PROJECT NUMBER (7 - digit) <input type="text" value="517-0130"/>	6. BUREAU/OFFICE A. SYMBOL    B. CODE <input type="text" value="LA"/> <input type="text" value="05"/>	7. PROJECT TITLE (Maximum 40 characters) <input type="text" value="Rural Roads Maintenance and Rehabilitation"/>
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8. ESTIMATED FY OF PROJECT COMPLETION FY <input type="text" value="8"/> <input type="text" value="3"/>	9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY <input type="text" value="7"/> <input type="text" value="9"/> B. QUARTER <input type="text" value="4"/> C. FINAL FY <input type="text" value="7"/> <input type="text" value="9"/> (Enter 1, 2, 3, or 4)
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10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$1 - )						
A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	( )	( )	( )	( )	( )	( )
(LOAN)	( 7,700 )	( 2,300 )	( 10,000 )	( 7,700 )	( 2,300 )	( 10,000 )
OTHER						
1. U.S.						
2.						
HOST COUNTRY		1,348			17,300	17,300
OTHER DONOR(S)						
TOTALS	7,700	3,648		7,700	19,600	27,300

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY <u>79</u>		H. 2ND FY <u>80</u>		K. 3RD FY <u>81</u>	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	189		061		10,000				
(2)									
(3)									
(4)					10,000				
TOTALS									

A. APPROPRIATION	N. 4TH FY <u>82</u>		O. 5TH FY <u>83</u>		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED
	P. GRANT	Q. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1)						10,000	<input type="text" value="0"/> <input type="text" value="3"/> <input type="text" value="8"/> <input type="text" value="1"/>
(2)							
(3)							
(4)						10,000	
TOTALS							

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.

1 = NO  
2 = YES

14. ORIGINATOR'S OFFICE CLEARANCE SIGNATURE: <i>Philip R. Schwab</i> TITLE: Mr. Philip R. Schwab, USAID/DR Director DATE SIGNED: <input type="text" value="0"/> <input type="text" value="8"/> <input type="text" value="10"/> <input type="text" value="9"/> <input type="text" value="7"/> <input type="text" value="9"/>	15. DATE DOCUMENT RECEIVED IN AID/W OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION <input type="text" value="0"/> <input type="text" value="8"/> <input type="text" value="13"/> <input type="text" value="79"/>
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AID 1330-4 (3-76)

Memo attached - date used:  
9-27-79

8-13-79

AGENCY FOR INTERNATIONAL DEVELOPMENT  
**PROJECT IDENTIFICATION DOCUMENT FACESHEET**  
*To Be Completed By Originating Office*

1. TRANSACTION CODE  
 A - Add  
 C - Change  
 D - Delete

PID  
 2. DOCUMENT CODE  
 1

3. COUNTRY/ENTITY  
 Dominican Republic

4. DOCUMENT REVISION NUMBER

5. PROJECT NUMBER (7 digits)  
 517-0130

6. BUREAU/OFFICE  
 A. Symbol  LA  
 B. Code  05

7. PROJECT TITLE (maximum 40 characters)  
 Rural Roads Maintenance and Rehabilitation

8. PROPOSED NEXT DOCUMENT  
 A.  3  2 - PRP  
        3 - PP  
 B. DATE MM YY  
 08  79

10. ESTIMATED COSTS  
 (\$000 or equivalent, \$1 = RD\$1.00)

FUNDING SOURCE		Life of Project
a. AID Appropriated		10,000
b. OTHER US	1. 2.	
c. Host Country		17,300
d. Other Donor(s)		
TOTAL		27,300

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION  
 a. INITIAL FY    
 b. FINAL FY

II. PROPOSED BUDGET AID APPROPRIATED FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. FIRST FY 79		LIFE OF PROJECT	
		C. Grant	D. Loan	F. Grant	G. Loan	H. Grant	I. Loan
(1) FN	189				10,000		10,000
(2)							
(3)							
(4)							
TOTAL					10,000		10,000

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)  
 061  252  821

13. SPECIAL CONCERNS CODES (maximum six codes of four positions each)  
 BR  BL  LAB

14. SECONDARY PURPOSE CODE  
 139

15. PROJECT GOAL (maximum 240 characters)  
 To improve the income, productivity and quality of life of the Dominican Republic's rural poor; with a subgoal of the rural feeder road network in good condition and under regular maintenance.

16. PROJECT PURPOSE (maximum 420 characters)  
 To develop the institutional capacity of the Directorate of Rural Roads to maintain and rehabilitate rural roads at three levels, national, regional, and local community level, through maintenance and rehabilitation operations, planning, program development and research activities.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)  
 Up to 8 weeks short-term TDY assistance will be required at a cost of approximately \$8,500 plus 3 TM's of local social scientist at approx. cost of \$3,600.

18. ORIGINATING OFFICE CLEARANCE  
 Signature *Erwin A. Levy*  
 Title Acting Director, USAID/DR  
 Date Signed MM DD YY  
 04  30  79

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution  
 MM DD YY

## GLOSSARY OF TERMS

AIFLD	American Institute for Free Labor
AASHO	American Association of State Highway and Transportation Officials
Camino Vecinal	Rural Road
Carretera	Highway
Campefino	Farmer
DGCV	"Dirección General de Caminos Vecinales" Department of Rural Roads
DGC	"Dirección General de Carreteras" Department of Highways
DOR	"Departamento de Organizaciones Rurales" Department of Rural Organizations
FDD	"Fundación Dominicana de Desarrollo" Dominican Development Foundation
FENAC	"Federación Nacional Agraria Campesina" National Federation of Farmers
INDRHI	"Instituto Nacional de Recursos Hidráulicos" National Institute of Water Resources
JUCAVE	"Junta Coordinadora de Caminos Vecinales" Community Coordinating Committee for Rural Roads
ODC	"Oficina para el Desarrollo de la Comunidad" Office of Community Development
ONE	"Oficina Nacional de Estadística" Office of National Statistics
PVO	Private Volunteer Organization
SEA	"Secretaría de Estado de Agricultura" Secretariat of Agriculture

Roads:

"Good"	A road in condition for routine maintenance
"Fair"	A road that needs rehabilitation
"Poor"	A road that needs reconstruction
SEOPC	"Secretaría de Estado de Obras Públicas y Comunicaciones" Secretariat of Public Works and Communications
Tarea	Common measure of farm land equal to approximately 629.5 m <sup>2</sup> . One hectare is about 15.9 tareas.
Terrateniente	Land holder
VOC	Vehicle Operating Costs

# RURAL ROADS MAINTENANCE AND REHABILITATION

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## I. SUMMARY AND RECOMMENDATIONS

### A. RECOMMENDATIONS

USAID/DR recommends that a loan be authorized to the Government of the Dominican Republic in the amount of \$10,000,000 to support the program described herein. The loan will be repaid over twenty-five years, including a ten year grace period, with interest at 2 percent during the grace period and 3 percent thereafter.

### B. BORROWER AND IMPLEMENTING AGENCY

The Borrower will be the Government of the Dominican Republic. The implementing agency will be the Secretariat of State for Public Works, acting through its Directorate General of Rural Roads (Dirección General de Caminos Vecinales, hereinafter "DGCV"). Certain aspects of program implementation will be carried out through the Secretary of State for Agriculture (Secretaría de Estado de Agricultura, hereinafter "SEA"), the Office of Community Development (Oficina de Desarrollo de la Comunidad, hereinafter "ODC"), and community development organizations.

### C. SUMMARY PROJECT DESCRIPTION

#### 1. Project Goal

The goal of the project is to improve the income, productivity and quality of life of the Dominican Republic's rural poor. Quality of life will be enhanced primarily by improving access to government services in health and education. Income will increase as a result of improved marketing opportunities and increased availability and lower cost of agricultural inputs and technical services. Other effects which may be anticipated include increased production of higher value crops, more productive utilization of the farm labor force and direct employment in road rehabilitation and maintenance activities.

#### 2. Project Purpose

The purpose of the project is to develop the institutional capacity to maintain and rehabilitate rural roads. This institutional capacity will be developed at three levels:

a. At the national level, a fully staffed office will be established within DGCV responsible exclusively for rural road maintenance and rehabilitation operations, planning, program development and selected research activities.

b. At the regional level, seven regional offices and seven sub-regional facilities will be established or upgraded. They will be provided with equipment, training and management assistance to assure an adequate organizational structure for support and supervision of local road maintenance and rehabilitation efforts.

c. At the local level, community participation will be institutionalized with a view to developing effective cooperation with DGCV and a long-term capability to maintain and rehabilitate rural roads.

The development of institutional capacity will be carried out with the objective of establishing a new attitude and orientation toward the rural road system. Within the GODR, the DGCV will be re-oriented from a construction and reconstruction policy to a rehabilitation and maintenance policy pursued on a stable, slowly growing rural road network. This policy will be reinforced by budgetary commitment and administrative and organizational structure.

At the local level, an essentially passive, dependent community approach to road service will be reoriented toward active community involvement and responsibility for the state of local roads.

In working toward this objective, considerable road maintenance and rehabilitation work will be carried out. Current estimates of work to be accomplished are reflected in "project outputs." However, the precise amounts of road work are considered secondary to accomplishing the organizational, budgetary, administrative and attitudinal changes associated with a shift to dominant concern with systematic road maintenance as a stable long term policy.

### 3. Project Outputs

The process of institution building which is the purpose of the project will take place in the context of an operational program with the following outputs:

a. A separate, functioning rural road maintenance department at the national level in DGCV with approximately 35 administrative and technical employees and an operating budget of over RD\$200,000 annually.

b. A unit within DGCV to carry out planning activities and studies including: appropriate road maintenance technologies; design standards; methods of community participation; design of work for optimal utilization of available labor in relation to equipment; training methods for supervisors and work force; acquisition, storage and movement of

equipment and materials; and organizational relationships between the various levels of the roads maintenance system.

c. 112 DGCV employees trained in administration, road maintenance, equipment operation and maintenance, management and other relevant skills.

d. Fourteen regional and subregional offices with 105 staff employees (administrators, engineers, supervisors, etc.) under DGCV fully capable of managing local rural roads maintenance and rehabilitation in their areas.

e. 700 local community self-help organizations identified and participating in rehabilitation and maintenance of local feeder roads. 700 community leaders trained in maintenance skills and management.

f. A permanent training capability established at the national, regional and local levels.

g. 1,200 kilometers of rural roads rehabilitated.

h. 3,500 kilometers of rural roads under the maintenance program with reasonable expectation of permanent maintenance through the national budget.

i. An inventory of rural roads including detailed information on road conditions and requirements for rural road network planning.

#### 4. Project Inputs

Project inputs will include:

a. Technical assistance and training to the DGCV staff at the national and regional level and training of local community managers (\$1,050,000);

b. Purchase of road rehabilitation and maintenance equipment and tools (\$5,500,000);

c. Equipment and tools for seven regional machinery maintenance and repair shops (950,000);

d. Equipment and hand tool replacement (\$1,000,000);

e. Road rehabilitation labor expenses (\$4,800,000);

f. Road maintenance labor expenses (\$10,293,000);

g. Administrative costs (\$2,607,000); and

h. Rural Roads inventory (\$100,000).

Since the GODR has no inventory of existing roads, a road inventory will be made the first year of the project. The inventory will include such information as location, length, width, right-of-way, existing structures, condition, requirements for rehabilitation or reconstruction and maintenance, and community organizations in the area.

In determining project inputs, \$4,000/kilometer has been used in estimating the costs for rehabilitation of the feeder roads. During the first two years, this figure is expected to be lower, but taking inflation into consideration, \$4,000/kilometer should be an average for the life of the project.

The maintenance program estimate is \$850/kilometer annually, again at a lower initial cost, but probably reaching the \$850/kilometer figure by the end of the third year of the project.

ESTIMATED PROJECT COST (5 Years)  
(U.S. \$ 000)

A.I.D. US\$ ITEM	Y E A R S					TOTAL 1979-1984
	1980	1981	1982	1983	1984	
Equipment and hand tool purchase	3,800	1,700	-	-	-	5,500 <u>1/</u>
7 sets shop equipment for 7 regions	700	250	-	-	-	950 <u>1/</u>
Technical Assistance and Training	350	300	100	100	50	900 <u>1/</u>
Road Rehabilitation	-	335	335	335	335	1,340
Road Maintenance	160	150	-	-	-	310
Contingencies	-	250	250	250	250	1,000 <u>1/</u>
<u>Total A.I.D. US\$</u>	5,010	2,985	685	685	635	10,000
=====						
GODR \$						
Road Inventory	100	-	-	-	-	100
Administrative Salaries	229	557	557	557	557	2,457
Local Training Cost	10	45	45	40	10	150
Office Equipment and Materials	70	20	20	20	20	150
Road Rehabilitation	-	865	865	865	865	3,460
Maintenance	919	1,427	2,074	2,588	2,975	9,983 <u>2/</u>
Equipment Maint. & Replacement	20	80	200	300	400	1,000 <u>1/</u>
<u>Total GODR \$</u>	1,348	2,994	3,761	4,370	4,827	17,300
=====						

1/ Foreign Exchange Costs  
2/ Includes inflation factor

## D. SUMMARY FINDINGS

The project committee has reviewed all aspects of the proposed rural roads maintenance and rehabilitation project and finds that it is technically, socially, economically, and financially sound and consistent with the development objectives of the GODR and of USAID. It has also been determined that the Secretariat of Public Works is institutionally capable of administering the project and disbursing the funds committed within the time planned for implementation (5 years).

### 1. Institutional Analysis

The institutional capability of DGCV to carry out the project has been carefully examined. While the program will require significant adjustments on the part of DGCV because of the fundamental restructuring of role and functions of the organization with respect to maintenance operations, it has been determined that DGCV is capable of making the necessary changes. The policy and operational implications of these changes are fully supported by the Secretariat of Public Works, the Technical Secretariat of the Government, SEA and other relevant institutions.

The institutional capabilities of ODC and SEA to carry out their functions under the project have also been examined. The program should not place serious strains on ODC or SEA capacity. A problem of credibility of ODC in the eyes of some campesino groups may limit the effectiveness of ODC in implementing the project in some cases. In certain communities, therefore, the Department of Rural Organization of SEA or private agencies may handle local organization functions where they can more effectively work with local campesino groups.

### 2. Economic Analysis

The economic analysis demonstrates that the project will have a highly favorable impact on the economy of the Dominican Republic because of the savings which will be generated by regular rural road maintenance operations in terms of both reduced road reconstruction costs and lower vehicle operating costs. The economic analysis further demonstrates that the project will have favorable economic implications for members of the USAID target group living in the influence area of the program's rural roads subprojects as a result of lower prices for farm inputs, lower transportation costs, and more convenient passenger travel. Additional benefits for the target group in terms of increased productivity are expected as a consequence of changes in agricultural cropping patterns resulting (a) from improved access to local markets and (b) from increased services received from agricultural extensionists.

Rural passengers will also benefit from increased mobility, from reduced waiting and travel times, and lower fares for their trips to local service centers. Finally, savings in road vehicle fuel consumption and fuel consumed by road building machinery will result in considerable energy savings for the Dominican Republic.

### 3. Financial Plan

The financial analysis demonstrates that the project as presented is financially viable. The commitment of the GODR to providing its counterpart contributions to the program has been confirmed.

### 4. Social Analysis

The social analysis examines the historical and cultural reasons for existing attitudes toward rural roads maintenance and the growth of local organizations in rural areas in recent years. The analysis concludes that the institutionalization of rural roads maintenance at the local level is feasible.

The analysis notes that the complexity of the rehabilitation and maintenance tasks contemplated by the project are such that operations should be initiated only with local organizations which have some record of accomplishment in carrying out smaller and less complex community projects. As a consequence, some poorer and less organized communities will not be suitable participants for the project at the outset. The project, however, provides for efforts on the part of ODC, SEA and community organizations to upgrade the organizational capabilities of weaker communities so that they may begin to participate in the project towards the end of the implementation period.

## E. BENEFICIARIES

The intended primary beneficiaries will be poor small farmer and rural landless families living in areas served by feeder roads. Typically affected will be families with land holdings of less than 5 hectares, with incomes of under DR\$827 per six-person family. (See Section IV. A, which discusses the distribution of project benefits.)

Beneficiaries and the nature of benefits anticipated include the following:

1. Residents of areas served by rural roads who gain improved access to social services at lower cost.

2. Small farmers in areas served by rural roads who gain improved access to markets, lower input prices, and lower transportation costs.

3. Consumers of agricultural products, both rural and urban, to whom lower production and transportation costs may be passed on in the form of lower prices and better quality produce;

4. Truck, taxi and bus operators who use rural roads.

5. The Dominican population as a whole, because: a) reduced costs and prices translate into greater effective demand for and supply of food; b) resources now allocated to reconstruction of roads can be reallocated to more productive and economically efficient uses; and c) decreased foreign exchange requirements, for both equipment and fuel, will contribute to greater availability for other imported goods.

6. Local committees and participants who benefit by experience of local responsibility in responding to local problems; and

7. Workers both locally and in government positions who will be employed as a consequence of the project.

The criteria for selection of priority sub-projects will assure that the rural poor target group will be directly benefited. As the development and application of the criteria will be a cooperative effort among the government agencies which have constructed roads through their own resources (such as Secretariat of Agriculture, National Sugar Institute, Office of Community Development, Agrarian Reform Institute, and Institute of Water Resources), the project may provide an opportunity to influence the flow of non-project resources from these agencies in favor of the rural poor.

## F. PROJECT DEVELOPMENT COMMITTEE:

CHAIRMAN:	Charles S. Blankstein
PROJECT MANAGER:	Betty Facey
ADMINISTRATION:	Clara Kirmse
LOAN OFFICERS:	Frank Miller
	Timothy Hammann
	Allen Merrill
ENGINEERING:	Betty Facey
	Rafael Genao
ECONOMICS:	Robert Maushammer
	Cam Wickham
	Charles Vandervoort
SOCIAL SCIENCE:	Max Chapin
CONTROLLER:	Joe Hill
PROGRAM OFFICER:	John Clary
AGRICULTURE:	Eric Shearer
	John Gloetzner
EDUCATION:	Al Ravelli
HEALTH:	Oscar Rivera
PRINCIPAL AUTHORS:	Betty Facey, Charles Blankstein
USAID APPROVAL:	Philip R. Schwab, Mission Director
GODR LIAISON OFFICIALS:	Ing. R. Antonio Vicente Moronta, Director General of DGCV
	Ing. Evaristo Sucre Matos, Sub-Director of DGCV
	Ing. Pedro Batista, Chairman of DGCV Maintenance Office
	Ing. Félix Morales, DGCV Official

## II. BACKGROUND

### A. The Transportation System in the Dominican Republic

Until the 1920s, surface transportation within the Dominican Republic depended largely on mules, horses, small canoes, and sailboats. Trade, travel and communication followed the country's system of horse trails or the coastal water routes. The first major bridge in the country was not built until 1880, and the Río Haina near the capital was not spanned until 1912. Trips between Santo Domingo and the rest of the country were lengthy and hazardous.

Some improvement in this situation began with the construction of roads as part of the public works programs undertaken during the U.S. Marine occupation (1916-1924). Under Trujillo (1930-1961), a massive highway construction program was initiated and further road construction was undertaken by the Balaguer administration.

Today, the road network of the Dominican Republic comprises approximately 5,500 kms. of paved primary roads, 6,000 kms. of rural feeder roads and an unknown amount of penetration and other tertiary roads. Road is by far the most important mode of internal transport. Railroads consist of very short lines which do not operate on regular schedules. Domestic air transportation is limited, providing primarily passenger rather than commercial transport services. Coastal shipping is limited and there are no navigable rivers. Roads account for 95% of all internal traffic. The national vehicle fleet includes approximately 56,700 privately owned automobiles; 25,300 taxis; 22,500 light trucks; 16,600 heavy duty trucks; 2,145 buses; 2,400 jeeps; and 58,300 other vehicles.

The base of the road system is a network of three paved highways that emanate from Santo Domingo. These highways and a series of secondary roads provide rather good communication between the major urban centers and the principal ports. The rural road system, however, is generally not in good condition. Primary rural roads have not been well maintained and rural feeder roads have not been subject to systematic "maintenance" at all.

The poor condition of rural roads is exacerbated by the topography and climate of the country. Four almost parallel mountain ranges extend in a north westerly direction in the western part of the country and a single range runs east - west in the eastern part. These rough and precipitous mountain ranges, combined with heavy rainfall, make internal communication in certain rural areas of the Dominican Republic difficult. The influence of the anticyclones and the trade winds bring about two fairly well-defined rainy seasons in much of the

country, with maximum precipitation occurring in the late spring and fall. During this period serious erosion is common in rural areas and flooding is frequent. Since many rural roads lack adequate provision for drainage, transit often becomes difficult or impossible.

The lack of proper road maintenance in rural areas can be attributed in part to the attitude of rural communities toward road maintenance and repair, and in part to the policy and budgetary shortcomings of previous Dominican governments. These factors are discussed in the following sections.

#### B. Attitudes of Rural Communities Toward Road Maintenance

Political attitudes and behavioral patterns of Dominicans towards their government and their leaders have had a major impact on the condition of the rural road network. A long history of "personalismo," paternalism and the "patron" ideal has contributed to the development of dependency patterns towards the government. Since Hispanic times, social tradition has stressed not only a rigid hierarchy of power and status but also a centralized authority that has left little leeway for local initiative and decision-making. Accordingly, submissive patterns have developed towards the central government. The populace has come to expect their leaders to be benevolent men who will "take care of them." One consequence of this orientation is the existence of strong dependency patterns among the local populace for the provision of public services by the Central Government.

Therefore, although there are numerous organized community groups, especially small farmer associations, there has been very little community participation in regular rural road maintenance. While some communities have organized to repair roads on an emergency basis, most communities continue to look to the Central Government to provide them with regular road maintenance services.

#### C. GODR Policy Toward Rural Road Maintenance and Repair

The poor condition of rural roads is due in part to the failure of previous governments to budget adequately for feeder road maintenance. But the problem is more complex than the lack of adequate funding. DGCV has been oriented primarily toward rural road construction. It has not had an independent maintenance unit or a comprehensive maintenance program. Maintenance efforts which DGCV undertook in the past tended to be erratic, responding basically to political pressures rather than technical requirements. Typically, maintenance was not undertaken until serious road deterioration had already taken place and rehabilitation or reconstruction was required. While rural roads that service relatively

wealthy landowners are often maintained by them (and in a few notable cases communities have organized to maintain their roads), the general picture to date has been one of inadequate funding, a lack of systematic maintenance procedures and an expensive pattern of road construction, rapid deterioration and then reconstruction.

It is estimated that between RD\$72 and RD\$84 million has been invested in rural road construction. However, this large investment in feeder roads has been and is being seriously eroded. DGCV estimates that 80% of the rural feeder road network (approximately 4,800 kms.) currently needs to be rehabilitated or reconstructed. The remaining 20% of the network (about 1,200 kms.) can be brought up to the desired level of service by widening and deepening the side ditches and then following up with adequate maintenance services.

It appears that the new Dominican Government which assumed power following national elections in August 1978 intends to deal decisively with the problem of the condition of roads and highways. Several public policy statements have stressed the importance of improving the national road network as part of the country's economic and social development. Moreover, specific road projects including large operations with IBRD and IDB financing are being developed. Rural road construction and maintenance responsibilities are being concentrated in DGCV and a standard for rural road design has been established. The 1979 DGCV budget has been increased to RD\$14.0 million.

The GODR has asked USAID assistance to develop DGCV's administrative and technical capacity to use its enlarged maintenance budget and to help rehabilitate and maintain the rural roads system which, because of past neglect, requires capital investments well in excess of current budget allocations. This request is fully supported by the Secretariats of Public Works, Agriculture and the Technical Secretariat of the Presidency, which makes final decisions on external assistance projects.

#### D. The Socio-Economic Importance of Rural Roads

Approximately 50% of the Dominican Republic's estimated 5.2 million people live in rural areas. Most of these people are dependent on the agriculture sector for their living. However, agriculture is the least productive sector of the economy accounting for less than 20% of the GDP while absorbing over half of the national labor force. According to estimates prepared in 1975, there were about 435,000 rural households. Within this group, 25% had no land and another 12% had less than one-half hectare, for a total of 160,000 households dependent mostly or entirely upon the agricultural labor market for livelihood. Of the

275,000 households of farm operators, about 185,000 had farms of one-half to five hectares. Over 53% of all farmland is owned by 1.6% of all landowners while 13.1% of all farmland is owned by 54.3% of all landowners.

The effects of the unequal distribution of income and low income levels upon the well-being of rural Dominicans are devastating. Data suggests a death rate of 17 per 1,000 for rural areas. A 1969-1970 survey conducted by the GODR Unidad de Planificación de Alimentación y Nutrición (UPAN) revealed that on the average individuals consumed less than 62% of the minimum daily recommended amount of calories and 46% of the daily recommended amount of protein. A total of 43% of the residents of rural areas over the age of ten were illiterate in 1970. (The GODR defines literacy as the ability to read and write one's own name.) The few employment surveys that have been conducted since 1970 have estimated open unemployment at approximately 24%. It is estimated that if underemployment were also measured, the nationwide rate would approach 40%.

The condition of the rural road system is of great and increasing significance to the productivity and welfare of the nation. The efficiency of agricultural production systems, the national energy budget, the development of adequate employment opportunities in rural areas, the impact of transport costs on marketing, input prices, production incentives and ultimately on the price and availability of food all are affected by the condition of the rural road system.

The deterioration of the rural road system, while costly to all, appears to be especially harmful for the poor. Bad roads reduce the availability of educational, health and other social services in rural areas. The development of the agricultural sector is also linked directly to the condition of the rural road system. Many small farmers are not maximizing their production due to a lack of agricultural extension services, production credit, storage/processing facilities and improved seed and plant materials. Inadequate access roads contribute significantly to this problem. Extension services, credit and other needed inputs often do not reach small farmers because of poor road access. In addition, poor roads result in expensive and unreliable transportation to markets. Food costs are increased not only for the urban poor but for the rural poor as well. (In the Dominican Republic even very small farmers tend to market their produce and later buy food, in contrast to more subsistence-oriented rural societies in which the farmer tends to store a larger proportion of his production for family use.) Better roads are also an important factor in stimulating industries which offer expanded employment opportunities.

In sum, the poor are the primary losers from the distortion of development investment caused by the construction-deterioration-reconstruction cycle. Roads which might have remained serviceable far longer, given adequate maintenance efforts, must now be reconstructed at costs far higher than the cost of routine maintenance programs. Funds unnecessarily expended for reconstruction cannot be invested in new rural roads or other development projects benefiting the rural poor. Few projects could impact as widely on USAID/DR's target group as a project to provide for maintenance of rural roads on a long term basis.

#### E. Relation to USAID Strategy

The Mission's FY-1981 Country Development Strategy Statement (CDSS) states that USAID/DR's "long-range goal is to improve the living standards of the poor majority in the Dominican Republic."

The project supports this objective by promoting better access to agricultural inputs and markets by the rural poor, and improving the outreach of government services through improved road communication. The project will expand employment opportunities directly through labor intensive techniques in road rehabilitation and indirectly through stimulation of agriculture and related industry.

Several elements of the Mission's CDSS strategy are advanced by the project:

##### 1. Improving Institutions and Human Resources

Technical assistance and the implementation of sub-project activities funded under the project should lead to improvements in the Secretariat of Public Works' abilities to plan, construct, and maintain road networks, and to utilize and maintain its equipment.

##### 2. Increased Food Production

Farm to market roads are a significant factor in increasing agricultural production.

##### 3. Improved Rural Health and Family Planning, and Expanded and Improved Rural Education

Improved road communication eases access to public services, and improves the outreach of government technicians.

4. Addressing Underlying Causes of Poverty ... with Direct Attention to Unemployment

The system established by the project will create employment through the labor intensive rehabilitation and repair methods to be used in improving the road network. Better roads are an important factor in stimulating industries which offer expanded employment opportunities.

The project will also complement several ongoing AID activities by providing routine maintenance for rural roads constructed or rehabilitated under earlier projects. For example, under the Agriculture Sector I Loan (517-T-027) \$2 million were provided for the construction of over 100 kms. of feeder roads. Under the PL-480 program about \$1 million in Title I sales receipts are being used for the rehabilitation of 150 kms. of mountainous feeder roads damaged in 1979 floods.

F. Other Donor Activity

Foreign donor assistance for the road sector has been relatively minor. The Inter-American Development Bank (IDB) provided a \$477,000 grant in early 1975 for the preparation of a study on the organization and administration of the transportation sector. The study was completed in July 1978 and outlines possibilities for restructuring the transportation sector. In 1976 the IDB also provided a \$2 million loan to design the expansion of the Duarte Highway. The IDB is currently developing a loan-financed program for rural road construction that is scheduled to be signed at the end of 1979. USAID has had several meetings with the IDB design teams in order to integrate our efforts and avoid duplication. It is expected that roads constructed under the IDB program will be brought immediately under the routine maintenance program financed by AID.

A World Bank loan approved in 1975 for \$15 million provides for the rehabilitation of 186 kms. of highways and the development of a highway maintenance program. Rural feeder roads are not covered under the World Bank program.

In summary, the proposed project is fully consistent with Mission and host country priorities as well as with other donor activities, and represents a significant step in addressing the needs of the poor majority.

### III. DETAILED PROJECT DESCRIPTION

#### A. Developing Institutions for Rural Road Maintenance

Developing the institutional structure needed for effective rural road maintenance will require a number of changes at the national, regional and local level. "Maintenance" as a function will be separated from rural road construction. Rural road maintenance will be kept separated from highway maintenance. The new rural road maintenance system will be decentralized to a greater degree than construction and highway maintenance in order to facilitate local participation and encourage DGCV responsiveness to local community needs. The distribution of functions between national, regional and local levels and relationships of rural road maintenance to rural road construction and highway maintenance represents an explicit decision by Secretary of Public Works Ing. Rafael Corominas taken after an intense debate on the merits of two organizational plans. One plan would have optimized the efficiencies of control of SEOPC resources through unitary management of highway and rural road maintenance. The other plan emphasized the need for clean, simple lines of communication from the local communities to a DGCV department concerned solely with road maintenance and rehabilitation problems of local communities. In opting for the latter, Secretary Corominas emphasized the need for the communities to have a sense of ownership of their local roads and an assurance of their ability to influence the responsiveness of DGCV to local road problems. USAID/DR believes that by accepting a few minor redundancies, the Secretary has, insofar as possible at the outset, assured an organizational structure which will meet the need for cooperative and responsive maintenance operations.

Generally speaking, the plan places control of mobilization of labor and other local resources at the local level along with responsibilities to provide timely information to DGCV. The regional level will control application of regional DGCV resources, coordinate with other GODR agencies at the regional level and supervise local community work. The regional level also shares responsibility with the national level to select specific subprojects for support. The national level retains responsibilities for overall management and planning, administration, research and coordination. In all cases, DGCV is the responsible and accountable agency. Coordination with other interested agencies will be under the control of DGCV. Thus, AID will look to DGCV as its single point of contact.

##### 1. National Level

The Secretariat of Public Works and Communications (SEOPC) is now divided into Sub-Secretariats which are further sub-divided into General Directorates. The Sub-Secretariat for roads is divided into two Directorates: Highways and Rural Roads (DGCV). In theory, the Highways Directorate and DGCV have equal status, but in practice, Highways have received a much higher priority in allocation of funds and scarce physical

resources. Obviously, rural roads cannot function without connecting highways, nor can a highway serve the public without feeder roads; however, the Highway Directorate has in the past been supported at the expense of DGCV, an imbalance that this project is intended to correct.

Upon the completion of the National Roads Inventory (described subsequently), the Secretary of SEOPC will designate all roads as either "carretera" (highway) or "camino vecinal" (rural road). In a meeting in June 1979 with members of the USAID/DR and IDB project teams, the Secretary of Public Works agreed that the designations should be based on road surfacing materials so that all asphalt or concrete surfaced roads will be assigned to the Highway Department and all gravel and dirt roads assigned to DGCV jurisdiction. Annually, vehicle traffic counts will be made for the running road inventory, and at some predetermined count (probably 350 to 400 vehicles daily), a rural road will be hard surfaced, reclassified and passed from DGCV to Highway Directorate jurisdiction.

a. The DGCV Central Office

DGCV's central office will be responsible for overall management and control, programming, research, and national program coordination.

In order to carry out the new program, two new units will be created in DGCV and a third significantly reoriented. A new Maintenance Department (see b below) will be established with divisions for equipment and transport, administration, audit and accounting, and programming. The new Department will be the principal implementation unit under the project, and a project Director reporting directly to the head of the Department will be assigned. He and his immediate staff will supervise the seven regional center chiefs, coordinate project activities within SEOPC, within the GODR and with private agencies and manage the acquisition and application of GODR and AID inputs to the project. (See organization charts Annex C-1 and C-2.)

The second new unit to be established in DGCV is the "Sección de Estudios y Proyectos." (See e below.) This is essentially a research unit which will service rural road construction as well as maintenance activities of DGCV. Finally, the existing "Sección de Programación y Control de Proyectos" will be augmented and technical assistance provided. (See d below.)

The reorganization and additional functions of DGCV described in the following section will require 25 additional permanent staff positions at DGCV headquarters in Santo Domingo. Administrative support for the additional staff has been assured. At the national level the central office staff will be expanded and/or shifted from other units to provide support services to the regional offices. Annex D-3 shows the current personnel levels or available personnel already employed and the requirements over the next five years not only for this project, but for other donor

projects.

The project will provide extensive technical assistance to DGCV. The total cost of T.A. at the national level is budgeted at \$331,000 including \$145,000 for research and studies and \$20,000 for conferences. A detailed summary of all technical assistance support is set out in Section III D.

b. Functions of the Rural Road Maintenance Department

The new Rural Road Maintenance Department will manage the project through a project director. Four support divisions will be created: Programming, Equipment and Transport; Administration; and Audit and Accounting.

The Programming Office will:

- i) determine priorities and criteria and manage the process for the selection and funding of rural roads activities under the project;
- ii) prepare and present the Maintenance Department yearly operational budget;
- iii) evaluate and monitor ongoing maintenance activities;
- iv) coordinate and plan foreign donor assistance to the DGCV Maintenance Department;
- v) Manage training and technical assistance inputs of the project; and
- vi) establish a permanent training capacity.

(The DGCV Programming Department described subsequently to which the Maintenance Department Programming Office will relate also will perform functions under the project.)

The Equipment and Transport Office of the Maintenance Department will supervise developing and operation of shops and the acquisition and maintenance of equipment for the seven regional centers and subcenters.

Administrative and controller offices within the Maintenance Department will follow regular SEOPC arrangements for these functions.

Technical assistance will be provided to the new Maintenance Department to help develop its capabilities in the foregoing areas in the amount of approximately \$98,000.

c. Functions of the Research Department

A new Department will be established in DGCV to perform research into the costs and effects of current and future methods for construction, rehabilitation and maintenance of rural roads. Under the project, a research committee will be established within the DGCV to select and fund research studies.

Studies such as the following will be undertaken:

- i) Determine costs for specific maintenance operations (e.g., study tradeoffs between labor intensive versus capital intensive construction techniques under all types of terrain;
- ii) Examine the competitiveness of commercial vehicle services to determine the likelihood that road improvements will be passed on to consumers in the form of lower prices for consumer goods, more frequent and rapid transit to cities and social services;
- iii) Study alternative materials for road surfacing (e.g., stabilized soils and use of bagasse);
- iv) Determine typical vehicle operating costs for various types of vehicles on secondary roads under different conditions; and
- v) Determine traffic flows broken down by type of vehicle -- auto, minibus, light truck, heavy trucks, and buses.

Technical assistance to support these research activities is budgeted at \$145,000 over a two year period.

Preliminary discussions have been held between Haitian, Dominican and AID officials concerning coordination and cooperation in rural road research activities between the two nations.

In addition to studies, it is also anticipated that the Research Department will organize and fund four local conferences under the program to bring together various GODR leaders and experts in a particular field to discuss issues, findings and developments related to rural road maintenance and rehabilitation. This will allow DGCV officials and others to gain knowledge and understanding of each sector's respective concerns over rural road maintenance and development. The technical assistance costs for these conferences is estimated at \$20,000.

d. Changes In Functions of Existing DGCV Program  
and Project Control Department

i) Development of Overall DGCV Planning, Budgeting  
and Evaluation Capacity

DGCV has been determining budgetary needs according to the level of operations required to support various approved rural roads projects rather than according to the needs of the country for construction, rehabilitation and maintenance of rural roads. The current structure and staffing of the DGCV Programming Section reinforces this emphasis on development of engineering related costs and designs for specific rural road projects. The Department's orientation will be revised to include planning, forecasting, and evaluation of rural road needs. To accomplish this will require substantive changes in staff composition and functions combined with technical assistance.

To assist the Programming Department in redefining its new role and executing the corresponding new responsibilities, technical assistance will be provided at a cost of approximately \$72,000. The T.A. program is described in detail in Section III.D. These advisors will assist in:

(a) Organizational development of the Programming Department, including defining areas of responsibilities and relationships with other departments, regional offices, community organizations, other GODR institutions and foreign donors;

(b) Development of a long-term planning system for the rural road sector, including procedures and methodologies for the development of a National Rural Road Plan;

(c) Designing and assisting in the implementation of budget and administration norms, systems and methodologies to improve the formulation, implementation and control of rural road programs;

(d) Development of procedures to evaluate ongoing rural road projects in order to compare progress with targets and objectives, and including procedures to evaluate the impact on the environment of the various rural road development activities; and

(e) Development of DGCV's administrative capacity to program, coordinate, control, and evaluate foreign assistance.

The staff of the Programming Department and DGCV will be augmented to include two additional economists and a financial analyst. One economist will head the evaluation section and the other will head the planning section. The financial analyst will head the Budgeting Section. The other staff members will be selected from the existing DGCV personnel. These new staff members will be hired during the first year of the project and work closely with the technical advisors in order to learn the new procedures and methodologies. These additional staff positions will be paid for by counterpart funds.

ii) Development of a Rural Roads Information System

Accurate information on the extent and condition of the rural road network does not exist. Implementation of the rehabilitation and maintenance activities planned under the project and the operation of a systematic maintenance program will require substantial reliable data. An inventory of the existing rural road network will be completed and then developed into a rural roads information system. The system will be used not only by DGCV but also by other GODR agencies for various purposes.

An initial rural roads inventory will be completed during the first year of the project based on existing maps and ground surveillance of rural roads. A new program of aerial photography is also being planned by the National Office of Statistics (ONE). USAID/DR may provide some financial support for the aerial photography under a separate grant agreement. If new maps based on new aerial photography become available within a reasonable time, the schedule of road inventory work may be delayed to take advantage of updated material. However, existing maps will be adequate to deal with the needs of the project at the outset.

Ground surveillance activities will begin approximately two months after the execution of the Project Agreement. Fourteen interviewers will be employed under the supervision of DGCV regional and subregional supervisors for approximately four months to gather information such as road conditions (ditching, surfaces, bridges) population, schools, community organizations and agricultural production). The estimated cost for the information system is \$174,700 including \$74,700 AID funds. A technical advisor will be contracted for six months to assist DGCV in developing and implementing methodologies and procedures for maintaining a system to keep the initial rural roads

inventory current. The design of this system will include periodic information gathering by DGCV community maintenance employees and the subregional supervisors. The information will be collected on specially designed forms to allow easy incorporation into a system of data files for each road to be maintained at the regional and central office (see Annex C-3). The system will be designed to permit the generation of periodic reports needed by decision makers. The system will be simple and require little mechanization, yet permit easy data retrieval. The Roads Information System will be maintained by the DGCV Programming Department.

e. Institutional Coordination

Development of the institutional structure for rural roads maintenance requires effective coordination between DGCV, other GODR agencies and various private agencies which may play a role in the program.

Since its inception in 1970, DGCV has unsuccessfully attempted to gain the support of the various GODR institutions involved in rural road building for the development of a National Rural Road Plan. The new GODR administration has renewed the attempt to centralize the responsibility for construction and maintenance of rural roads under DGCV.

Since the primary role of rural roads is to serve the agriculturally based rural economy, DGCV is making a strong effort to develop an effective coordinating committee comprised of the major GODR institutions whose programs service the agricultural needs of the rural areas, including the following agencies:

1. Secretariat of Agriculture.
2. Office of Community Development.
3. Dominican Agrarian Institute.
4. Institute for Cooperative Credit and Development.
5. Department of Forestry.
6. Agricultural Development Fund (FEDA)
7. Agricultural Bank.
8. Office of National Statistics.
9. National Office of Planning.

As proposed by DGCV, the national steering committee is to collaborate in the national road inventory, and participate in developing policy for rural road construction, maintenance, rehabilitation and reconstruction. The Secretariat of Agriculture (SEA) has appointed

a coordinator at the national level and has instructed its regional directors to work with DGCV to develop regional plans. In its first month of operations, SEA-DGCV teams identified 150 kms. of priority rural roads that need to be rehabilitated.

The national level coordinating committee is echoed at the regional and local levels through regional coordinating committees and the formation of community organizations, Juntas Coordinadoras de Caminos Vecinales (JUCAVE).

Under this concept, a JUCAVE exists at the national, regional and community levels through which interested organizations can meet and jointly develop plans and policies on rural roads activities. While it is too early to judge the effectiveness of this approach, the Mission believes it is a plausible mechanism which appears to have the support of the key agencies whose cooperation is essential to project implementation.

The DGCV proposal for JUCAVE is reproduced in Annex C-15.

In addition to the intra-GODR coordination arrangements, DGCV will establish national level relationships with several PVO's such as Fundación Dominicana de Desarrollo (FDD) and Federación Nacional Agraria Campesina (FENAC). Several PVO's support substantial numbers of community organizations which in some cases may be selected for participation in the project as described in IV. D. DGCV generally will work through parent PVO's to establish working relationships with such local organizations.

## 2. Regional Level

### a. Role of the Regional Level

Project road operations will be managed at the regional level. The provision of DGCV maintenance services and the supervision work at the community level will be the responsibility of a DGCV Regional Maintenance Chief who will report to the Project Director.

A basic premise of the project is the need for a rural roads maintenance organization which can protect its own equipment and staff from encroachment by construction and highway maintenance interests and can relate closely to campesino organizations through its own regional centers. In order for the maintenance unit to work effectively with community organizations, it is essential that simple lines of communication be open to local communities and that, insofar as possible, operational control over DGCV maintenance staff and equipment be maintained at the regional office level. The Secretary of Public

Works subscribes fully to this concept. Such delegations of authority and transfer of responsibility for equipment and staff as are necessary to implement the decentralization concept will be carried out as a condition precedent to disbursement for road operations under the project.

b. Restructuring Regional Jurisdictions

At the present time, the Highway Department and Rural Road Department are each divided into four underequipped and understaffed regions. Under the project, SEOPC will restructure DGCV into 7 regions and 7 subregions. The regions and location of the regional centers will conform geographically to those already in use by the Secretariat of Agriculture and the Office of Community Development so that DGCV can better coordinate agricultural and community development activities with rural road services. (For SEA and ODC regions, and the current and proposed DGCV regional divisions, see Annexes C-4 through C-7.)

c. Regional Centers

DGCV will establish seven regional centers under the project in Higüey, San Cristóbal, Cotuí, Santiago, San Juan de la Maguana, Santiago Rodríguez and Barahona (see Map, Annex C-6). The regional centers will supervise local community activity and provide heavy equipment, technical assistance and other support to community road operations. Each of the 7 regional centers will have a core staff, equipment set, offices, equipped workshop, and space for parking the heavy equipment. Land for the Centers is already GODR owned. Physical facilities will be constructed with loan funds and facility designs provided by Engineering Offices of DGCV. Each Regional Center will have approximately 200 sq. meters of offices and spare parts storage, 200 sq. meters roofed area for equipment maintenance and repair and a fenced yard of approximately 1,000 sq. meters, at a total construction cost of \$346,000 per Center. Office furnishings will be counterpart funded with heavy equipment sets and shop equipment purchased under loan funds. (Heavy equipment and shop equipment are listed in Annexes C-8 and C-9.).

In addition, seven sub-regional facilities will be established essentially for storage purposes. The Sub-regional centers will have a small office, fenced yard for temporary storage of equipment, and storage space for hand tools.

d. Staff

Each center will be permanently staffed by a minimum of 16-18 persons, plus contracted supervisors for rehabilitation programs and equipment operators. The operations staff will include:

- An experienced engineer/administrator who will be fully and autonomously responsible for all activities in his region;

- Depending on regional requirements, one to three hand maintenance supervisors;
- One accountant;
- One secretary;
- One supervisor for spare parts and inventory;
- One supervisor for heavy equipment and transportation vehicles, scheduling of equipment usage, routine maintenance of equipment, etc.
- A chief heavy equipment mechanic;
- 2 assistant equipment mechanics;
- Chief mechanic for vehicles;
- Assistant mechanic for vehicles;
- Electrical systems mechanic (heavy equipment and vehicles).
- Shopman for shop equipment operation and maintenance of shop equipment.
- Training Coordinator to schedule training programs for hand labor maintenance and one to two day training programs of the JUCAVE, and to work with the technicians who will provide the actual training.
- Watchman.
- Chauffeur/messenger

In addition to these Regional Center employees, between 15 and 20 equipment operators and helpers will be assigned to each Center. Training will be given to hand maintenance supervisors, accountants, spare parts and inventory supervisors, all mechanics, shopmen and heavy equipment operators and helpers. Training for mechanics, shopmen and equipment operators will be included in requests for bids for equipment. These costs are not therefore calculated under the Technical Assistance summary budget.

e. Shops

Workshops will be constructed for the regional centers and equipped with basic hand tools and machines for routine maintenance of heavy and light equipment and storage of diesel fuel. The regional shops are intended to provide sufficient tools for routine equipment maintenance.

Major repairs will be contracted out to the heavy and light equipment suppliers or to DGCV shops in Santo Domingo. At a cost of approximately \$550,000, the regional shops will be provided with tools for greasing, lubricating, changing filters, tire repairs, battery charging, and the repair of minor components such as starters, pumps, compressors, hydraulic cylinders, brakes, electrical systems, valve adjustments, etc. (For a list of the types of equipment required for the regional workshops, see Annex C-9.)

f. Heavy Equipment

Basic equipment fleets (such as front loaders, compactors, motorgraders, tractors, etc.) will be purchased under loan funds, to complement the hand labor component of this project. A total of \$4,821,000 AID loan funds will be expended for heavy equipment including a 20% factor for spare parts. For the most part, DGCV has been renting heavy equipment from private contractors for both road construction and maintenance. To justify equipment purchased under loan funds, studies were made comparing the hourly rental costs from private contractors, and the projected costs of DGCV owned equipment. All GODR operating costs reflect the increased prices for petroleum products as of July 1979. Comparisons are given below on three pieces of equipment showing the hourly rental rates from private contractors and owned costs to the GODR. These hourly rates include operators, helpers, fuel, lubricants, filters, spare parts, batteries, tires and miscellaneous items. (For a complete analysis of these comparative costs, see Annexes C-10 and C-11).

COMPARATIVE EQUIPMENT HOURLY RATES (DR\$)

	GODR OPERATION COSTS			CONTRACTOR RENTAL	DIFFERENCE
	Net	Deprec.	Hourly	Hourly	Hourly
Tractor	11.52	6.16	17.68	35.00	17.32
Motor Grader	11.22	5.31	16.53	25.00	8.47
Front End Loader	3.33	4.34	13.17	30.00	16.83

Using 176 hours per month, minus 20% down-time, the savings to the GODR on these 3 representative pieces of equipment would be DR\$6,000 per month.

In seven regions, savings only on these three pieces of equipment would be \$42,000 per month or \$504,000 per year. The Mission feels that such savings (which include a depreciation factor), fully justify the expenditure of \$5.5 million for equipping the seven regional centers with basic fleets. Two pickups and "trail" motorcycles are to

be furnished to each regional office for transportation of the regional supervisors to rehabilitation and maintenance sites (motorcycles during the dry season and pickups for the rainy). The pickups are to be equipped with radio receivers, to complement the purchase of radio transmitters under the proposed IDB rural road construction loan.

The project budgets \$1,000,000 of GODR counterpart funds for equipment replacement and augmentation during the five year life of the project. Certain types of equipment will wear during this period such as dump trucks and wheelbarrows. An indeterminate amount of equipment will be lost or destroyed. In addition, the basic heavy sets may be insufficient for maintenance coverage in later stages of the project as both maintenance and rehabilitation work builds up.

The anticipated equipment replacements detailed in Annex D-4 have been attributed to GODR counterpart not only because of difficulties in predicting exact U.S. dollar costs, but also because the project is attempting to orient the DGCV towards regular budgeting for equipment replacement.

Consideration was given to the establishment of a sinking fund to assure the availability of funding for the replacement of heavy equipment purchased under the loan. This was considered to be impractical as well as impossible under GODR budgetary law. It is assumed that replacement of heavy equipment sets will be required in 12 to 15 years. It is not possible to anticipate conditions at that time with sufficient accuracy to enable a sound judgment to be made concerning establishment of a fund under the project to finance equipment replacement.

g. Hand Tools and Purchase Arrangements

Hand tools totaling \$316,000 will be purchased under AID loan financing and provided by DGCV regional offices for rehabilitation and maintenance work. (See Annex C-12 for Hand Tool Purchases and Estimates Costs.) Annex C-13 gives the hand tool requirements for one 30-man labor team for rehabilitation, and Annex C-14 lists the tools to be provided/man for the routine hand maintenance program. At the end of the first year of hand maintenance this hand tool set may be revised to reflect actual usage.

Workers who wish to do so may purchase their hand tools (with the exception of wheelbarrows) through payroll deductions. The purchase by workers at government bulk prices and without interest payments has the advantage of placing needed tools in the hands of the rural poor at low prices. Further, a worker who is purchasing his tools will exercise greater care than with DGCV owned tools.

The DGCV also proposes to make the 48 loan-funded motorcycles available for purchase by the regional supervisors, community organizers, and the road inventory ground surveillance crews, again, on a payroll deduction basis, using the pay-back funds for purchases of new motorcycles. The reality is that the motorcycles will be used unofficially for private purposes anyway. The DGCV proposal circumvents a potential personnel problem while helping assure better care and maintenance of the equipment.

### 3. Community Level

The role of the community level as implemented through selected local organizations is to provide labor for rehabilitation and maintenance operations and to work with DGCV to make the system function by providing information, some degree of local supervision and in some cases materials. In a larger sense, the role of the community is to take responsibility for the condition of the local rural road by doing those things within the power of the community to keep roads in good condition.

a. Role of Community Organizations

The essence of the project and the ultimate determinant of whether its objectives will be met is the quality of participation by campesinos in maintenance efforts through organizations which they control. The project will build upon existing community organizations. Only organizations which have demonstrated their viability by the size and participation of their membership and the complexity of community projects which they have already implemented will participate in the project. This will not unduly restrict the scope of the project. The Dominican rural sector is blessed with a relatively well developed pattern of local organizations. (Details are presented in IV.D.)

Generally speaking, community organizations have been formed and supported by parent organization both public (such as ODC and SEA) and private (such as DDF and FENAC). Perhaps the strongest of the community organizations are the farmers associations which work directly with SEA. But no one group of organization can or should be selected for project participation to the exclusion of others.

In each area in which the project will work, the strongest local organizations willing to undertake the work will be invited to participate. Data on the characteristics of local organizations will be gathered along with road information in the road inventory.

DGCV, working through the relevant parent organization will provide community organizations with briefings, promotional materials developed by DGCV, and opportunities to obtain information on the program. When and if the organization decides that it wishes to join the program, it will enter into a formal contract with DGCV which will cover both the responsibilities of the community organization and DGCV in carrying out the program in a specified area, normally about 5 kilometers from the community toward the next link in the road system in the direction of a highway.

The community organization will provide labor for rehabilitation work, which will be paid at the minimum wage, currently DR\$3.50. In addition, the community organization will undertake to support periodic maintenance and mobilize labor on a non-paid basis to meet emergency conditions such as landslides, the threat of debris to bridges during flooding conditions and other dangerous emergent conditions. DGCV will also contract separately with a local individual to perform daily routine maintenance on a paid basis and to mobilize community labor for emergency maintenance operations. The individual contractor will also undertake to inform DGCV of road conditions and emergency situations when they arise.

DGCV for its part will contract to provide supervision, tools, periodic maintenance and other support activities as appropriate to the work to be done in the area of the particular community.

The community organization will be free to determine the distribution of work within the organization, providing that the contractual undertakings of the community organization to the DGCV indeed are met. If they are not, the contract will provide that DGCV can hire laborers from the area directly or terminate operations.

b. Role of ODC, SEA and Other Parent Organizations

The multiplicity of community organizations in the Dominican Republic in part reflects a history of several GODR agencies and PVOs taking the lead in rural organization at different times. As is explained in the Institutional Analysis, ODC was organized in the early 1960's and carried out extensive rural organization work. Recently, the SEA community organization office, Departamento de Organizaciones Rurales (DOR), was organized and initiated extensive activities in developing farmers organizations. Several PVOs have maintained strong community organization programs for a number of years. FENAC, for example, has some 700 associated local organizations.

As reflected in the Institutional Analysis, ODC is the largest and most experienced of the community organization agencies in the country. But ODC became a political vehicle for the Balaguer Government in recent times and thus lost cachet with the campesino. DOR has not yet proved its capability and PVOs have varying strengths and weaknesses. A clear choice of one organization or the other as the lead organization for developing relations with the campesino is not available and indeed is not necessary. In some communities, the ODC organization will clearly be more influential. In others, the DOR or a FENAC or DDG affiliate will be the obvious choice. This reflects local conditions and political considerations which the project neither can nor should attempt to alter. Where a qualified local organization already exists, the project will work with it regardless of parent affiliation. If the local organization is unaffiliated or affiliated with a parent organization not suitable for the contract work involved (as might be the case with a local Parent Teacher Association) then ODC will be selected for local promotion activities.

This approach to the selection of parent organizations is not neat, However, it does reflect the political reality of the prevailing circumstances. The Mission has concluded that any effort at this juncture to attempt to limit the project to particular parent organizations in advance will be counterproductive and might lead to a circumstance where DGCV is locked into working with an organization in which the community has no confidence.

c. Developing Local Organizations

It was apparent to the Mission at the time that the PID for this project was developed that effective and experienced local organizations would be necessary to carry out the complex tasks contemplated at the local level. The Social Soundness Analysis confirms this view. The PID pointed out that allowing participation only of local organizations which could meet certain standards of effectiveness might well exclude certain communities in the country. Therefore, the project provides for additional assistance to such communities in order to help them eventually to qualify to participate in the project. Informal agreements have been reached with ODC, SEA and private agencies to assign community organization promotion agents to work with communities which do not qualify for participation in the program because of lack of local organizational structure and capability. \$69,000 of project funds are provided to support special organizational development activities of this nature by ODC and SEA. It is not expected, however, that a great deal of such local organization promotion will in fact be necessary.

d. The Local JUCAVE Concept

In April 1979, DGCV outlined in broad terms a proposal for local coordination of rural roads activities including community participation in local JUCAVES. The local JUCAVE would echo the proposed collaboration of DGCV and other GODR institutions at the national level. The creation of local JUCAVES would form the base of a consistent nationwide program in the maintenance, reconstruction, and rehabilitation of rural roads.

The functioning of a JUCAVE at the local level was not precisely defined in the DGCV proposal, although references were made to establishing links with existing community organizations such as Farmer's Associations, Community Development Groups, Parent-Teacher's Associations, or with newly organized entities. Under the proposal, the strongest local organization would be identified during the national road inventory. An ODC or SEA promoter would visit the community to meet with the existing organizations and explain the reasons and advantages of the JUCAVE and the work expected of the group.

This is basically the concept presented in this paper with one significant difference. The local JUCAVE approach implies a new formation of various local groups to carry out the work. The model presented in this paper is based on the selection of an existing local organization with an established membership, source of support through a parent organization and a track record of performance in local projects.

The project will encourage development of local coordinating committees wherever feasible. But the risk of relying on

the creation of new organizational arrangements in all the areas in which the project will function appeared to be rather high. For purposes of the project, emphasis has been placed on selecting one existing organization on which reliance can be placed rather than creation of new organizational modalities. In this Project Paper, the term "local JUCAVE" is used interchangeably with local or community organization. In implementation, the JUCAVE concept may be enlarged and elaborated to include various local interests and organizations. However, contractual relationships will be maintained with a specific local organization unless and until a broader coordinating committee is clearly capable of taking on the responsibilities involved.

e. Role and Motivation of Community Members

Ultimately, the project depends upon the attitudes of tens of thousands of Dominicans living in rural areas who will contribute to and benefit from the project directly or indirectly. Some DR\$6,000,000 paid to 20 to 30,000 laborers is by no means an insignificant motivating element. But other means of involving people in the project and heightening their perceptions of the importance of maintenance will be used as well. A flow of information about the project to the people as well as channels for people to express their views about road maintenance will be encouraged. Local participation in sub-project evaluation is required. Motivation will be enhanced by the tool purchase arrangement and provision of prestige-promoting "hard-hats" to participants.

The project will seek to encourage the communities' understanding of the importance of road maintenance, a sense of responsibility for the conditions of local roads, and a perception of DGCV as an organization working for and with the people to meet a crucial development need

## B. Road Operations

The work contemplated under this project includes rehabilitation (but not reconstruction), and routine, periodic and emergency maintenance. Maintenance will be performed on selected roads now in good condition, on newly constructed roads as they are completed, and on rehabilitated roads upon completion of rehabilitation work. The following table summarizes the amount of roads to be included under the project.

RURAL ROADS CONSTRUCTION OR RECONSTRUCTION PROGRAMS  
TO BE INCLUDED UNDER MAINTENANCE PROJECT  
(KMS.)

Financing Agencies	1979/80		1981		1982		1983		1984	
	Const/Rehab.	Maint.								
AID - PL 480	150	150	-	150	-	150	-	150	-	150
IDB	40	40	80	120	80	200	100	300	-	300
BIRF	50	50	50	100	50	150	50	200	-	200
GODR (1977 contracted construction)	570	570	-	570	-	570	-	570	-	570
DGCV/GODR Force Account	460	460	-	460	-	460	-	460	-	460
DGCV/GODR Projected Program	-	-	155	155	155	310	155	465	155	620
AID Rehabilitation	-	-	300	300	300	600	300	900	300	1200
Maintenance Totals:		1270		1855		2440		3045		3500

## 1. Rehabilitation

This project will undertake rehabilitation of approximately 1,200 kilometers of rural roads. Rehabilitation will include cleaning of rights-of-way, ditching, transverse drains, cleaning and repair of existing culverts, construction of headwalls, decking on small bridges, compaction of roadbeds, new gravel surfacing and construction of inspection boxes on new and existing culverts. Eligibility of a road for inclusion in the project will be determined on the basis of data gathered in the national road inventory supported by ground surveillance efforts.

The project will not undertake reconstruction, realignment or other heavy rehabilitation work. This is to limit project expenditures on any one segment of road in order to spread the benefits of the project as broadly as possible. The average cost of rehabilitation work necessary to put roads into a condition to be regularly maintained is approximately \$4,000 per kilometer. The Mission and DGCV have taken into consideration the recommendations of Para. 13 of the DAEC approval cable (State 141006) which suggested including minor construction work such as cutting and filling, realignment, and bridge construction in rehabilitation. Such work will be undertaken if it can be carried out at a cost not exceeding approximately 15% of the per kilometer cost, or in those cases where a local organization agrees to provide labor on a voluntary basis to carry out the additional work in conjunction with DGCV, 10% of the total estimated cost of the subproject. Prior approval of AID will be required in such cases. Further relaxation of this standard is not recommended.

## 2. Routine Maintenance

The project will support maintenance operations which will increase over the life of the project to approximately 3,500 kilometers. The estimated average cost of permanent maintenance is \$850 per kilometer per year.

When a road meets project selection criteria, including the standard of condition for routine maintenance, project financing for routine maintenance activity will be made available. Contracts will be entered into with the community organization and an individual contractor to perform specific routine maintenance activities on a stretch of road up to 5 kilometers long. The contract will specify the area of responsibility, number of workdays required, specific tasks (such as clearing ditches and right-of-ways, cleaning culverts, filling and hand tamping potholes, redistribution of gravel, removal of debris, care of hand maintenance tools assigned) and salary and other incidents of the work to be done. The local contractor will be trained in the

above tasks. His work will be supervised by regional DGCV supervisors who will monitor each road twice monthly. 14 regional supervisors will ultimately be hired to monitor routine maintenance. Supervisors will not necessarily be trained engineers but rather persons with a practical knowledge of road construction.

### 3. Periodic Heavy Equipment Maintenance

The regional heavy equipment team will be scheduled to "pass" each road twice annually to carry out heavy grading and shaping, compacting, delivering new gravel and other work as necessary. The heavy equipment team will average approximately 3 kilometers daily. When necessary, the community organization will provide volunteer labor to cooperate with the equipment team in spreading of gravel or other tasks.

### 4. Emergency Maintenance

From time to time, emergencies may arise which require the rapid marshalling of labor to deal with emergency conditions, including landslides, flood damage and debris piling up against bridges during flood conditions. The community organization will provide labor on a voluntary basis to deal with these problems.

Failure of the community organization to meet its responsibilities when dealing with emergency problems will be considered a serious matter and constitute grounds for cancellation of the contract with DGCV. The decision to terminate the contract under such circumstances will be at the discretion of the DGCV regional senior officer. Where failure to carry out responsibilities under the contract will adversely affect the interests of communities further "upstream" from the defaulting community, the DGCV may under the terms of the contract cancel the community's paid work opportunities which would be reassigned to "upstream" communities or hired labor brigades.

### 5. Labor Intensive Methods-Labor/Equipment

This project is intended to utilize hand labor wherever it will result in total costs equal to or lower than alternative equipment-based methods. Selection of the mix of hand labor and equipment has been based on the World Bank report entitled, "Study of Labor and Capital Substitution in Civil Engineering Construction, September 1978." Specific activities to be carried out with hand labor are discussed in the Technical Analysis (IV.C.7) and Annex C-13.

### 6. Design Standards

The Secretariat of Public Works and DGCV have established geometric and design standards for various classes of highways and rural road construction which take into account soils, terrain, vehicle

traffic, etc. These standards are acceptable and conform to the standards developed by the American Association of State Highway Officials (AASHO) and standards which have already been approved by AID and IDB in other Latin American countries. (See Annexes D-2-1 through D-2-9 for DGCV design standards, typical road section and typical drainage details.)

### C. Subproject Selection Process

The process by which roads will be selected for rehabilitation and maintenance under the project is of crucial importance not only because it defines the beneficiaries and directs the efforts of the project, but also because it influences the configuration of the Dominican rural road system in the longer run.

Because selection decisions are important both in the short and longer run, considerable care will be taken to assure that the decisions are made honestly, evenhandedly and (at least to the extent that reasons for decisions will be made public) openly.

The system of subproject selection is designed to be biased in favor of projects serving the largest number of people and areas in which effective local organizations exist. Subproject threshold criteria will be used which assure a fairly broad eligibility. Once the threshold criteria are met, a system of priorities will be applied which assures that project benefits flow to the target group, that roads are selected objectively, and that continuing community level maintenance activity is encouraged.

#### 1. Allocation of Resources

Firm guidelines for allocation of project resources are considered desirable to assure a fair distribution of benefits among regions and a proper distribution of resources to maintenance rather than rehabilitation activities.

In the case of regional distribution of resources, allocation roughly in accordance with population is desirable so that heavily populated regions with less political "influence" will continue to receive a fair share of benefits. This approach is not considered to be a problem by the current GODR.

The allocation of resources between maintenance and rehabilitation will always be a problem. Rehabilitation is a high visibility activity with very real political benefits to the government. Regular maintenance is a low visibility activity, which can be easily avoided without political problems. The benefit of routine maintenance is the long term protection of investment. The project will seek to encourage a change in attitudes toward maintenance among GODR officials. A "maintenance mentality" will be developed and reinforced to assure that once maintenance begins, it will continue and that maintenance funds will not be diverted to rehabilitation and reconstruction work. The operating plan to be submitted by the GODR as a Condition Precedent (see V.G) will specify funding allocations between rehabilitation and maintenance work under the project.

## 2. Threshold Eligibility Criteria

Threshold eligibility criteria for rehabilitation or maintenance subprojects are:

a. Relatively high population - based on number of persons living within one mile of the road section under consideration.

b. Community organization - a community organization with which DGCV can work must exist and must meet minimum standards of number of members (relative to community size) and organizational capability, in terms of activities successfully undertaken.

c. Condition of road - the road section in question must be in a condition in which it can either be placed immediately under maintenance or the rehabilitation work required to bring it up to this condition will cost no more than \$3,000 per kilometer in flat areas, \$5,000 in rolling countryside and \$8,000 in mountainous terrain.

d. The road section must be linked to a primary or secondary road that leads to a market center.

## 3. Establishing Priorities Among Eligible Projects

Qualifying subprojects for maintenance and rehabilitation will be separately ranked in accordance with the factors described below.

### a. High Population Density in the Area Served by the Road

Because much of the Dominican countryside is characterized by a mix of small and large farms, some of the economic benefits of an improved road system will inevitably fall to larger farmers. (Most of the incremental social benefits will, of course, be reaped by the small farmers who will also value them more highly.) By using the criterion of high population density, the proportion of large estates which will be diminished, and a greater number and proportion of small farmers will be reached. Following this rule, the areas with the highest population density will be given higher priority.

### b. Strength of Community Organization

In order for the project to function, there must be an organization that can work effectively with DGCV. Once the existence of an Asociación de Agricultores or other qualifying organization has been

established, it will be ranked with others in order of organizational capabilities, with the strongest receiving higher priority. In gauging an association's strength, the following variables will be taken into account: number of years in existence, number of members (relative to the size of the community), regularity of meetings and history of activities it has undertaken and accomplished. It might be objected that some of the most disadvantaged communities lack associations, and are de facto excluded from the project. While this may indeed be true in a few cases, it is also clear that a certain level of organizational experience is necessary for communities to enter into an arrangement as complex as that contemplated by the project. Where a community without organizational capacity needs help and is interested in becoming a participant in the present project, ODC or SEA will help it to form an association and build up its organizational capabilities. Active collaboration from the Peace Corps and other organizations working in community development will be sought out and utilized. If, after a period of two or three years, the association is judged to be of sufficient strength, it can be included in a later phase of the project.

c. Linkage to Market Centers

To be eligible for support, a road section must link to a road that connects directly or indirectly with market centers. Higher priority will be assigned to those road sections which are necessary to establish links for other communities further "upstream" which would otherwise be able to participate in the project. It will be noted that this approach encourages different local organizations to join together to seek project support for a rural road "basin."

d. Farm Size

Higher priority will be accorded subprojects on road sections having in their area of influence high percentages of farm families which own or operate farms of 250 areas or less.

e. Gross Income

Higher priority will be accorded areas in which farm production on a gross basis is at least RD\$20 per year per tarea, valued at farm-gate prices. This minimum level of production is considered necessary to ensure that rural roads are being used to a significant extent and that the potential exists for increasing farm productivity and shifting cropping patterns where efficiencies can be gained.

f. Cost Per Kilometer

A lower cost-per-kilometer of rehabilitating or maintaining roads will be favored. This helps to spread the benefits of the project broadly and provides an incentive to communities and

groups of communities to contribute labor and materials voluntarily (in the case of rehabilitation) and to improve the priority ranking of their project.

#### 4. Application of Criteria

The criteria for qualification and prioritizing road maintenance and rehabilitation subprojects will be applied through an interaction of officials at the national and regional levels.

In the first instance, potential subprojects will be identified by regional level DGCV and SEA officials and reported to the DGCV Maintenance Department Program Office. Information from the National Rural Road Inventory will also be used as a basis for identifying and verifying potential subprojects. The Program Office will schedule and mobilize resources for individual socio-economic studies of the potential subproject areas. The studies will be carried out by interdisciplinary teams comprised of an economist, sociologist or anthropologist, and an engineer.

The data gathered in the studies will be analyzed by the Program Office which will decide whether a proposed subproject meets the threshold criteria and its priority relative to other potential subprojects.

The Program Office may change the order of potential subprojects if new data supports such a change. An example might be a situation in which new data indicates a larger upstream population base than previously reported.

The Program Office will make recommendations for particular subprojects to the regional JUCAVE. The regional JUCAVE may approve the recommendations, in which case no further approval is required. In the event the regional JUCAVE does not approve the Program Office recommendation, the project director may agree with the regional JUCAVE decision, or take the issue to the Secretary of State for Public Works whose decision is final. The Secretary may seek the advice of the National JUCAVE but is not obliged to do so.

Technical assistance in establishing the subproject selection system and its procedures will be provided under the project. The system will be evaluated periodically and changes made as necessary to assure not only sound technical judgments but also confidence in the fairness of the selection process.

5. Exception to Prioritizing System - Other Donor Projects

The system of setting priorities described above will be subject to one major exception. Both IBRD and IDB have indicated concern that roads constructed with their support should be brought into the regular maintenance stream immediately upon completion of construction. In order to avoid a duplication of donor efforts in rural roads maintenance, USAID has agreed to provide for immediate maintenance coverage under this project for rural roads being constructed by IBRD and IDB. Because of the nature of the maintenance program, threshold eligibility for maintenance coverage will be required for IBRD and IDB constructed roads. However, IBRD and IDB rural roads which are new or under construction will be exempted from the prioritizing process.

6. Project Implementation Scenario

The following summarizes the steps expected to be followed in project implementation:

- a. Regional meetings of DGCV, SEA and ODC produce initial lists of candidate subprojects (this has already been done for several regions).
- b. DGCV, in consultation with SEA at national level, produces "short-list" for initial socio-economic studies.
- c. Socio-economic studies initiated by joint DGCV-SEA teams including economists, sociologists, and engineers.
- d. Socio-economic studies processed by DGCV Program Office.
- e. DGCV Program Office recommendations re project threshold criteria and prioritizing forwarded to regional coordinators.
- f. Candidate community organizations in subproject areas identified (through road inventory or socio-economic study).
- g. DGCV project director contacts parent organization of candidate local organization.
- h. Parent organization decides whether to participate in the program (this may require developing capability to work with candidate organizations in rural roads activities) or whether to defer to ODC to provide this service to its local units.
- i. Local organization contacted by DGCV and parent organization. Program described, promotional materials discussed.

j. Local organization decides whether or not it will participate in program.

k. Local organization notifies DGCV regional office of its intentions.

l. If local organization wants to participate, its response is filed with others in proposal subproject area. If not, DGCV decides whether to try another local organization, ask ODC to develop a new organization, utilize upstream organization, or drop the subproject.

m. Subproject rank ordered by DGCV program office.

n. Contact maintained with local organizations by parent organization.

o. When DGCV ready to initiate a subproject, local organizations notified. Workers and the maintenance contractors are identified by the local organization. Training courses provided.

p. Contracts are executed by DGCV with the local organization and with the local maintenance contractors. If rehabilitation is involved, the maintenance contract is initiated after the end of the rehabilitation work.

q. Once maintenance begins, DGCV conducts inspection every two months.

r. DGCV schedules a "pass" of heavy equipment over the maintained road every six months.

s. In the event of emergency, the local organization acts and notifies DGCV of local conditions.

t. At the end of one year, the local organization and other interested parties in the village participate in an annual evaluation.

D. Other Aspects of the Project

1. Technical Assistance and Training Summary

This section summarizes technical assistance and training activities referred to in other sections of the Project Paper, describes current technical assistance activities ongoing in SEOPC, and discusses the procurement and implementation of the technical assistance and training services under the project.

The majority of technical assistance will be procured under a single "umbrella" contract in order to assure consistent, efficient delivery of services and a minimum of overlap. Further, the different kinds of administrative and management T.A. and various types of training and scheduling would make the contracting of more than one consultant costly and possibly ineffective. The consultant will be responsible directly to the Director of DGCV.

Several types of assistance and training will be underway simultaneously, ranging from a few days to as much as 18 months in duration. Some 20 different types of technical assistance are contemplated, each involving a training element, for a total of approximately 331 person/weeks at an estimated cost of \$614,000. A summary of Technical Assistance and associated costs is set forth in Table A.

Estimates for the time and costs are consistent with those of an existing GODR contract for T.A. for the development of a highway maintenance program, including highway maintenance management, administration, planning, accounting, equipment and workshop management, and training in all areas.

Some of the Technical Assistance requirements are: development of a detailed reorganization plan for DGCV, including department functions and job descriptions; development of planning, development of a system of review, selection and prioritizing of candidate roads for maintenance and rehabilitation; budgeting and evaluation procedures; development of a methodology for maintaining a running road inventory; development of teaching aids and promotional materials; direct research activities; development of job specifications for each of the regional officials and arrangement of training; design of an inventory control system for spare parts and training of control personnel; development of a training program for the regional training officer and development of training methods for community organizations. 2,900 trainee days for 169 professional and technical personnel at the national and regional levels are estimated, with training programs ranging from 2 to 7 weeks in duration. The regional and national staff of DGCV will share some of the same training programs in their specific fields in order to gain an understanding of the total maintenance program and the new concept of DGCV as a road maintenance institution.

The consultant will also coordinate the training of mechanics, shopmen and equipment operators. Technical services of vendors of the

equipment to be procured will be utilized in this component. Mechanics, shopmen, and operators will be recruited from experienced skilled laborers with no attempt to institute long term training programs. It is hoped that, at no extra cost, more mechanics, shopmen and equipment operators will be trained than are required under the program to form a reserve pool of technicians.

Various training and promotional materials will be provided for community organizations. "Hard hats" marked with names of the person and village will be provided to individual participants.

Upon termination of the Technical Assistance contract, ongoing training programs in the DGCV national office will be lodged in a permanent training unit in the Maintenance Department Program Office and at the Regional level with the Regional training officer.

Counterpart funding in the amount of \$150,000 has been programmed for training costs, primarily to be used for per diem and in-country travel costs for 7,600 person/days of training.

To ensure that the community organization component will go forward on schedule, \$68,000 has been programmed to assist the parent organizations pay salaries for some 25 community organizers for 700 person/weeks of promotion activities at the community level, and \$14,000 to purchase 20 motorcycles for transportation of community organizers.

Also under Technical Assistance, but not to be included under the "umbrella" contract, is \$100,000 budgeted for a Dominican liaison engineer/administrator to be contracted for \$20,000 per year as an independent "assessor" or advisor for the life of the project. He will act as a project coordinator, reporting to USAID and the Director of DGCV. This advisor will be selected from applicants responding to public advertising, and contracted on a yearly basis, with options for renewal. The selected advisor must be approved by USAID.

\$74,700 has been allocated to cover salaries and support costs for 14 persons to be short-term contracted for the national road inventory ground surveillance, as described in Section IV-C of this paper. An estimated \$100,000 of counterpart funding will be required for the inventory, \$25,000 for supervision, and \$75,000 for drafting and printing of updated maps.

USAID/DR will provide up to \$15,000 of PDS funds for the procurement of services in the selection of specific shop equipment, preparation of bidding documents for hand tools, heavy equipment, and shop equipment, and to research the possibility of procuring U.S. excess property.

Three project evaluations are planned at a cost of \$20,000 at 18, 36 and 60 months of the project life for a total of approximately 13 person/weeks.

In sum, the different kinds of technical assistance and training outlined above are considered necessary to upgrade DGCV's capabilities at the national and regional level and community organization capabilities' at the local level. While the amounts of T.A. and training are fairly extensive, they are considered necessary to achieving the institution building objectives of the project.

Table A gives summary information on the types of technical assistance, training, costs and estimated person/days or person/weeks for each component.

TABLE A  
TECHNICAL ASSISTANCE AND TRAINING

	T. A. PERSON/WEEKS	PERSONS TRAINED	PERSON DAYS IN TRAINING	ESTIMATED COSTS (AID)	ESTIMATED COSTS (GODR)
A. UMBRELLA T.A. CONTRACT					
1. Technical Assistance	88	-	-	\$132,000	\$ -
2. Training					
a. National Level	33	35	1,240	49,000	25,000
b. Regional Level	51	134	1,665	24,000	35,000
c. Equipment Operators (Trainers under Equip. Procurement)	2	120	1,200	2,000	25,000
d. Village Level					
i) Local Contractors	2	700	3,500	2,500	50,000
ii) Villagers	2	21,000	21,000	2,500	15,000
3. Research	116	-	-	145,000	-
a. Seminar (4)	4	-	-	20,000	-
4. Promotional & Training Visual Aids, Printed Materials, "Hard Hat" Procurement	27	7	70	147,000	-
5. Support Services and Progress Reports	26	-	-	90,000	-
Umbrella T.A. Sub-Totals	331	21,296	25,175	614,000	150,000
B. VILLAGE ORGANIZATION, PROMOTION	700	25	250	82,000	
C. PROJECT LIAISON ENGR/ADVISOR	672	-	-	100,000	-
D. EVALUATIONS (3)	13	-	-	20,000	-
E. ROAD INVENTORY, GROUND SURVEILLANCE					
1. Ground Surveillance	224	-	42	74,700	-
2. Mapping and Printing	-	-	-	-	75,000
3. Road Inventory Supervisor	24	-	-	-	25,000
<u>TOTALS:</u>	1,340	22,021	28,967	\$890,700	\$250,000

## 2. Spread Effects and Continuing GODR Commitment

The project is designed to institutionalize rural road maintenance, not to bring the entire Dominican rural road system into a maintainable and maintained state. The project proposes to have some 3500 kilometers of rural road under maintenance at the end of five years. Bringing the balance of the system, whatever its configuration may prove to be, will be the work of subsequent years.

At the end of 5 years, it is expected that all the basic elements for a national rural road maintenance program will be in place and operating. Building on these basic elements through additions to supervisory personnel and locally contracted personnel, continuing community organization, and the purchase of additional tools and equipment, this project can be replicated, and, if the planned rate of progress is continued, all rural roads in the Dominican Republic could be under routine and systematic maintenance within 10 years. It should be noted that this project takes on the problem of bringing roads to a maintainable state only where mere rehabilitation is required. Roads requiring reconstruction to bring them to a maintainable state will require substantial investment. Efforts should be made to assure that all rural road building and reconstruction efforts by the GODR and donor agencies are carried out in the context of the objectives of this project.

Investment in road maintenance, unlike investments in facilities, technology or credit is not subject merely to gradual deterioration in utility if not supported by the government after the end of the project. Investment in maintenance can be wiped out in a day of heavy rain if the institutionalization of maintenance fails to take hold. In this sense, this is a high risk project which places a blind bet on GODR policy five years hence and thereafter.

In the last analysis, there is no sanction to assure continued GODR budgetary support at the levels contemplated by this project. However, USAID/DR will negotiate for a covenant of continued budget support at an acceptable target level so that at least the sanction of acceleration is available if future GODR administrations do not maintain necessary financial commitments.

## 3. Coordination With Other Donor Agencies

The nature of this project is such that the activities of major donor organizations must be carefully coordinated particularly in the following areas:

1. Initiation of maintenance activities upon completion of roads constructed under the financing of other agencies.

2. Availability of road maintenance services to support

projects other than road construction projects of other donors.

3. The harmonization of activities of the donor agencies within the Secretariat of Public Works.

Of these three areas, the first is simple and straightforward. The IDB and World Bank are undertaking or planning projects involving construction of feeder roads. USAID has been asked informally by both organizations to provide for maintenance arrangements upon the completion of these roads. When IBRD and IDB road building projects reach an appropriate stage, the relevant GODR agencies are expected formally to request continuing maintenance support from the DGCV. AID will support these requests. If the threshold criteria are not met, ODC or SEA will be requested to undertake organization promotion activities along the road in question so that a sufficient local organizational capability can be achieved by the time that the roads are completed.

With respect to road maintenance in areas of non road construction projects of other donors, the regular threshold and priority criteria for sub-project selection will be applied. It may be in the best

interest of AID and other donors, however, to coordinate efforts closely for the reason that road maintenance can contribute to the success of other donor rural development efforts, while rural development projects of other donors can at the same time help strengthen rural institutions and organizations and thereby contribute to effective rural road maintenance.

The anticipated problem of the three major donors all operating within the Secretariat of Public Works does not appear to be as complicated as initially feared. In brief, the problem of coordination of operations within the Ministry of Public Works involves:

1. Coordination of technical assistance activities.
2. Assurance that staff and equipment dedicated to one project or activity is not diverted to another.
3. Assurance that technical assistance contracting is not excessively burdensome.

It is believed that the Secretary of Public Works will be able effectively to coordinate donor activities in these areas. The Secretary has periodically called to his office representatives of IBRD, IDB and AID, the major donor organizations involved, and has demonstrated both the will and capacity to assure close coordination and the elimination of overlapping activities. In addition to the coordination activities of the Secretary's Office, USAID and officials of IDB and IBRD have been in regular contact on matters of mutual interest in the roads and highways field. This coordination is considered to be entirely satisfactory and no further formalized institutional coordinating arrangements appear to be necessary.

#### 4. Environmental Concerns

An Initial Environmental Examination recommending a Negative Determination was prepared and presented with the PID for the project (see Annex A-4). Based on the IEE, the AA/LAC reached a Negative Environmental Threshold Decision for the project on July 12, 1979 (see Annex A-4).

As stated in the IEE, the project does not involve the construction or reconstruction of any roads. While rehabilitation and maintenance of roads is expected to improve their condition, lower vehicle operating costs and reduce travel time, it is not expected that these activities will increase access to remote areas or substantially increase vehicular traffic in environmentally sensitive regions. The main negative environmental effect anticipated, as noted in the IEE, is a small increase in the amount of land under cultivation which may result from the successful improvement of farm to market transportation resulting from maintained roads.

Because of the very limited potential negative impact of the project on the environment, the Project Committee has not considered it necessary to build specific environmental protection measures into the subproject selection criteria. However, the socio-economic studies undertaken as the basis for road selection will include identification of potential environment impacts. If potential negative impacts are identified, the contracts for both rehabilitation and maintenance work will specify measures to be taken by the contractors to insure that the environment is adequately protected.

ESTIMATED PROJECT COST (5 Years)  
(U.S. \$ 000)

A.I.D. US\$ ITEM	Y E A R S					TOTAL 1979-1984
	1980	1981	1982	1983	1984	
Equipment and hand tool purchase	3,800	1,700	-	-	-	5,500 <u>1/</u>
7 sets shop equipment for 7 regions	700	250	-	-	-	950 <u>1/</u>
Technical Assistance and Training	350	300	100	100	50	900 <u>1/</u>
Road Rehabilitation	-	335	335	335	335	1,340
Road Maintenance	160	150	-	-	-	310
Contingencies	-	250	250	250	250	1,000 <u>1/</u>
<u>Total A.I.D. US\$</u>	5,010	2,985	685	685	635	10,000
=====						
GODR \$						
Road Inventory	100	-	-	-	-	100
Administrative Salaries	229	557	557	557	557	2,457
Local Training Cost	10	45	45	40	10	150
Office Equipment and Materials	70	20	20	20	20	150
Road Rehabilitation	-	865	865	865	865	3,460
Maintenance	919	1,427	2,074	2,588	2,975	9,983 <u>2/</u>
Equipment Maint. & Replacement	20	80	200	300	400	1,000 <u>1/</u>
<u>Total GODR \$</u>	1,348	2,994	3,761	4,370	4,827	17,300
=====						

1/ Foreign Exchange Costs

2/ Includes inflation factor in construction materials.

#### IV. PROJECT ANALYSIS

##### A. Economic Analysis

###### 1. Macro-Economic Considerations

###### a. Recent Economic Considerations

The Dominican economy grew at an extraordinary pace from the late 60's through the mid 70's. From 1968 through 1974, the real GNP grew at a compound annual rate of 8.95%. This performance was exceeded only by that of Brazil and Ecuador within Latin America. Since then, however, the growth of the economy has slowed appreciably. The real GNP has grown at a compound annual average rate of about 3% since 1975. Significantly, this experience has been contrary to that of the great majority of LDC's whose growth rates have improved since 1975.

The principal sources of growth during the late 60's and early to mid 70's were increasing export earnings, attributable mainly to rising world sugar prices, and substantial increases in investment, both public and private. Foreign lending played an instrumental role in the latter by contributing, on an annual basis, between 25 and 50% of total investment funding. The great majority of the foreign funding -- roughly 75% -- came from private sources.

The Central Government contributed to the rapid growth by providing a stable political environment and economic policies designed to encourage business investment. As noted in Table I, it was also a major source of investment. By holding real expenditures for public services and defense nearly constant, it was able to devote its rapidly growing revenues to a wide variety of public infrastructure projects. These included investment in dams and irrigation; public housing; parks, monuments, and cultural buildings; ports and highways; schools and hospitals.

The Central Government policy of financing a large part of its capital expenditures from current revenues enabled it to keep external borrowing to a relatively modest level. The externally guaranteed public debt now totals about \$883 million. The Central Bank reports that during 1978, service payments on the debt amounted to \$117 million. At current prices, this constitutes about 17% of annual export earnings. The policy has changed dramatically with the new administration inaugurated in August 1978, however. The Central Government's current expenditures are now increasing at a rapid rate while capital expenditures are declining. Sources of long term concessional financing are being sought for continuing capital projects now underway and planned for the near future. The debt service ratio will thus most probably increase somewhat in the intermediate to long term. It is not anticipated that the increased service payments

TABLE I

Real GNP by Spending Component, Including Exports and Imports  
(All Figures in 1962 Prices)

Year	GNP	Private Investment	Public Investment	Total Investment	Exports	Imports	Private Consumption	Public Consumption	Total Consumption
1968	1,030,369.1	101,365.2	50,547.4	151,912.6	201,600.0	265,700.0	903,617.9	149,117.7	1,052,735.6
1969	1,163,153.6	132,284.9	62,750.0	195,034.9	227,400.0	297,000.0	1,002,091.6	160,918.7	1,162,938.3
1970	1,256,801.0	172,358.8	66,697.4	239,056.2	202,400.0	311,500.0	1,018,038.6	124,542.9	1,142,581.5
1971	1,380,554.3	174,668.0	102,436.8	277,304.8	230,700.0	344,500.0	1,131,386.7	112,364.4	1,243,751.1
1972	1,555,734.6	218,138.8	131,861.2	350,000.0	315,000.0	365,400.0	1,170,018.2	111,776.7	1,281,794.9
1973	1,745,211.8	281,412.8	134,937.2	416,350.0	365,000.0	392,900.0	1,268,695.2	114,966.6	1,383,661.8
1974	1,877,851.3	318,895.1	160,479.0	481,815.7	380,900.0	522,800.0	1,388,824.6	166,814.1	1,519,610.8
1975	2,109,073.3	352,896.8	186,061.1	533,310.7	373,100.0	542,600.0	1,511,019.1	109,070.6	1,573,423.0
1976	2,059,070.1	364,618.6	167,674.5	532,293.1	449,800.0	530,300.0	1,554,385.2	122,591.8	1,676,977.0
1977 *	2,162,608.1	477,430.6	184,747.7	662,178.3	515,500.0	562,300.0	1,583,044.7	156,461.0	1,739,505.7
Compound Average Annual Rates of Growth	7.70	16.76	13.84	15.86	9.84	7.78	5.77	0.48	5.15

\* Estimated.

Source: Central Bank, Cuentas Nacionales.

will be difficult for the economy to finance, however.

The marked decline in growth in the GNP after 1974 has been the result of several factors. These include precipitous declines in the prices of sugar and ferronickel -- the leading exports -- an attendant decline in Central Government revenues, the sharp increase in the price of petroleum imports, and abnormally severe weather conditions. The latter have seriously damaged the nation's crops and livestock and reduced the output of hydroelectric energy. Due to prevailing low prices and reduced prospects for the leading exports, a continuation of the current low growth rates for the next two or three years is likely.

Rapid growth in the past was accomplished at the expense of inflationary pressures which proved difficult to control, despite the recent slowdown in GNP. From a period of remarkable stability during the 1960's, inflation rose rapidly to 15% per annum thereafter. Price increases began to moderate in 1976, when the annual increase was slightly over 7%. There was a resurgence in 1977, however, to the 15% level, followed by a cooling off to less than 5% during 1978. Given the recent substantial increase in the price of petroleum imports, however, it is probable that price increases during 1979 will be closer to 10%.

Despite the rapid growth of the GNP prior to 1975, unemployment and underemployment remain serious problems. The 1970 census reported a nationwide rate of unemployment of 24%. An ILO survey of Santo Domingo in 1973 estimated 20% of the capital's labor force to be unemployed and 60% underemployed. A 1977 survey, also for Santo Domingo, estimated unemployment at 24%. After its analysis of the nation's employment situation, the ILO concluded that while the rapid rate of growth had some favorable impact upon the levels of underemployment, the level of unemployment had not been substantially affected. It attributed the failure to the capital intensive bias of investment in the production process and the rapid growth of the labor force.

There are not sufficient data available to make definitive judgments as to the impact of the nation's recent economic progress on the distribution of income. A recent household survey indicates that income is very unequally distributed, with the lower half of income recipients earning about 25% of national income and the top 10% earning 38%. Most observers believe that the distribution of income has worsened during the past decade. Their conclusions, however, are either based upon personal observation or data of limited application and validity, and should be treated with considerable caution.

b. Caminos Vecinales -- The Macroeconomic Setting

As noted elsewhere in the PP, the nation's CV system

consists of 6,000 kms. of secondary roads constructed at an estimated cost of between DR\$72 and DR\$84 million. In general economic terms, the system forms an important part of the nation's transportation network. As such, the CV's perform the important function of permitting goods and services to be marketed with greater efficiency, i.e., in less time and at lower cost, than would otherwise be the case in the areas that they serve. Given their overwhelmingly rural location, the CV's are of especially vital importance to the agricultural sector. Without them, a substantial portion of the sector's produce could either not be marketed at all, or marketed only at significantly higher prices. As noted in Table II, the sector's importance has declined somewhat in recent years. Agriculture's direct contribution to the GDP during the past decade has diminished from about 25% annually to more or less 20%. None the less, the sector continues to account for about two thirds of the nation's foreign exchange, absorbs between 40% and 50% of the total labor force and generates approximately 50% of public revenues (directly and indirectly).

TABLE II

Percentage of Gross Domestic Product  
Originating in the Agricultural Sector, 1968-1977

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Agriculture	15.7	16.7	15.7	14.9	13.8	15.4	15.9	15.8	14.1	15.7
Livestock	9.2	8.6	6.9	6.8	6.2	6.2	5.6	5.2	5.0	4.7
Forestry and Fishing	0.6	0.6	0.6	0.6	0.6	0.7	0.3	0.5	0.5	0.4
Total for Sector	25.5	25.9	23.2	22.3	20.6	22.3	22.2	21.5	19.6	20.8

c. GODR Support for Project Related Activities,  
1966-1977

GODR expenditures in the agricultural sector and for public investment, public construction, the Secretariat of Public Works and Caminos Vecinales appear in Tables III and IV.

In the agricultural sector, public expenditures increased considerably between 1966 and 1977. Expenditures in areas other than irrigation, however, remained about constant as a percentage of the overall public budget fluctuating between about 5.5% and 8.0% annually. Irrigation expenditures, on the other hand, exhibited strong growth, increasing as a percentage of the overall public budget from a low of 1.7% in 1968 to 11.2% in 1975. Overall, public spending in the agricultural sector increased as a proportion of overall GODR expenditure to nearly 50% between 1966 and 1977, and in some years was even higher.

The strong predilection of the Balaguer administration (1966-1978) for financing expensive infrastructure projects from current revenues is disclosed by the figures presented in Table IV. The very rapid increase in expenditures for both capital investment and construction is particularly noteworthy. The fact that the budget for the Secretariat of Public Works was either declining or constant throughout much of this period, both as a percentage of overall public spending as well as absolutely, reflects the channeling of financing for infrastructure structures directly through the Office of the President. The budget for Caminos Vecinales has fared somewhat better, increasing from DR\$2.7 million in 1969 to DR\$7.5 million in 1977. As a percentage of overall GODR expenditures, however, the budget has remained approximately constant. Since the CV budget includes the activities of more than half a dozen other GODR institutions, it is largely a functional classification. The majority of the construction or rehabilitation activities of the various agencies are also funded directly through the Office of the President and are therefore not included in the CV budget. The little road maintenance activity that was undertaken is included in the figures listed. It was not considered important enough or significant enough to warrant a separate line item of its own.

TABLE III  
GODR SUPPORT FOR AG SECTOR

Year	Population (Millions)	Gross Domestic Product (RD\$ Millions) (Current Prices)	GDP/Capita at Market Prices (US\$)	Total GODR Expenditures (RD\$ Millions) (Current Prices)	Total GODR Expenditures for Agriculture (RD\$ Millions) (Current Prices)	Total GODR Expenditures for Irrigation (RD\$ Millions) (Current Prices)	(5) + (6) (7)	(5) as % of (4) (8)	(6) as % of (4) (9)	(5) + (6) as % of (4) (10)
	(1)	(2)	(3)	(4)	(5)	(6)				
1966	3.6	1,069.4	297	198.0	13.5	5.7	19.2	6.8	2.9	9.7
1967	3.7	1,125.9	302	198.1	14.0	4.8	18.8	7.1	2.4	9.5
1968	3.8	1,162.2	303	207.6	18.0	3.5	21.5	8.7	1.7	10.4
1969	4.0	1,325.7	336	235.3	17.1	10.4	27.5	7.3	4.4	11.7
1970	4.1	1,485.5	366	264.8	15.2	12.4	27.6	5.7	4.7	10.4
1971	4.2	1,666.5	399	305.0	15.4	14.5	29.9	5.1	4.8	9.9
1972	4.3	1,987.4	462	334.3	17.5	12.4	29.9	5.2	3.8	9.0
1973	4.4	2,344.8	529	387.4	27.2	18.5	45.7	7.0	4.8	11.8
1974	4.6	2,922.6	641	508.8	40.1	50.9	91.0	7.9	10.0	17.9
1975	4.7	3,595.7	766	665.0	47.7	74.7	122.4	7.2	11.2	18.4
1976	4.8	3,914.6	810	571.9	52.3	24.7	77.0	9.1	4.3	13.4
1977	5.0	4,416.6	866	618.7	47.5	40.1	87.6	7.7	6.5	14.2
1978	5.1	4,575.6	897	675.5						
Annual Rate of Change-%	2.72	11.83	8.87	9.90						

TABLE IV  
GODR SUPPORT FOR PUBLIC WORKS

Year	Total GODR Expenditures (RD\$ Millions) (Current Prices) (1)	Total GODR Expenditures for Capital Investment (RD\$ Millions) (Current Prices) (2)	Total GODR Expenditures for Construction (RD\$ Millions) (Current Prices) (3)	Total Secretariat of Public Works Expenditures (RD\$ Millions) (Current Prices) (4)	Total GODR Caminos Vecinales Expenditures (RD\$ Millions) (Current Prices) (5)	(2) as % of (1) (6)	(3) as % of (1) (7)	(4) as % of (1) (8)	(5) as % of (1) (9)
1966	198.0	37.3	16.5	22.8		18.8	8.3	11.5	
1967	198.1	53.4	23.9	17.0		27.0	12.1	8.6	
1968	207.6	55.2	28.9	12.2		25.6	13.9	5.9	
1969	235.3	73.0	37.3	13.5		31.0	15.9	5.7	
1970	264.8	91.9	48.9	12.1	2.7	34.7	18.5	4.6	1.02
1971	305.0	122.1	71.1	12.3	2.7	40.0	23.3	4.0	0.89
1972	334.3	139.1	91.3	13.1	4.2	41.6	27.3	3.7	1.26
1973	387.4	166.7	107.8	13.1	3.6	43.0	27.8	3.4	0.93
1974	508.8	233.5	105.3	13.5	3.8	45.9	20.7	2.6	0.75
1975	665.0	378.7	153.4	11.9	4.0	56.9	23.1	2.0	0.60
1976	571.9	236.8	152.6	14.1	6.1	41.4	26.7	2.1	1.07
1977	618.7	263.2	160.3	19.2	7.5	39.0	25.9	2.3	1.21
1978	675.5								
Annual Rate of Change-%	9.90								

## 2. Project Economic Analysis

### a. Economic Analysis of Overall Project Feasibility

The economic return on the investment in rural roads maintenance and rehabilitation was quantified by the use of a model that enabled calculation of the savings in vehicle operating costs (VOC) and the savings in avoiding future reconstruction and rehabilitation costs. Separate analyses were performed for the system as a whole as well as a typical subproject. Additional benefits accruing to passengers from more reliable access and improved accessibility to administrative and commercial centers were discussed at both levels, and an indication was provided of the possible value of incremental agricultural production that can be expected from the project. In addition, institutional benefits resulting from the training program, improvements in maintenance planning and the strengthening of the DGCV were assessed; a separate estimate was made of the incremental benefits resulting from such institutionalization. The latter is important since the essential justification of the project is not the beneficial effect of the physical equipment and rehabilitation that is provided under the project, but rather the contribution that project assistance makes to strengthening the institutional framework to ensure reliable performance of maintenance on a continuous basis.

The model compares the total system cost defined as the sum of road maintenance cost (routine and periodic), vehicle operating costs, and avoidable rehabilitation/reconstruction costs for two alternatives:

1. Without maintenance
2. With regular maintenance

For the "with" maintenance case, the project roads are assumed to stay in good condition throughout the life of the project, corresponding to the average life of the equipment purchased under the project. For the "without" maintenance case, road quality is assumed to deteriorate after three years to "fair" condition with an increase in VOC of about 40 percent over that of a good road. At that time, rehabilitation of the road would be required at a cost of approximately \$4,000 per km. (average for all terrains). If not rehabilitated after three years without maintenance, the road is assumed to further deteriorate to "poor" condition, with a further increase in VOC of about 50 percent over that of a fair road. Reconstruction of the road would cost approximately \$8,750 per km. (average for all terrains).

Estimates of average daily traffic were obtained from the comparative socio-economic studies along the roads in the seven agricultural regions (see Annex D-1). Vehicle operating costs were derived from the 1978 Transport Sector Survey performed by Delcanda International Limited under the auspices of the IDB, and from unpublished documents on the proposed IBRD Second Rural Roads Maintenance and Reconstruction Project in the Dominican Republic now being designed.

Costs and benefits are calculated in U.S. dollars, net of taxes, and in constant 1979 prices. As part of the sensitivity analysis, shadow prices were used for valuing foreign exchange and labor. The IBRD estimates the shadow price for foreign exchange at 12 percent above the official exchange rate. Unskilled labor has been valued at 57 percent of the minimum wage rate of DR\$3.50 per day, while the opportunity cost of capital is estimated at 11 percent.

Capital costs include expenditures on equipment and hand tools, spare parts, workshops, and road rehabilitation. Recurring costs include road maintenance costs and administrative salaries, while the quantifiable project benefits consist of vehicle operating cost savings, and rehabilitation/reconstruction cost savings.

The analysis demonstrates that over a 12 year period (1980-1991) the project will result in VOC and road rehabilitation/reconstruction savings totaling \$17.9 million, or \$5.8 million if all project capital costs are deducted. The internal rate of return on the project is calculated to be 20.89 percent (see Table V).

The incremental benefit of institutionalization, i.e., the strengthening of the institutional framework at the national, regional, and local level to ensure reliable rural road maintenance on a continuing basis is estimated to have an economic rate of return of 33%.

The timestreams of the various components of the capital and recurring costs with and without the project, the net present values, and the incidence of the benefits to the Government, truck operators, consumers, and farmers are shown in greater detail in Annex D-1.

#### b. Subproject Economic Feasibility

In addition to testing the overall feasibility of the project, it is necessary to make sure that individual subprojects will be economically viable. The requirement is valuable as much because it assures overall project feasibility as because it is a stepping stone to calculating how benefits of the project will be divided between those in the AID target group and those outside this group.

TABLE V: ECONOMIC BENEFITS AND COSTS OF TRUCK LOAD MAINTENANCE  
PROGRAM VALUES AT SHADOW PRICES (R.D. \$ 000)

	<u>With Project</u>			<u>Without Project</u>		<u>Net Benefits</u>
	<u>Capital Costs</u>	<u>Recurring Costs</u>	<u>VOC 1/</u>	<u>Recurring Costs</u>	<u>VOC 1/</u>	
1980	5,744	1,004	2,330	0	2,330	-6748
1	3,745	1,325	4,659	1,152	5,152	-3425
2	1,140	1,921	7,000	3,841	8,445	2225
3	1,072	2,355	9,318	3,841	10,774	1870
4	1,005	2,745	11,659	3,841	13,597	2029
4	3,360	2,745	11,659	5,377	14,560	2173
5		2,745	11,659	5,377	14,067	5040
7		2,745	11,659	2,688	13,597	1881
8		2,745	11,659	5,377	14,560	5533
9		2,745	11,659	5,377	14,067	5040
1990		2,745	11,659	2,688	13,597	1881
1991		2,745	11,659	5,377	14,560	5533
NPV @ 11%	12,147	14,241	56,660	21,570	67,204	IRR=20.89%
NPV @ 15%	11,141	11,527	45,392	17,167	53,682	

B/C Ratio

at 11% discount rate:  $\frac{67204 - 56660 + 21570 - 14241}{12147} = 1.47$

at 15% " " :  $\frac{53682 - 45392 + 17167 - 11527}{11141} = 1.25$

1/ Vehicle Operating Costs

The same concepts of benefits and costs were used in the microeconomic appraisal as were used in testing the overall project, except that technical assistance and training were not included in costs. Only normal operating costs of the DGCV were included. The evaluation of benefits was conservative.

Detailed examination was performed of a typical case, representative of the subprojects expected to be considered under the project. The internal rate of return for that case was calculated at 104 percent, a high rate despite the conservative assumptions used. (Annex D-1 contains a thorough discussion of the conservative nature of the analysis.) Evaluated at a discount rate of 15 percent, the typical road example showed a benefit-cost ratio of 2.58.

c. Distribution of Project Benefits

The distribution of project benefits was analyzed at the micro level. The analysis showed that overall benefits would be divided as follows:

Agricultural Producers in General	30.2%
Vehicle Owners	24.8%
GODR (Dominicans in General)	45.0%

The agricultural producers would benefit in the sense that improved roads would enable them to expand the value of production (new crops, more land under cultivation or more efficient production), and a careful analysis of the circumstances led the Mission to conclude that about 60 percent of the agricultural benefits would accrue to the target group. The target group would also be likely to benefit by an amount equal to 90 percent of VOC savings because input and output transportation costs would be lower, and previous monopoly profits in some areas would be counteracted through the marketing power of farmer associations in subproject areas because the the farmer's cost of shipping would probably fall faster than the vehicle owner's cost of providing transportation services. At the same time, general savings would allow the Government to undertake other high priority projects that would affect the target group more than the population of the country as a whole. Thus, perhaps as much as 30 percent of these general benefits would flow back to the target group. In addition to these benefits, the target group would benefit from the employment found in the project road rehabilitation and maintenance activities. Unskilled labor costs will in fact amount to between 35 and 40 percent of the cost of the project. In total about 82.4 percent of project benefits would end up as benefits to the target group. This result, as high as it is, would be even higher if indirect benefits (such as reduced passenger travel costs, increased access to social and administrative service centers, etc.) could have been calculated.

In summary, the target group would receive the following benefits:

	<u>AID TARGET GROUP</u> (\$000)
Increased Agricultural Production	\$16,633.2
Reduced Transportation Costs	20,541.6
Other Government Programs	12,396.9
Employment	<u>26,167.3</u>
Total Benefits	\$75,739.0
Total as Percent of Project Benefits	82.4

d. Energy Savings

Given the number of kilometers of feeder roads to be upgraded under the project, the number of additional kilometers of feeder roads to be included in the maintenance program, and the decreased fuel consumption that better roads would imply, fuel savings were calculated to be in the area of 2,400 metric tons per year, divided between gasoline and diesel fuel. In addition, 1,800 metric tons of diesel fuel would be saved annually as a result of breaking the construction-no maintenance-reconstruction cycle that would occur in the absence of the project. This total would be roughly 1.5 million gallons per year.

e. Employment Effects

As the project was designed to make maximum economic use of available labor resources, following IBRD recommendations on substituting labor-based for equipment-based approaches in all rehabilitation and maintenance activities, the project will have a relatively large impact on employment of unskilled labor. It is expected that over 4,000 person years of employment of unskilled labor will be directly generated by the project and about 750 person-years will continue each year thereafter. Indirect creation of permanent employment through multiplier effects will be limited, however, by the high rate of underemployment existing in the Dominican Republic.

## B. Social Soundness Analysis

### 1. The Dominican Poor - an Historical Perspective

At the time of Independence from Spain in 1844, much of the agricultural land in the Dominican Republic was transferred to the public domain and turned over to local municipalities to be farmed communally; there were virtually no large estates in the country. But toward the end of the 19th century the structure of rural Dominican life began to alter drastically, giving way to the pattern which exists, in its main outline, to the present day. Due to a combination of factors- including the penetration in force of European and North American interests- the Dominican Republic began to move toward becoming a major producer of sugar. Small holdings and communal farms were swallowed up at an ever-increasing pace by both foreign and Dominican capitalists and absorbed into large estates. As this process spread, the rural peasants were given two choices: either they remained where they were and became laborers on the newly formed estates, or they retreated into the less fertile hill slopes to pull a slim existence out of the generally marginal land.

During the first decades of the 20th century the concentration of land continued, and the rural peasants were increasingly alienated from the richest agricultural regions. When Trujillo, the self-proclaimed Benefactor of the Fatherland, came to power in 1930, the Dominican peasantry was backward and isolated, cut off from the events taking place in the nation's cities. According to Howard Wiarda:

...the bulk of the peasants still remained outside the national social, economic, and political life. Most continued to live at the subsistence level and were unintegrated into and uninvolved in anything larger than the narrow confines of the small plot of land that they tilled, the hacienda, and the local community in which they lived. Some had been absorbed into the newer sugar enterprises but the majority had not. They bought little, sold little, and consumed little and were not a part of the national economy nor participatory members of the national social and political system. It was estimated that only about 10% of the rural population had a little broader awareness and had been brought into the money

economy through seasonal employment on the large estates; the bulk of the population even at this date only four decades ago remained atomized, ignorant of and cut off from the main currents of the modern world (1975:594-5).

The isolation of the peasants began to break down, however, when Trujillo initiated a vigorous campaign in the mid-1930's to strengthen the Dominican self-image. While one component of the campaign was the barbaric extermination of as many as 25,000 Haitians who had over the years taken up residence on Dominican soil, Trujillo also undertook the construction of a road network that reached into the farthest corners of the Republic, and especially along the Haitian border. For the first time, the world of the Dominican peasant saw new ideas, values and standards at an ever increasing pace. Rural dwellers began to stream into the cities by the thousands; the exodus became so thick that in 1953 Trujillo passed a law forbidding further migration to the capital.

Trujillo styled himself as the Great Benefactor, the Father of his people, who were in turn his children. Everything the government passed out to the citizenry flowed directly from the dictator. This pattern was of course not new with Trujillo, but he took it to exaggerated heights. On occasion he would tour the countryside amid flamboyant pomp, tossing out gifts to his "humble children" as they gathered along the roads. All schools, bridges, roads, and other public works were bestowed upon the people by the Benefactor. It was mandatory for all government employees to hang a bronze plaque reading "In this house Trujillo is the chief" in the living rooms of their houses. The crushed initiative of the Dominican people, coupled with the paternalistic stance of the government created over time a patrón-client mentality that became so ingrained in the Dominican national character that it has persisted, although in a somewhat more duluted form, to the present day.

In 1961 Trujillo was assassinated, and the initial shock of the Dominican people soon gave way to political confusion. Most significant for the present discussion, however, is the fact that in the constitutional elections of 1962 the decisive vote was cast by the peasants. Still ignorant, lacking cohesion, and uninformed, they were beginning to emerge as a powerful, if amorphous, force. The new president, Juan Bosch, was the champion of the peasant; during his campaign he had promised agrarian reform, education, cooperatives, employment, and rural justice. But however sincere Bosch's projections were, they were not to be realized: after only a few months he was toppled from office by a military coup. Although he had not lasted as head of state, he had exposed the peasants to all manner of new ideas, given them hope that their future could bring a better life, and sown the seeds for more significant changes.

Following the civil war and the intervention of U.S. Marines in 1965, Joaquín Balaguer was elected president. Balaguer stayed in power from 1966 through 1978. During his three terms in office the government concentrated most of its energy on building the country's infrastructure. Numerous gravel roads were laid into the hinterlands; aqueducts and electrification systems were extended to many rural communities; dams, irrigation canals, health clinics, schools were built. Today, they are readily noticed when one drives about the countryside. Although many of these works are quite functional and beneficial, an equal number are far too elegant and expensive to be justified. Schools in small rural towns frequently have flush toilets, fluorescent light fixtures, and whatnot -- while the towns lack potable water and electricity. Balaguer also built entire colonies of concrete houses, complete with health centers, elaborate plazas, and community meeting halls; more often than not, the health centers are empty and the community center unused (one such building near Santiago was recently found full of mud; the building was so constructed that this occurs every time a hard rain falls). The overwhelming emphasis was on physical structures- highly visible monuments- that were signs of the benevolent nature of a Patrón president.

Largely in an attempt to gain the peasant vote, Balaguer pushed more feeder roads into the countryside. These roads, combined with the diffusion of battery operated radios and, in the past few years, television sets, have provoked a flow of ideas that is leaving a firm imprint on the rural peasant. In the mid-1960's national and voluntary agencies began sending community development promoters into remote villages, and although these enterprises often reverted to the traditional paternalistic system and became arms of political parties, they had the effect of stimulating a change in peasant consciousness.

The expansion of road networks, improved communication channels, and the actions of community development promoters in the rural areas, together with the dissipation of the repressive environment of the Trujillo era, combined to help the rural peasant find his voice. By the early 1970's, small asociaciones de agricultores (farmers' associations) began appearing in different rural communities throughout the Republic, with or without encouragement from the growing number of community development workers. The primary function of the asociaciones was as pressure groups which could petition assistance for their communities from government agencies or even the president himself. An inventory carried out by the Secretariat of Agriculture (SEA) in 1975 located 1125 asociaciones de agricultores with 98,120 members. The following year a re-count discovered 1413 asociaciones comprised of over 130,000 members. This organizational movement has continued with vigor since then, with the creation of federaciones de asociaciones at the provincial level. By 1977, more than 65% of the country's asociaciones were bound into federaciones.

Quite clearly, many of these organizations are weak, but others are strong and growing in strength; many have only recently been formed, while others have five or six years of experience behind them and have succeeded in bringing tangible benefits to their members. A number of cooperatives have come into being, but these are few and weak; their primary difficulty has been what is delicately called "poor administration of funds" - numerous examples of cooperatives collapsing from this cause can easily be found. The asociaciones in general suffer from a hazy idea of the sorts of aid they can solicit, but their awareness of potential sources is increasing.

The most significant fact, however, is that the majority of these asociaciones- together with parent-teacher groups, groups of women, and youth clubs- are springing up spontaneously and on the initiative of the rural peasants themselves. The successes they have achieved in securing technical assistance, seeds and fertilizer, machinery, aqueducts, feeder roads, and education in the form of short courses on organizational techniques and various aspects of agricultural production and marketing, have been substantial enough to spur them forward. The government has continued with its traditional system of outright patronage, but more frequently the farmers are willing to collaborate in projects and contribute their share of money and/or labor. While vestiges of the old suspicion and lack of solidarity remain, these developments represent in general a dramatic change in the way Dominican peasants view themselves, their relation to the government, and their ability to shape their own destiny. This orientation toward shaping their own destiny must be encouraged if the basic needs of Dominican campesinos are to be met.

## 2. The Importance of Roads in Dominican Rural Development

The extensive road building campaign initiated by Trujillo in the mid-1930's can be seen as one of the most important factors in opening up the world of the rural peasant and bringing him into the economic- if not political- mainstream of national life. Since 1961, more and more feeder roads have been built, and the pace has quickened with time. With the growth of community organizations, rural dwellers are actively petitioning government agencies for new roads and reconstruction of roads that have deteriorated.

The people living in areas recently reached by this expanding network of rural roads are quick to state that their lives have improved substantially since the roads were put through. Cars, jeeps and trucks have supplanted donkeys and mules, making marketing of agricultural produce considerably less onerous and more efficient. Many such regions have expanded their plots of cash crops, and have even begun to concentrate heavily on crops they scarcely planted

before the roads were built. Farmers in several regions of the country, for example, have been observed expanding their coffee plantations and moving into the cultivations of cacao. Heavy crops such as manioc, bananas and plantains were formerly grown almost solely for household consumption; now they can be shipped out of the hills in vehicles, and consequently are becoming important items in regional market places.

Social services have likewise improved. New cement schools are popping up everywhere in villages along gravel roads, and the quality of the teachers who staff them is improving, for trained teachers are much more willing to work in communities that are accessible by vehicle. Medical dispensaries are likewise extending into the interior along roads, although they are frequently under-staffed and under-supplied (or even unstaffed and un-supplied). More important, however, is the fact that those in need of emergency medical care can be quickly shipped to the nearest hospital by car. In the past, they had to be carried out on a litter, a technique which often took up to two days. (A community in the northwest corner of the Republic recently solicited a road in a letter which stated that over the past year 13 women in labor had been carted out of the hills in this way; two babies had died en route.)

Community development workers from ODC, SEA, and various other international groups such as the Peace Corps, World Church Services, and Save the Children have moved into these formerly landlocked communities. Agricultural extension, while still weak, is being felt where it had never been before. The roads have also brought increasing quantities of merchandise, including radios and even televisions, with a significant impact on peasant consciousness. All of these developments have been made possible, directly or indirectly, by the construction of roads.

### 3. Maintenance of Roads

There is still a need for more rural roads; numerous petitions from rural community groups sit unanswered on the desks of as many as 10 different national and international agencies. On the other hand, the feeder roads which do exist - more than 5000 kms. - suffer from a chronic lack of maintenance. Rural roads are almost invariably built by the government (although there are some isolated cases of community road projects), and when they begin to deteriorate, the people in the communities expect the government to return and patch them up. As many of the roads have been initially built in cursory fashion to cut costs, they have a tendency to fall apart rapidly. If the roads were properly built and maintained on a regular basis, significant savings would result which could be channelled into the construction of new roads.

Maintenance of public facilities in general is a severe problem in the Dominican Republic. The overwhelming emphasis of government public expenditure has been on building an elaborate infrastructure with a singular lack of interest in maintenance. Health clinics and hospitals commonly fall into disrepair shortly after they are constructed, and they often lack personnel and supplies. Irrigation canals frequently become unserviceable after only a few years, becoming clogged with vegetation and silt. Potable water systems in rural and urban areas alike often break down from lack of maintenance. Electrical facilities also deteriorate - the wires rot, the connections oxidize - resulting in power shortages and debilitating energy losses.

This lack of emphasis on maintenance of existing facilities is due to a number of factors. Traditionally, most public works have traditionally been the province of the government, and construction of a new road, for example, is more dramatic, in political terms, than filling in a few holes and patching up culverts. This consideration was of great importance during the Balaguer presidency (1966-1978); during the campaign year preceding elections, there was always a flurry of government action over roads, school buildings, etc. Second, private contractors and occasionally government agencies see large construction projects as a chance to make money, while light maintenance is by comparison less lucrative.

It might be asked why the rural people who use and depend on these roads do not engage in voluntary communal maintenance. One simple reason is that the government has traditionally footed the bill. It builds the roads, and reconstructs them when they become impassable. There have been a number of cases in which community groups have built or rehabilitated roads on their own; but as soon as the government has arrived on the scene with machinery and salaries for hand laborers, voluntary action has stopped. In most parts of the country, rural peasants continue to feel that the government is obliged to foot the bill for road work.

It is common practice throughout the country for groups of peasants to turn out voluntarily in an emergency situation, when they cannot coax the government in rapidly, to clear out land slides and fill in holes that have made their roads impassable, particularly during marketing season. This is usually a one or two day job in which the farmers participate out of necessity. On the other hand, the need for maintenance is less visible or urgent; therefore little voluntary maintenance work is undertaken. Another problem is that much of the rural countryside is made up of a mixture of large and small estates. Under these circumstances, small farmers are reluctant to repair roads without collaboration of the large estate

owners (who usually derive greater benefits from road repair in any case). Yet, realistically, larger landowners cannot be made to participate in maintenance programs.

Another problem is that most rural roads pass through as many as 5 or 6 different communities and in a sense belong to them all. It is very difficult of course to coordinate the efforts of different communities. Furthermore, road maintenance demands sustained labor over longer periods of time. A job left partially done, for example, is likely to be washed away by a rain storm.

#### 4. Community Integration

As noted in the foregoing section, road maintenance is a serious problem. The emphasis of government activities has always been on construction of new work rather than taking care of those facilities which have already been built. At the same time, the communities of rural peasants who utilize the roads have not shown interest in keeping them in shape. They do not consider the roads to belong solely to themselves; the roads are in many ways "public roads", and it is therefore the duty of the government to maintain them. This feeling has been reinforced by the paternalistic stance of the government, which has traditionally stepped in with machinery and paid labor when the roads are in need of major reconstruction.

The present project has as its primary purpose the institutionalization of maintenance at both the central government and local levels. The project does not demand a strong community input of voluntary labor. However, it does try to secure community participation by tapping the organizational capacity of local asociaciones de agricultores. These particular local organizations have been chosen because (1) they are extremely widespread in the Dominican Republic, (2) while they are uneven in strength throughout the country, they are the most active groups in most communities and (3) because they are involved in agricultural production and marketing, which will benefit from improved roads, their members will be more highly motivated. One side benefit of the project will be to strengthen these associations and give them experience in negotiating with government agencies.

#### 5. Conclusions

This project is considered to be socially feasible at the local level due to the existence of community organizations capable of collaborating actively with DGCV. The complexity of the rehabilitation and maintenance tasks contemplated by the project are such that operations should be initiated only with local organizations which have some record of accomplishment in carrying out smaller and less complex community projects. As a consequence, some poorer and less organized communities

will not be suitable participants for the project at the outset. The project, however, provides for efforts on the part of parent agencies to upgrade the organizational capabilities of weaker communities so that they may begin to participate in the project toward the end of the implementation period.

## C. Technical Analysis

### 1. Definitions

Following are definitions of terms that have been used in this paper:

#### (a) "Rural Road" or "Feeder Road"

A rural road is a road connecting agricultural producing areas and communities to secondary or primary trunk roads. These roads are, for the most part, 6 meters wide (including shoulders), with one meter ditching each side. Road surface is gravel. Right-of-way varies from 8 to 10 meters. Road lengths vary from 2 to 10 kilometers.

#### (b) "Rehabilitation"

Rehabilitation under this program will be of a "corrective" maintenance type, and will include such activities as: construction or reconstruction of ditches; construction of transverse drains; construction of new culverts or cleaning and repair of existing culverts; cleaning of existing ditches; escarification, grading, and compaction of surfaces; new gravel surfacing; new decking on small bridges; and on a few roads, a small amount of cut and fill.

#### (c) "Routine Maintenance"

Control of weeds in ditches and drains, cleaning of culverts and inspection boxes; filling and hand tamping of potholes, minor repairs to structures; and maintenance of ditch contours.

#### (d) "Periodic Maintenance"

The use of heavy equipment twice annually, escarification of wearing surface (if needed), grading, machine compacting, repair of culverts, structures, headwalls, and delivery of new materials.

#### (e) "Reconstruction"

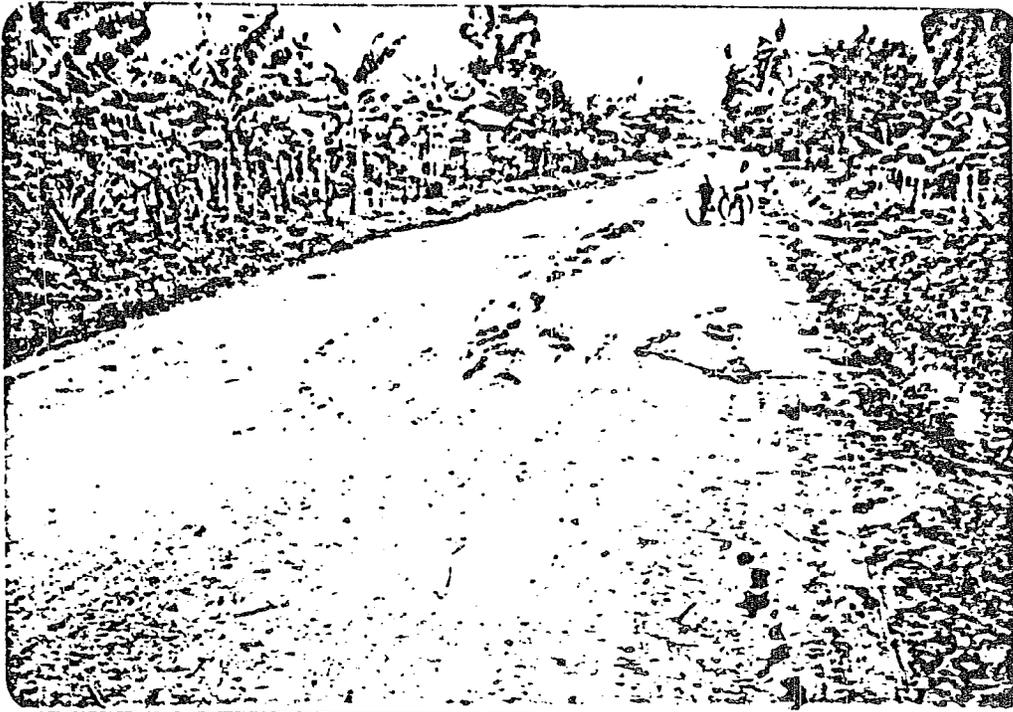
For the purposes of this project reconstruction is defined as realignment, construction of new bridges, large amounts of cut and fill, or other major construction work. No "reconstruction" of roads is contemplated under this project, except as noted in Part III.B.

The following photographs further clarify the differences between candidate roads for project rehabilitation and roads needing reconstruction, not eligible under this project.

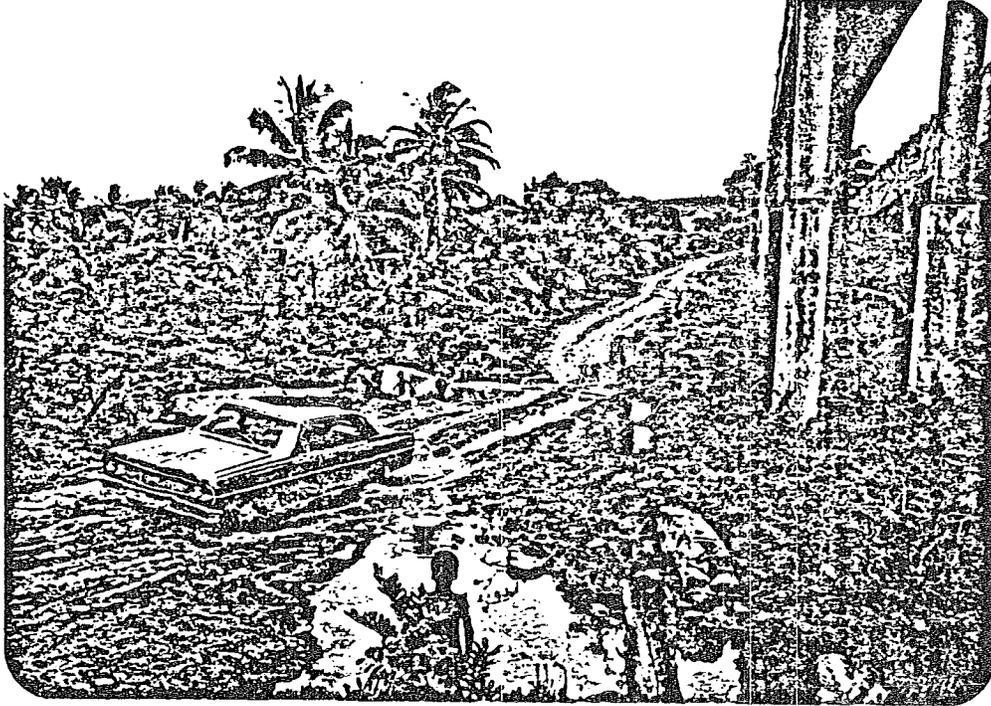
CANDIDATE ROADS FOR REHABILITATION



CANDIDATE ROADS FOR REHABILITATION



In contrast, these roads will not be rehabilitated under this project, since they fall within the project's definition of roads that need reconstruction.



## 2. Road Inventory

A national rural road inventory will be made to assure orderly and systematic development of a rural roads maintenance system. Ground surveillance of rural roads will begin approximately two months after the execution of the Project Agreement. Fourteen interviewers will be employed by DGCV for approximately four months to collect specific information on road conditions such as ditching, surfaces, bridges, etc., as well as information on population, schools, community organizations, and agricultural production.

Time and personnel required for the surveillance work are based on the following assumptions:

Estimated 6,000 kms. ÷ 14 people = 428 kms./person.

428 kms./person ÷ 88 mandays (4 months) = 4.8 kms./day/person.

During the execution of the road inventory, an inventory supervisor will be contracted for 5 months to assist DGCV in implementing the ground surveillance and to coordinate ground surveillance data with DGCV drafting personnel to update existing maps.

The PID for this project had anticipated the availability of aerial photography for mapping services. However, in July, 1979, the Office of Statistics (ONE) asked the cooperation of other government agencies and international donors to share the costs (estimated at \$1.0 million) for comprehensive aerial photography (ortho-photography) to be used for the 1980 census. Such photography will be of great value, not only to DGCV, but to the Cadaster Office, Forestry Service, Agriculture, Public Works, Secretariats of Health and Education, Institute of Water Resources, National Mapping Institute. The ONE photography project has not materialized rapidly enough to permit the availability of new maps for the initial survey work for this project. Rather than delaying survey work for the aerial photography project, the Project Committee decided to "make-do" with existing maps. When new photographs are taken and new maps made available, these materials will be incorporated into the Rural Roads Information System.

Annex C-3 is a preliminary format developed by DGCV and USAID for the types of information to be gathered by ground surveillance. These data will provide the base for planning specific road reconstruction, rehabilitation, or hand maintenance programs. It is anticipated that some roads will no longer qualify as rural roads at all, in which case they will be dropped from DGCV programs.

Two months of technical assistance will be provided for the design of a continuing road inventory, providing such information as size, number of culverts, bridges, and dates of all repairs or construction, as a guide for planning and budgeting. The design of this system will include periodic information gathering by the DGCV community maintenance employees and regional supervisors. The information will be collected into a data system on each road, filed in both the regional and national offices to permit the generation of periodic reports needed by decision makers.

### 3. Regional Centers

Each of the seven regional centers will have a core staff, equipment set, offices, equipped workshop, and space for parking the heavy equipment. Obviously, some regions will require slightly larger staff and variation in equipment; for example, it is anticipated that the heavily populated Santiago region will require an additional maintenance supervisor, while the Haitian border region will need only one.

Land for the centers is already GODR owned; physical facilities will be constructed with loan funds and facility designs provided by Engineering Offices of DGCV.

Anticipated space requirements and costs are as follows:

7 Regional Offices and Spare Parts Storage -	(US\$000)
200 sq. M - \$100/sq. M.	140
7 Regional Equipment Maintenance Workshops -	
200 sq. M - \$75/sq. M.	105
7 Sub-Regional Offices -	
70 sq. M - \$100/sq. M.	49
7 Sub-Regional Storage Areas -	
100 sq. M - \$75/sq. M.	<u>52</u>
TOTAL	\$346

Extensive infrastructure will not be needed since all regional sites have water and electricity available. Diesel fuel storage will be above ground, using portable, 1,000 gallon tanks, obviating expensive underground installations, and facilitating deliveries. Fuel storage tanks are listed as part of the equipment purchases and may be found in Annex C-8.

No classrooms or assembly areas for training programs will be constructed since schools or community centers are available in each of

the regional centers for rent or loan on a daily basis, and an open "laboratory" area (with potholes and ditches) for demonstration purposes, will be set aside in regional center yards.

The centers will be permanently staffed by a minimum of 16-18 persons, plus contracted supervisors for the rehabilitation program and DGCV equipment operators. The engineer/administrator in each center will be fully and autonomously responsible for all activities in his region, budget submissions, scheduling, personnel, and general operations of the region. He also will be provided with a petty cash fund, probably not exceeding \$300/month, for minor purchases and hiring of skilled labor as needed on a daily basis. This fund will be reimbursable monthly by central DGCV offices.

In addition to the basic regional center staffing discussed in Section III, between 15 and 20 equipment operators and helpers will be assigned to each region.

Training will be given to hand maintenance supervisors, accountants, spare parts and inventory supervisors, all mechanics, shopmen and heavy equipment operators and helpers. It is proposed that the technical training for mechanics, shopmen and equipment operators be included in the requests for bids under Equipment Procurement.

With the probable exception of the Engineer/Administrator, all personnel will be recruited among residents of the region. Additionally, it is hoped that at least twice the number of mechanics, shopmen and equipment operators required will be trained to form a reserve pool of trained and skilled workers.

The seven sub-regional centers will contain a small office for use by the supervisors plus storage space for hand tools, tool inventory records, and a 1,000 gallon fuel storage tank. (As is the local custom, one or two cots will probably appear in the office, although it is not the intent to provide dormitory space.) A job foreman responsible for warehousing, distribution of hand tools and inventory in the sub-region and a watchman will be the permanent employees of the sub-regional centers.

#### 4. Equipment and Hand Tools

Equipment. Basic equipment packages will be purchased to complement the hand labor component of this project. Each region will be provided with a front loader, compactor, motorgrader, tractor with ripper, 1,000 gallon water truck, lubrication truck, a small mobile shop truck, a portable aggregate classifier, 6 or 7 dump trucks, a 1,000 gallon fuel

storage tank, 2 pickup trucks, and 2 motorcycles. For mountainous areas, 2 compressors with 4 jack hammers will be purchased to break up rocky materials. Assigned to the national office will be 2 "Lo-Boys" for country-wide transportation of equipment, and three 2,000 gallon tank trucks for the delivery of diesel fuel to the regional and sub-regional centers.

During project development, the number of dump trucks was reduced from 10 to 6 1/2 (average) per region, considering that the relatively short distance of any road from borrow pits precludes long hauls of select materials, and since all material spreading will be hand labor, 6 to 7 dump trucks will be sufficient to keep a steady supply of materials for the hand labor brigades.

The inclusion of 2 portable rock crushers might be considered a minor extravagance, but will be useful initially in the western regions of the country. Currently under study is the possible fabrication of concrete culvert pipe by DGCV in these same western regions, and the portable rock crushers could also be used for culvert fabrication.

For the most part, DGCV has been renting heavy equipment from private contractors or individuals for both road construction and maintenance. The DGCV owned (and frequently shared) equipment fleet is comprised of:

Equipment	Number and Condition			
	Good	Fair	Poor	Inoperable
Tractors		9	10	1
Loaders	1	5	4	
Motorgraders		6	2	
Compactors		6	3	1
Dump Trucks	13	6	6	
Water Trucks		3		
"Lo-Boys"		1	1	1
Compressor		1		
Portable Concrete Mixers		2		
Pickups	1	5	4	6

The equipment that DGCV has been renting over the past five months amounts to a total of \$680,104,24, as shown in the following table:

<u>Month</u>	<u>RD\$</u>
February	49,589.50
March	139,987.00
April	127,387.24
May	214,140.50
June	149,000.00
TOTAL	RD\$680,104.24

The list of rented equipment, condition, and suppliers may be seen in USAID/DR project files.

The Directorate of Highways is so short of equipment that its rental bills since the first of January, 1979, have ranged from \$400,000 to \$500,000 monthly. With the exception of \$2.5 million under World Bank loan No. 1316T-DO, no international agency, at least for the past ten years, has financed equipment purchases for either the Highway or Rural Roads Directorates. Other Secretariats have received financing for equipment which must be used exclusively in the programs for which they were procured. (See Annex D-9 for list of Highway Department's operable equipment.)

To justify equipment purchases under loan funds, studies were made comparing the hourly rental costs from private contractors, and the projected costs of DGCV owned equipment. All GODR operating costs reflect the increased prices for petroleum products as of July, 1979. For an analysis of the anticipated savings, see Annexes C-10 and C-11. The Mission finds that the savings fully justify the expenditure of \$5.5 million for equipping the seven regional centers with basic fleets. Two pickups and two "trail" motorcycles are also to be furnished to each region for transportation of the regional supervisors to rehabilitation and maintenance sites.

The pickups will be equipped with radio receivers to complement the purchase of radio transmitters under the proposed IDB rural road construction loan.

Hand Tools. The list of DGCV hand tools is found in Annex C-12. Additional quantities of hand tools will be purchased under the project, limited initially by storage space required for warehousing. Fifty five gallon "used" oil drums to store water for concrete mixing will be purchased in the villages as needed (RD\$4 to RD\$6/drum). Mechanical concrete mixers will not be purchased due to the small amount of concrete required and the dispersed usage at project sites.

Annex C-13 gives the hand tool requirements for one 30-man labor team for rehabilitation, and Annex C-14 lists the tools to be provided per man for the routine hand maintenance program. At the end of the first year of hand maintenance, this hand tool set may be revised to reflect actual usage, using the daily works sheets of the village contractor.

Equipment and Hand Tool Replacement. Under the project, \$1.0 million of GODR counterpart funding has been budgeted for equipment and hand tool replacement. The life of some pieces of equipment is estimated to be as short as 6 years (dump trucks), and hand tools vary from 6-7 months to 5 years. Through gradual replacement, the maintenance program can continue after the project life. A suggested list of replacements, by year, can be found in Annex D-4.

"Purchase Agreement" Proposal. The DGCV is proposing that workers who wish to do so may purchase their hand tools (with the exception of wheelbarrows) through payroll deductions, using the tools during the rehabilitation projects, and retaining them as personal property upon completion of the projects. Such purchases have the advantage of placing needed tools in the hands of the rural poor, and providing the DGCV with funds to continually supply new tools for each project. Additionally, it is the opinion of the Mission and DGCV that a worker who is purchasing his tools will exercise greater care with the tools he uses.

The DGCV also proposes to make the 48 loan-funded motorcycles available for purchase by the regional supervisors, community organizers, and the road inventory ground surveillance crews, on a payroll deduction basis, using the receipts for purchases of new motorcycles. In the case of motorcycles, fuel and lubricants would be provided at the regional centers on a mileage basis with the purchaser responsible for repairs, insurance, and maintenance. This arrangement recognizes the reality that the motorcycles will be used unofficially for private purposes in any case.

The Secretariat of Public Works' attorneys will be responsible for drawing up standard purchase agreements for hand tools and motorcycles, and securing approval for the entire "Purchase" proposal from the GODR.

##### 5. Regional Shops

As part of the regional centers, workshops will be constructed and equipped with hand tools and machines for routine maintenance of heavy and light equipment and storage of diesel fuel.

At a total cost of approximately \$550,000, each of the seven regions will be furnished equipment to perform the following tasks:

a. Preventive maintenance service:

- (1) Changing oil, lubricants, and filter elements.
- (2) Greasing and tightening.
- (3) Washing with solvents and water under pressure.
- (4) Repairing and changing tires and tubes.
- (5) Testing and charging batteries.
- (6) Replacing hoses, burnt bulbs, belts, windshield wiper blades, and spare plugs and points.

b. Repair of minor components:

Alternator, starter, water pump, oil pump, fuel pump, ignition, air compressor, hydraulic cylinder, etc.

- c. Brake repairs.
- d. Suspension system repairs.
- e. Valve adjustments.
- f. Soldering.
- g. Electrical system repairs.
- h. Removal and installation only of:

Engine, transmission, and differential.

Beyond these tasks, all major repairs will be done in the Santo Domingo DGCV workshops or by a local, qualified private company, since the regional shops are intended to have only those tools for routine maintenance of equipment and vehicles.

The selection of regional workshop tasks was based on estimated frequency of needs balanced against capital investment. Technical assistance has been programmed to make detailed selection of tools and machines to perform the proposed tasks, write specifications for bidding, and to review the possibilities of purchases from U.S. excess property.

Facilities to house the shop equipment has been included in the construction of the regional centers.

As part of the technical assistance, the requests for bids will include manufacturer's technicians to train all shopmen and mechanics in the use and maintenance of shop tools and equipment.

For a list of the types of equipment required, see Annex

## 6. Design Standards

The Secretariat of Public Works and DGCV have sets of geometric and design standards for various classes of highways and rural road construction which take into account soils, terrain, vehicle traffic, etc. These standards are acceptable and conform to the standards developed by the American Association of State Highway Officials (AASHO) standards which have already been approved by AID and IDB in other Latin American developing (and developed) countries. (See Annex D-2 for DGCV typical road section, typical drainage details, and geometric standards.)

Under this project, roads to be rehabilitated will be brought up to standards, where necessary, and all future construction and maintenance will conform to established specifications.

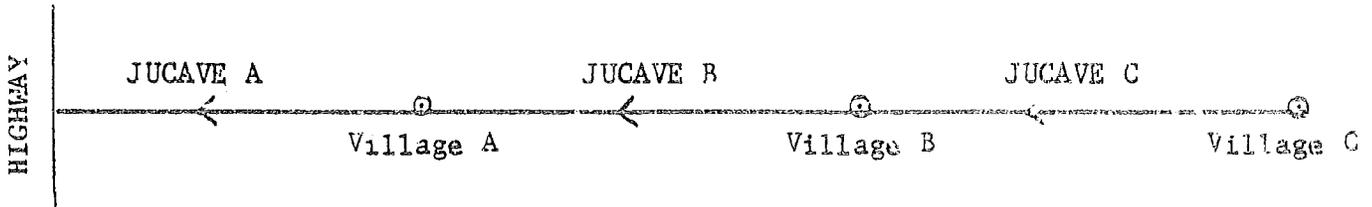
## 7. Rehabilitation

The rehabilitation component of the project involves the light rehabilitation of approximately 1,200 kilometers of roads, at an average cost of \$4,000/km., to put these roads into condition to pass to the routine maintenance program. As needed, the rehabilitation activities will include cleaning of rights-of-ways, ditching, transverse drains, cleaning and repair of existing culverts, construction of headwalls, decking on small bridges, compaction of road beds, new gravel surfacing, and construction of inspection boxes on new and existing culverts.

Using data gathered in the National Road Inventory ground surveillance records and any additional information required, rehabilitation plans and cost estimates will be developed in the national engineering offices, with the participation of the regional engineer and approved by USAID technicians. (USAID approval of costs will be required since FAR methods will be applied for road rehabilitation.)

The decentralization of the DGCV maintenance department will make the rehabilitation project manageable. Nation-wide, no more than 10 to 14 projects will be underway simultaneously.

In cases where a single road connects several small villages, World Bank studies have suggested a higher degree of productivity when each village works in the direction of the nearest highway or secondary road. It appears that once a village is reached, workers tend to lose interest in the construction (rehabilitation) of road segments going further "upstream". Therefore, insofar as possible, a village or community organization will carry out rehabilitation work on the segment of road "downstream" from the village, as shown in the following diagram:



Labor-intensive work by the JUCAVE will include all cleaning, excavation, ditching, backfill, hand tamping of some potholes, construction of headwalls, masonry work on culverts, and carpentry for bridge decking. Spreading of gravel surface materials will be by hand since hand spreading provides a more even distribution of materials than that of machine distribution, and the economic costs in 1975 are about equal between hand labor and machine for spreading. In selecting the work for hand labor, the Mission has been guided by the World Bank report on "The Study of Labor and Material Substitution in Civil Engineering Construction" (September, 1975) and UNCTAD 1976 labor costs adjusted to reflect inflation. (See Appendix 1 for a list of references on "Activities Resulting in Lower Total Costs Achieved by Labor Rather Than Equipment".)

A qualified career or experienced road construction supervisor will direct all road rehabilitation (probably a contractor rather than a permanent employee), working under the direction of the regional administrator.

The JUCAVE will be notified at least one month in advance of the project of a detailed outline of the work to be done, and the number of laborers required for the rehabilitation of their road section. The responsible chief engineer will schedule the equipment necessary for the project in the regional office, and order hand tools from the regional or sub-regional warehouse.

At least one week prior to beginning of work, a one or two day training program will be held in the community for all workers participating in the project.

Daily time sheets will be filled out and initialed by the workers, and weekly time cards for each worker will be maintained by the project supervisor for submission to the regional accountant for approval and then forwarded to national offices for issuance of pay checks. Workers will be paid the basic minimum wage, RD\$3.50 daily.

Each team of 15 to 20 workers will be supervised by a job foreman for hand labor activities, and a heavy equipment foreman will direct the usage of equipment. The hand labor job foreman will also be responsible for inventory and distribution of hand tools used by his crew. In the rehabilitation of mountainous areas, compressors and jack hammers will be provided for breaking up rocky material on both the surface areas

and ditches. Masonry and topography teams will be contracted from the area on a daily basis, as needed. (See Annex D-6 for site organization of the rehabilitation program.)

Fortunately, there is no lack of gravel in the country and few roads are further than 10 kms. from GODR borrow pits. Due to lack of aggregate classifiers, select materials have been delivered on an "as is" basis, and for this reason each regional equipment team is being provided with a portable aggregate classifier. For the mountainous areas, two portable rock crushers will also be purchased in order to use materials at hand rather than rely entirely on delivery from borrow pits.

Reinforced concrete cuivert pipe rather than metal culvert is used throughout the country, due to the rapid deterioration of metals in the wet humid climate. Traditionally, the purchase price of culvert sections includes delivery and placement, an economic plus for this project.

The week following completion of rehabilitation, routine maintenance will begin as outlined in the following section.

For cost estimates and projected unskilled labor requirements in man days for the rehabilitation program, see Annex D-7.

#### 8. Maintenance

For the routine maintenance program, one supervisor per region (by the end of 1981, two supervisors) will be needed to monitor an average of 30 kms./day, with visits scheduled twice monthly to about six communities.

The number of hand maintenance supervisors by the end of the project will be 14, based on the following assumptions:

3,500 kms. under maintenance ÷ 7 regions = 500 kms./region.

500 kms. ÷ 30 kms. average/day = 16 man days.

16 man days - 2 regional supervisors = 8 man days (or 2 work weeks to visit each site once).

2 supervisors/region = 14 nationally.

Since extensive engineering knowledge will not be a prerequisite for hand labor supervisors, this project proposes to train persons with practical knowledge of road construction who are natives of the region in which they are to work.

The supervisor will review the work accomplished by the local contractor, outline the work schedule for the next 2 weeks, sign a time card for the contractor, and deliver the local contractor's paycheck each month. The local contractor will fill out a daily work sheet indicating the time required for specific activities, tools used, and tool life. At the end of one year, an analysis will be made of these daily work sheets which will form the basis for planning and budgeting of routine hand maintenance and tool requirements.

The selection of the local contractor for hand labor maintenance will not be easy. The candidate or a member of his family must be able to read and write; must live permanently in the community; must be physically fit; demonstrate knowledge of hand tools and their repair; and have the respect of the community. From the applicants, the regional administrator and supervisors will select two or more acceptable candidates, with the final selection to be made by the local JUCAVE. The JUCAVE may request DGCV to contract more than one individual or change local contractors annually, thus spreading the training and employment to more than one individual in the community.

The local contractor will be assigned a specific number of kilometers -- usually 5 kilometers/contractor -- for full-time hand maintenance. If only 3 kilometers is the assignment, he will receive 3/5 of the minimum GODR established salary scale. A road of 8 kilometers will require 2 contractors each receiving wages corresponding to the road section they maintain.

The contractor will sign a formal document with DGCV, stating responsibilities such as the distance covered (e.g., from north side of bridge "B" to mahogany tree in front of Sr. Garcia's house); number of work days and holidays; salary; and specific tasks such as clearing all ditches and rights-of-way, cleaning all culverts, filling and hand tamping potholes, redistribution of gravel, removal of debris, care of hand maintenance tools assigned to him (with a list of the tools); filling out daily work sheets; causes for dismissal, leadership required in summoning the JUCAVE for emergencies such as washouts and landslides, etc. The contract also will define DGCV's responsibilities: provision of hand tools and materials, supervision, a schedule of dates for receipt of salary, etc. This document is to be developed by DGCV.

Following selection and contract signing, the local contractor will be given a minimum of a one-week training course at the regional DGCV center consisting of "How-To" and "What-For", stressing the importance of the hand labor contractor and his work in the national system. It is expected that the training program and issuance of "official" tools will give the local contractor status in his community as the representative of DGCV.

The regional heavy equipment team will be scheduled to "pass" each road twice annually, to do heavy grading and shaping, compacting and deliver new gravel and culvert pipe as needed. In general, it is estimated that the heavy equipment team will be able to average 3 kilometers daily. Depending upon the type and extent of necessary repairs, the village JUCAVE may be requested to provide unskilled labor for one or two days cooperating with the equipment team. Generally, the local contractor will coordinate such volunteer labor with his regional supervisor and JUCAVE.

Using data developed by Roy Jorgensen Associates, Technical assistance consultants to the SEOPC Directorate of Highways for highway maintenance, it is estimated that one man can clear both sides of a 5 km. rural road in 15 days, a necessary task every six weeks. The remainder of the local contractor's time will be spent in maintenance of ditches, clearing debris, cleaning culverts, filling potholes, and making minor repairs.

Based on DGCV's past experience in equipment maintenance (recalculated to reflect increases in fuel costs), heavy equipment maintenance is expected to average \$408/km. with twice annual "passes" as proposed in this program. The entire equipment package will not be necessary on some roads, nor will the same length of time always be required, but the \$408 figure is being used for project planning.

Hourly Costs (Rounded) -	
Tractor (1/2 time)	\$ 9
Motorgrader	17
Loader	13
Compactor	12
Dump Trucks	26
Water Truck	14
Pickup	<u>11</u>
	\$102/hr.
\$102/hr. for 6 hrs. = \$612 - 3 kms./day = \$204/km.	
Equipment at \$204/km. at 2 passes annually	- \$408
Local contractor salary at \$1,500/year ÷ 5	- 300
Special skilled laborers (mason, carpenter)	- 60
Materials	- 60
Hand tools	- <u>22</u>
Annual costs/km. maintenance:	\$850

## D. Institutional Analysis

### 1. Secretariat of Public Works and Communications (SEOPC)

The SEOPC is responsible for physical facilities and operation of all airports, sea ports, public buildings, post offices, telecommunications, highways, rural roads, and the management and regulation of public transportation. The operation of the Secretariat has traditionally been highly centralized in the hands of the Secretary. Except for post offices and telecommunications, very little autonomous action is authorized for any division. Minor decisions and authorization for all purchases are made by the Secretary. Frequently, sub-divisions have been headed by inexperienced and underpaid personnel, who have looked to government for a first job, and have left government service as soon as possible after gaining some work experience. SEOPC has also been used by former governments for placement of political appointees.

SEOPC has a shortage of mid-level employees who can plan, manage, administer and implement. SEOPC suffers from (1) centralization of implementation in the hands of one over-worked Secretary, (2) lack of funds, (3) lack of nationally established priorities, (4) a tendency to respond only to crisis situations and (5) lack of capable implementing personnel.

The new government has recognized the inefficiencies in government service and the low salaries which have required employees to "moonlight" to support their families. As a first step in upgrading the government service, the GODR raised the salaries of its professional employees in June, 1979 from 35% to as much as 50%. These increases imply an increase from 30 to 40 working hours per week and put the government in a better position to compete with the private sector in hiring and retaining good employees.

The GODR has no civil service system. Pensions are granted only by Presidential decree and not as a matter of right. All government employees are personally appointed by the President on the basis of recommendations of a Secretariat. There are Social Security benefits for employees earning less than RD\$300/month which pay for certain medical expenses and a portion of lost salary when the wage-earner is sick or disabled. These benefits continue after retirement with a minimum of ten years employment.

SEOPC has in the past suffered from the effects of an insecure and low paid staff. New GODR personnel policies are clearly a step in the right direction but not as yet an assurance of a stable, highly motivated career civil service.

## 2. Directorate of Rural Roads (DGCV)

The DGCV has traditionally been oriented toward construction rather than maintenance of roads. Rehabilitation and maintenance work has been carried out largely on an emergency basis. Until very recently, there had been no separate division of road maintenance within DGCV at all.

Partly in response to early discussions on this project, and partly because of the PL-480 program to rehabilitate 150 kms. of rural roads, a separate maintenance division was recently established in DGCV with a staff of ten (2 engineers, 3 accountants, 2 draftsmen, 2 statisticians, and 1 secretary). The new division is generally recognized to be understaffed and underbudgeted.

The total central staff of DGCV, including the new division, is 90. In the field, DGCV has 4 engineers (one in each of the four zones), 15 construction supervisors and 123 equipment operators, truck drivers and helpers.

Despite the low salaries and crowded working conditions of DGCV, it is estimated that only about 5% of the staff have quit their jobs during the past year, and fewer than 2% have been fired. In general, morale and motivation seem high, and the staff dedicated and capable. During the preparation of this Project Paper, no member of the DGCV staff hesitated to work evenings or weekends when necessary.

DGCV has the authority to design and construct all rural roads. Its budget in 1979 is RD\$14,000,000, \$11.3 million of which will be used for payment of road construction contracted under the former government. The remainder of the budget will be used for new programmed construction and some maintenance. DGCV's budget is currently being strained by the heavy flooding of 1979, which damaged or destroyed hundreds of kilometers of rural roads.

Under the project, a separate line item will be established for maintenance operation in the DGCV budget. As can be seen from the summary project budget table in Section III of the PP, DGCV expenditures for rehabilitation and maintenance related activities will increase from RD\$1.3 million in the first year of the project to RD\$4.8 million by the fifth and final year. The GODR will covenant to maintain at least this level of annual maintenance expenditures in real terms after the life of the project.

### 3. Capability of DGCV to Implement the Planned Program

The project has as a major objective a shift in the role and function of the DGCV along with changes in staffing, procedures, relationships, financing and in attitudes with respect to maintenance operations. There are two aspects to the question of whether the DGCV might be "over-taxed" by the planned program:

1. Whether the program should be designed to include the entire country (as opposed to a limited number of regions with a view to later expansion to a nationwide program); and 2. If a nationwide program is undertaken, what level of funding and operations is feasible.

The Mission has examined the first question from the point of view of identifying areas where institutional capability could be strained and therefore possibly jeopardize the feasibility of the program. The areas examined include the following:

1) Staffing - would there be a problem in staffing the central DGCV maintenance division as well as the seven regional offices and seven subregional facilities? The maintenance division will require the addition of 25 employees and each region will be staffed with 16 to 18 people with skills described in Section IV. Based on inquiries about the availability of skilled labor, the Mission has concluded that identifying and hiring such individuals will not be a problem given current labor market conditions in the Dominican Republic.

2) Management - the expansion from four regional offices to seven regional offices and seven subregional facilities involves an increase in supervisory manpower of 3 administrative engineers and 14 regional maintenance officers. DGCV is confident that with the technical assistance provided under the project, the management of the expansion can be carried out effectively. The Project Committee concurs.

3) Monitoring and supervision of local maintenance activities - routine maintenance activities will be carried out by local contractors under the periodic supervision of DGCV regional supervisors. Each individual local contractor will be responsible for approximately 5 kms. of road. There would be approximately 250 contractors in the first year of the project, rising to 700 by the end of the project. Assuming a semi-monthly inspection of each 5 kms., a total of 14 regional inspectors will be required. This does not appear to present a serious staffing problem.

4) Equipment - given the relatively small amount of equipment now in DGCV inventory, there should be no serious problem in integrating old and new types and standards of equipment on a nationwide basis.

None of the foregoing concerns appear to pose insuperable obstacles to initiating a nationwide program; although each of them does emphasize the need for careful planning and implementation. There also appear to be numerous advantages to a comprehensive nation-wide approach. The DGCV can redefine its goals and functions in a comprehensive manner. Clear management goals applicable throughout the organization can be defined and implemented. Other agencies of the government and local organizations can adjust more easily to a clearly defined, nationwide reorientation of the DGCV. Furthermore, the benefits of the program will become available to more members of the target group sooner than would be the case if a multi-step program were undertaken.

The second question is whether, assuming a nationwide program, the level of funding and operation is excessive. The Mission concludes that with the technical and financial assistance provided under the project, DGCV will be capable of undertaking the level of road rehabilitation and maintenance contemplated. Assuming a roughly equal distribution of work among the regions, 300 kms. of rehabilitation will be carried out and roughly 500 kms. of regular maintenance operations will be brought on stream over a five-year period within each region. This would average 42 kms. of rehabilitation per year and 100 kms. of new maintenance operations coming on stream each year per region. This workload does not appear to be excessive.

#### 4. Office of Community Development (OCD)

The Office of Community Development was created in the 1960s as a type of Dominican VISTA. From its small beginnings it has grown to an institution with a national office numbering 90 administrators, supervisors, engineers, auditors and controllers, and 240 promoters working out of seven regional and 20 area offices. The minimum educational requirement for personnel is a high school diploma. At the administrative level there are fully qualified sociologists, engineers, and accountants. Currently, with technical assistance from the United Nations, ODC is undertaking an internal audit focusing on its use of both human and financial resources.

In addition to its own projects, ODC has traditionally done "leg-work" under agreements with other GODR institutions, such as with the Secretariat of Education for the promotion and construction of schools, with the Office of Public Health for a promotion program in family social services and with DGCV for several small projects to promote road construction. ODC organizes communities for self-help programs to develop schools, health centers, community centers, water systems, etc.

ODC provides a continuing training program for its promoters including 2-6 week courses in human relations, the family and society, techniques of communication, programs for community development, methods

ODC's 1979 budget is RD\$3.7 million of which RD\$1.2 is allocated to salaries, administration, and support services, and RD\$2.5 is for project support to pay for materials, equipment rental and hiring of skilled labor or specialized services in the development of ODC community projects. Additionally, ODC has a revolving Loan Fund of some RD\$2.0 million available to community organizations for community development projects.

ODC has the personnel and experience on a national level to carry out the activities contemplated in the Rural Roads Maintenance and Rehabilitation Project, and the institutional experience in working with other communities and government agencies. Undertaking additional work under the project would not pose serious problems for ODC.

The only potential obstacle to complete ODC effectiveness under the project is the fact that, unfortunately, it was used somewhat as a political vehicle by the Balaguex Government. As a consequence, it lost prestige and the trust of many campesinos. ODC is now in the process of regaining its effectiveness in the community development field.

#### 5. Department of Rural Organization of SEA (DOR)

The Department of Rural Organization (DOR) was recently established within the Secretariat of Agriculture to administer rural projects, technical support, farmer organizations, youth clubs, and agricultural production groups. The national office staff numbers 20 and there are 65 field promoters and supervisory and support personnel. At the national level the staff is usually college trained and field promoters are usually high school graduates who receive specialized training from DOR.

All facilities used by DOR belong to the Secretariat of Agriculture and the use of regional facilities and equipment by the DOR is at the discretion of the SEA regional director. Country-wide, DOR has 4 vehicles and 30 motorcycles.

The 1979 budget of DOR is RD\$ 1.9 million, of which RD\$ 1.2 is for administration and RD\$ 0.7 for project support.

With the exception of personnel supervision, all management functions are centralized within the Secretariat, and to date, DOR working relationships have been limited to other SEA departments.

DOR by itself does not have the capability to assume the community organization responsibility for the entire project. It is

developing a good working relationship with local farmer organizations, however, and should be able to complement the activities of the larger organization, ODC, effectively.

## 6. Community Organizations

Comprehensive data on community organization in rural areas is not available, but it is clear that large numbers of organizations are functioning. There should, therefore, be no shortage of capable community organizations for participation in the project. A survey in 1976 identified 1550 farmer associations. DOR now estimates approximately 3000 farmer organizations in operation. The American Institute for Free Labor Development (AIFLD) estimates that the Federación Nacional Agraria Campesina (FENAC) currently represents some 700 local farm organizations. DDF is working with over 200 organizations and ODC is working with some 1300 organizations. There may be some overlap in these numbers, but it is unlikely to be significant since local organizations tend to work with one parent organization. While there may be some villages where more than one parent organization is functioning, typically only one parent organization will operate in each community.

6

A possibly significant fallback source of local organization capacity exists in the Parent-Teacher Associations. In theory, every one of the 30 to 40,000 schools in the country has a PTA type organization. USAID estimates that there are some 15 to 20,000 functioning PTAs. In many instances, the PTA groups have taken on fairly complex tasks such as building schools with GODR assistance. It is believed that these organizations can indeed perform effectively when they are given meaningful responsibility, and could participate under the project.

On balance, the availability of local organization capable of assuming the road maintenance responsibilities under the project is not considered a serious problem. However, the need to assure coverage and cooperation may necessitate some variations in the type of organization used as well as the extent of its responsibilities (for example, the 5 kilometer coverage per organization may be relaxed in some cases).

### Summary

As noted above, all the organizations which will have a role in the project have certain limitations. The project will address the institutional limitations of DGCV with extensive technical assistance leading to specific structural and operational improvements. Where the limitations of certain parent organizations prevent them from working effectively with community organizations, other parent agencies which can work more effectively will be used. At the community level, flexibility in organizational arrangements, assistance from parent organizations and the possibility of forming area federations of associations provide ways of overcoming community organization weaknesses.

The Project Committee concludes that the institutional limitations of DGCV and community organizations can be effectively dealt with under the project and that the project is institutionally feasible.

## V. FINANCIAL PLAN AND DISBURSEMENT PROCEDURE

### A. Financial Plan

The total cost of the project is \$27,300,000 million, of which US\$10,000,000 will be financed with AID funds. The GODR counterpart contribution of \$17,300,000 represents 63 percent of total project cost. Project costs are summarized by year in Table I. Table II presents these costs by components, contributor, type of currency and annual program requirements.

The GODR contribution will be provided from the central national budget and will be largely additive to the regular operating budget of the implementing agency. The contribution more than adequately meets the requirements for counterpart contribution.

In attempting to determine what will be additive, it was not possible to segregate all of the current DGCV budget into maintenance versus construction. Therefore, it is possible that some minor portion of the counterpart contribution could be substituting for what was previously the operating budget of DGCV. Because all the personnel shown in the Financial Plan are for completely new positions and so little maintenance has been performed in the past, it can be safely assumed that essentially all the program costs are additive.

As indicated in the Financial Plan (Table II), disbursements are planned over a five year period.

### B. Loan Disbursement Procedure and Reporting Requirements

In order to segregate AID and GODR funds clearly, a special program account will be established for each party's contribution, since each is to finance particular line items, except for road rehabilitation and maintenance, which will be financed on an 8 (GODR) to 1 (US) basis. From these accounts, disbursements will be made for the program as is necessary, in conformity with a request prepared and forwarded to USAID for approval by the implementing agency.

For the non-rehabilitation and maintenance related components, each request will specify funding requirements over a three month period by program component and will report the status of funds previously provided.

A modified Fixed Amount Reimbursement Method (FAR) will be applied to the road maintenance and rehabilitation component of the project. After the work sites have been selected, plans and specifications

ESTIMATED PROJECT COST (5 Years)  
(U.S. \$ 000)

A.I.D. US\$ ITEM	Y E A R S					TOTAL 1979-1984
	1980	1981	1982	1983	1984	
Equipment and hand tool purchase	3,800	1,700	-	-	-	5,500 <u>1/</u>
7 sets shop equipment for 7 regions	700	250	-	-	-	950 <u>1/</u>
Technical Assistance and Training	350	300	100	100	50	900 <u>1/</u>
Road Rehabilitation	-	335	335	335	335	1,340
Road Maintenance	160	150	-	-	-	310
Contingencies	-	250	250	250	250	1,000 <u>1/</u>
<u>Total A.I.D. US\$</u>	<u>5,010</u>	<u>2,985</u>	<u>685</u>	<u>685</u>	<u>635</u>	<u>10,000</u>
=====						
GODR \$						
Road Inventory	100	-	-	-	-	100
Administrative Salaries	229	557	557	557	557	2,457
Local Training Cost	10	45	45	40	10	150
Office Equipment and Materials	70	20	20	20	20	150
Road Rehabilitation	-	865	865	865	865	3,460
Maintenance	919	1,427	2,074	2,588	2,975	9,983 <u>2/</u>
Equipment Maint. & Replacement	20	80	200	300	400	1,000 <u>1/</u>
<u>Total GODR \$</u>	<u>1,348</u>	<u>2,994</u>	<u>3,761</u>	<u>4,370</u>	<u>4,827</u>	<u>17,300</u>
=====						

1/ Foreign Exchange Costs

2/ Includes inflation factor in construction materials.

**TABLE II**  
**SUMMARY COST ESTIMATE AND FINANCIAL PLAN**

(\$000)

PROJECT COMPONENT	FIRST OPERATIONAL YEAR			SECOND OPERATIONAL YEAR			THIRD OPERATIONAL YEAR			FOURTH OPERATIONAL YEAR			FIFTH OPERATIONAL YEAR			TOTAL FOR PROJECT LIFE								
	A.I.D.	GOBR	TOTAL	A.I.D.	GOBR	TOTAL	A.I.D.	GOBR	TOTAL	A.I.D.	GOBR	TOTAL	A.I.D.	GOBR	TOTAL	A.I.D.	GOBR	TOTAL						
	US\$	RD\$	RD\$	US\$	RD\$	RD\$	US\$	RD\$	RD\$	US\$	RD\$	RD\$	US\$	RD\$	RD\$	US\$	RD\$	RD\$						
<b>I TECHNICAL ASSISTANCE &amp; TRAINING</b>																								
Technical Assistance & Training	350		350	300		300	100		100	100		100	50		50	900		900						
Road Inventory			100	100														100	100					
Training (Local Costs)			10	10		45	45		45	45		40	40		10	10		150	150					
<b>II COMMODITIES AND CONSTRUCTION</b>																								
Equipment for Mainten. W/Shop	350		350	250		250										600		600						
Heavy Equipment	3,650		3,650	1,508		1,508										5,158		5,158						
Hand Tools	150		150	192		192										342		342						
Office Equipment & Material			70	70		20	20		20	20		20	20		20			150	150					
Road Rehabilitation				335	865	1,200			335	865	1,200			335	865	1,200	1,340	3,460	4,800					
Road Maintenance	60	919	1,079	150	1,427	1,577			2,074	2,074			2,588	2,588		2,975	2,975	9,983	10,293					
Equipment and Hand Tool Replace.			20	20		80	80		200	200		300	300		400	400		1,000	1,000					
<b>III ADMINISTRATIVE SALARIES</b>																								
Central Office			59	59		144	144		144	144		144	144		144	144		635	635					
Field Offices			170	170		413	413		413	413		413	413		413	413		1,822	1,822					
Construction			320	320													350		350					
<b>PROGRAM COST ESTIMATE</b>	4,350	660	1,348	6,358	2,658	677	2,994	5,729	100	335	3,763	4,198	100	335	4,370	4,805	50	335	4,827	5,212	6,658	2,342	17,300	26,300
Contingencies				250		250	250		250	250		250	250		250	1,000			1,000				1,000	
<b>GRAND TOTALS</b>	4,350	660	1,348	6,358	2,208	677	2,924	2,279	250	325	3,781	4,448	250	325	4,370	5,055	300	325	4,827	5,462	7,658	2,342	17,300	27,300

\* A contingency of \$1,000 is provided to cover possible increases in cost of equipment over and above normal inflation as well as other unanticipated cost increases and unforeseen needs.

prepared, and cost of the work determined, AID and DGCV will agree on the detailed FAR procedures to be followed. Funds will be advanced to DGCV to permit work to begin. Generally, when reimbursement is made for a completed road, AID will deduct a prorata amount from each payment until the advance is liquidated by the time of final reimbursement.

AID will reimburse for a fixed percentage of estimated costs of a completed road. Prior to reimbursement, AID will require documentation and evidence which would verify actual costs expended for the roads and a certification that the road was in compliance with the agreed on design specifications and other criteria and was, in fact, completed. In addition, the Mission will provide for inspection of the completed roads.

The above described reporting procedure will provide USAID with the information necessary to determine the program requirements and then, upon receipt of evidence that counterpart funds have been deposited in the GODR special account, make a disbursement for the next quarter's requirements. The advance checks will be forwarded directly to the GODR Treasury for immediate release to the implementing agency.

### C. Schedule of Major Events

It is anticipated that the Rural Roads Rehabilitation and Maintenance Program will be implemented according to the following schedule;

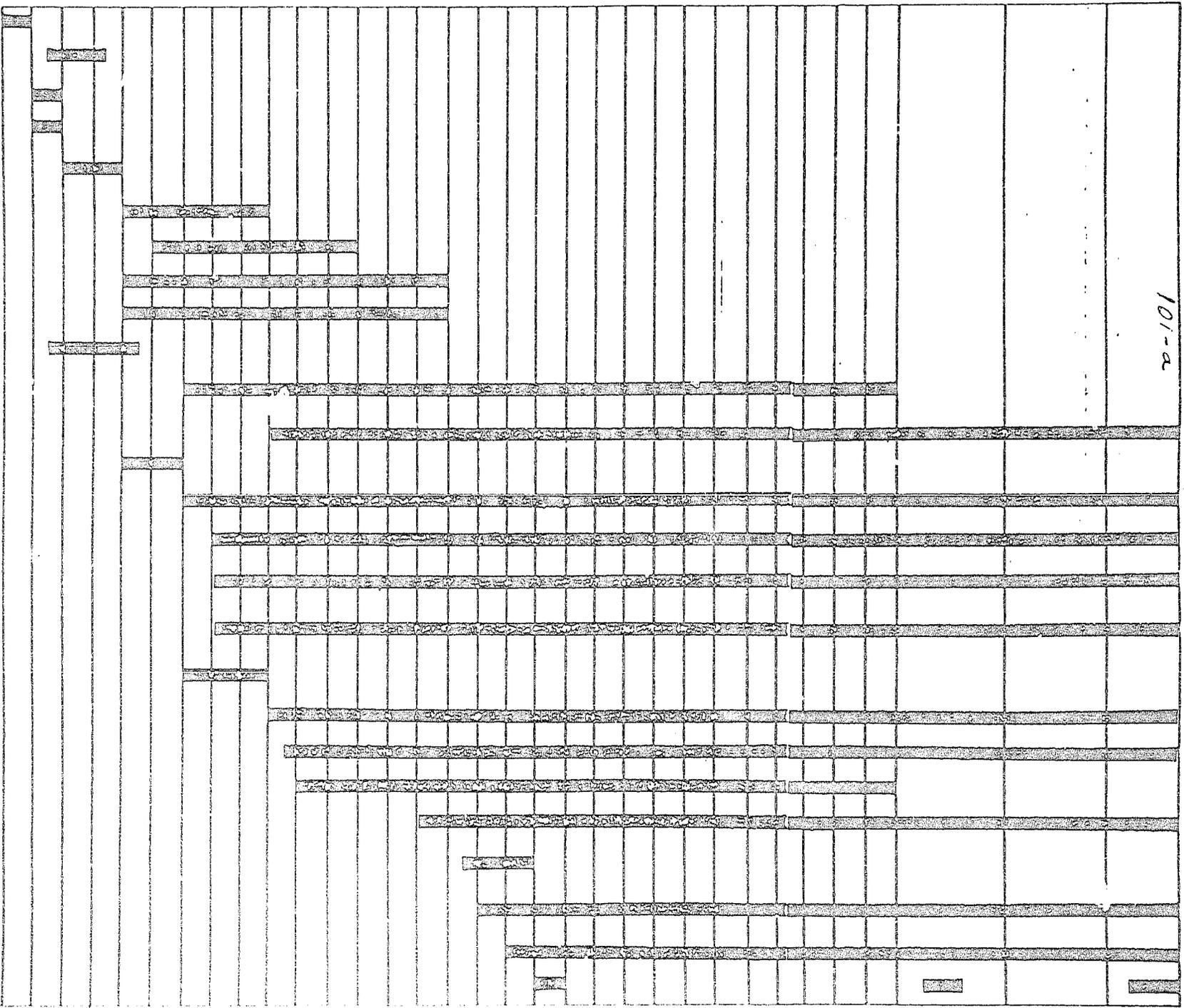
1. August 30, 1979 - Project authorized.
2. September 30, 1979 - Project Agreement signed and Implementation Letter No. 1 issued.
3. November 1, 1979 - Conditions Precedent to Initial Disbursements met.
4. November 15, 1979 - Bidding documents for commodities procurement complete.
5. December 1, 1979 - Conditions Precedent to Disbursement for Equipment Procurement met.
6. December 1, 1979 - Begin ground surveillance for Road inventory.
7. December 1, 1979 - Invitation for Bids for commodities published.
8. December 15, 1979 - Architectural designs for Regional Centers complete.
9. January 30, 1980 - Technical Assistance contracted and underway.
10. January 30, 1980 - Conditions Precedent to Disbursement for Maintenance and Rehabilitation Operation met.
11. January 30, 1980 - Award contracts for all commodity purchases.
12. February 15, 1980 - Begin socio-economic analyses of candidate sub-projects.
13. March 1, 1980 - DGCV National Administrative and Technical Staff in place.
14. March 1, 1980 - Begin community organization for Routine maintenance.
15. April 15, 1980 - Seven Regional and seven Sub-regional Centers construction completed.

16. April 15, 1980 - Regional Administrative Staff in place and trained.
17. April 20, 1980 - Receive first delivery of hand tools.
18. April 30, 1980 - Complete Road Inventory Ground Surveillance.
19. April 30, 1980 - Begin training program for routine maintenance-local contractors and local JUCAVE.
20. May 1, 1980 - Shop tools delivered.
21. May 5, 1980 - Begin training of shop mechanics and inventory control personnel.
22. May 15, 1980 - Begin Routine Maintenance Program.
23. June 1, 1980 - Begin research activities.
24. July 30, 1980 - Complete map updating on road inventory.
25. October 1, 1980 - Begin community organization for rehabilitation.
26. November 1, 1980 - All commodities purchased in country.
27. November 15, 1980 - Begin training of equipment operators and mechanics.
28. November 30, 1980 - Begin training of JUCAVES for rehabilitation.
29. January 1, 1981 - Begin rehabilitation program.
30. March 1, 1981 - First Loan Progress Evaluation complete.
31. April 1, 1981 - Begin research for specific costs on specific operations.
32. September 30, 1982 - Second Loan Progress Evaluation complete.
33. September 30, 1984 - Final Project Evaluation

IMPLEMENTATION PLAN

1979 1980 1981 1982 1983 1984  
 A . S . O . N D . J . F . M . A . M . J . J . A . S . O . N D . J . F . M . A . M . J . J . A . S . O . N D . J . . . . . J . . . . . J . . . . . S .

1. Project Authorization
2. Preparation of Procurement Bid Documents
3. Loan Agreement Negotiation
4. Implementation Letter No.1
5. CPs to Disbursement for Procurement
6. Road Inventory Ground Surveillance
7. Road Inventory Mapping
8. Procurement, Heavy Equip.
9. Procurement, Hand Tools
10. Architectural Designing, Regional Centers
11. Technical Assistance & Training Programs
12. DCCV Training Program
13. CPs for Maintenance & Rehabilitation
14. Project Liaison Officer
15. Socio-Economic Analyses of Sub-Projects
16. National DCCV staff, in place
17. Organization of Villages for Maintenance
18. Construction of Regional & Sub-regional Centers
19. Regional staffs in place
20. Routine Maintenance Program
21. Research Activities
22. Organization of Villages for Rehabilitation
23. Training of Equipment Operators & Mechanics
24. Training Villages for Rehabilitation
25. Road Rehabilitation
26. Loan Evaluations



101-a

#### D. PROCUREMENT

Commodities and Technical Assistance/Training services procured with Loan funds will have their source and origin in countries included in AID Geographic Code 941, or, for those materials purchased under shelf procurement regulations described in AID Handbook 11, from countries in Code 935.

A source/origin waiver is requested in this document from Code 000 to Code 899 for the purchase with Loan funds of 48 90 cc motorcycles to be used by the road maintenance supervisors, the community organizers, and the road inventory ground surveillance teams. The motorcycles will cost approximately \$30,000. The small "street-trail" motorcycles are not manufactured in the United States. Although they are available from suppliers in two of the 941 Code countries, country-wide maintenance and service from those suppliers in the Dominican Republic is considered to be inadequate for purposes of the project. A waiver is therefore requested to Code 899 to allow for adequate maintenance and service country-wide of purchased motorcycles.

All project procurement will be undertaken by the borrower/grantee except for the technical services procured from other U.S. government agencies which will be contracted by AID through PASA or other intra-agency agreements.

#### E. USAID MONITORING

The USAID/DR Capital Resources Development Office Engineering Section will have the primary responsibility for monitoring Project implementation and progress, assisted by the Office of the Controller. Officials from the Mission will review procurement proposals, plans and specifications for commodities procurement, training and technical assistance, procurement, rehabilitation and maintenance plans, specifications and cost estimates. The project engineer, assisted by the engineering section, will inspect each rehabilitation sub-project at least once a month, and two man/weeks monthly will be devoted to monitoring maintenance activities. Upon completion of each rehabilitation sub-project, the project engineer will review and approve the subproject jointly with the DGCV regional engineering supervisor.

The present Mission engineering staff has one U.S. and two Dominican Direct-Hire Engineers. USAID/DR engineering monitoring responsibilities for the next four years will include the drilling and installation of hand pumps for 2,650 wells, and construction of 26,500 latrines at a total cost of \$7.0 million under the Health Sector Loan II; construction of 654 new classrooms, 572 annexes to existing schools, 87 workshops and 87 directors offices under the Education Sector Loan for a total of

approximately \$8.0 million; approximately \$2.0 million in rural infrastructure under the Ag Sector Loan II; and \$3.0 to \$4.0 million for construction under PL-480 programs. Given the existing workload, the Mission anticipates the need for an additional Dominican engineer to be contracted for the life of the project. The Mission is satisfied that the program will not require additional direct hire U.S. or local personnel.

Monthly project status meetings will be held to discuss progress and ensure that Project activities conform to AID regulations, that sound financial control is being exercised, and that the terms and conditions of the Project Agreement are being met.

## F. EVALUATION

### 1. Project Evaluation Plan

Major evaluations of the project will be conducted eighteen months, thirty-six months, and five years after the commencement of the project.

The primary emphasis of the first evaluation will be the development of DGVC institutional capacity at the national and regional levels, the functioning of DGVC, SEA and ODC with local organizations, and selected initial subprojects. The functioning of local organizations in maintenance operations will also be examined in those areas where maintenance has been initiated upon recently completed road projects. Thus, the eighteen month evaluation will focus primarily on internal government agency operations, the establishment of units called for under the project, and related matters.

The second major evaluation will take place thirty-six months after the initiation of the project. This evaluation will examine the extent to which government organizations have "settled in" to their new approaches, examine the sincerity and effectiveness of maintenance operations, and further evaluate the long-term national and regional level institutionalization that has occurred. This evaluation will also focus on operations at the base level. After three years, there should be extensive experience with local association activities both in rehabilitation and maintenance. The impact of road rehabilitation and maintenance on farmer income and the extent of benefits in the areas of rehabilitated and maintained roads will be carefully examined. It is not anticipated at this point that extensive changes in agricultural systems in the project can be detected.

At the end of forty-eight months, a minor evaluation will update the second major evaluation focusing on questions of impact on the target group of the project. Other problems will be examined on a selected basis.

The third major evaluation will take place five years after the initiation of the project. This evaluation will focus on questions of permanent institutionalization at all levels and impact on the target group. It is expected that by this point significant changes not only in prices received by small farmers but also in the nature of farm systems can be identified and verified. The evaluation will examine other effects of the project such as improved maintenance attitudes and other activities of local and national institutions. This evaluation will also examine whether a national feeder road system has emerged which is adequate to meet the needs of the rural sector but not excessive in mileage or budgetary claims.

All evaluations will utilize the logical framework as a base in order to assure comparability and continuity in the evaluation process. Thus, in each evaluation, the evaluators will be asked to address progress and problems with respect to goals, subgoals, purposes, outputs and inputs. They will also be asked to verify and if necessary propose revisions in the logical framework with respect to objectively verifiable indicators, means of certification and validity of assumptions. In addition, they will be asked to examine side effects. If the project is fully successful, it will produce certain side effects such as major changes in the agricultural systems in the command area of the roads, a change in attitude towards maintenance in areas of the road activities, and significant improvements in the performance of agricultural associations in non-road maintenance activities. It will be of considerable use to the GODR and perhaps the development community generally if such benefits can be precisely identified.

Ex post evaluations could include recalculation of costs and benefits for each road and for the system as a whole in the second and third major evaluation. Their purpose would be to help DGCV to evaluate the procedures used under the Project to select roads and to determine better which roads in the system should continue to be maintained and which roads should be rehabilitated and incorporated into the system.

## 2. Subproject Evaluation Procedures

In addition to the major project evaluations described above, each community association will be required to conduct an annual evaluation of its performance and the performance of DGCV under the project. This evaluation will be simple in form. The association will merely be asked to answer questions such as the following:

1. Has your section of roads been maintained adequately?
2. Have "downstream" sections of roads been maintained adequately? If not, what has been the effect on your community?
3. Has the community organization performed its duties in conformity with the contract? Has ODC (or SEA) provided

adequate support for local organization work?

4. Have the individuals who have worked under the contract performed their duties properly?
5. Has DGCV performed its obligations properly? If not, identify what problems have occurred (such as payment of wages, supply of equipment, timely arrival in accordance with plans, etc.).
6. What has the effect of this work been on the strength and standing of the organization in the community? Has membership increased? Does the organization feel better able to deal with government agencies? More capable of carrying out difficult and complex projects in the community? How has participation otherwise changed community life?
7. Do members of the organization and the community at large regard maintenance not only of roads but also aqueducts, irrigation, ditches, schools and the like as more important now than a year ago?

The ability of the community organization to evaluate its own performance and that of DGCV is considered an important side benefit of the project. The annual evaluation will be discussed with the regional leaders of the DGCV maintenance unit at a meeting of the community association. Copies of the evaluation will be forwarded to DGCV central headquarters and to USAID.

### 3. Feedback to DGCV

The formal evaluation channels described above are one method of providing feedback to DGCV on the quality and effectiveness of its performance under the project. In addition to these formal channels, community organizations will be encouraged to make their views known informally to DGCV, ODC and SEA officials.

The community organizations are not only a client, but also a performer in a complex operation. Regular consultations between DGCV, ODC and SEA's officials on the one hand and community organizations on the other will be encouraged to assure that the organizations and their members are made aware of shortcomings of the organizations and their implications for the welfare of the community. Responsible DGCV regional officials will be expected to report on the performance of community organizations and to take appropriate actions to assure that proper standards of performance are met.

USAID/DR recognizes that effective operations under the project may require substantial changes in the institutional arrangements proposed in this paper, in the various criteria applied, and in the contractual arrangements called for in other details of project implementation. The Mission proposes to encourage a high degree of flexibility in the management of the project in line with the overall objective of the institutionalization of road maintenance capability at all levels. Several years of operations will doubtless teach us much more about how maintenance can and should be institutionalized in the Dominican Republic that can be anticipated at this point. Change and experimentation with different approaches will be encouraged if necessary.

#### G. CONDITIONS, COVENANTS AND NEGOTIATING STATUS

The Project Committee recommends that the following conditions and covenants be included in the Project Agreement.

1. Conditions Precedent to Initial Disbursement:
  - a. The GODR confirms its commitment to establish a fully staffed rural roads maintenance unit within the DGCV.
  - b. The GODR provides USAID with evidence of its intention to create a separate line item in the national budget for the DGCV maintenance unit.
  - c. The GODR confirms a permanent rural roads maintenance budgeting objective of \$850 dollars per km. (in present value) for rural roads brought into the maintenance system established under the project.
  - d. The DGCV appoints a full time coordinator for the project.
2. Conditions Precedent to Disbursement for Equipment Procurement:
  - a. A plan for commodity procurement, delivery, distribution to regional centers and warehousing be submitted by DGCV and approved by USAID.
  - b. A plan for a preliminary inventory system be submitted by DGCV and approved by USAID.

3. Conditions Precedent to Disbursement for Maintenance and Rehabilitation Operations.
  - a. An operating plan satisfactory to AID has been submitted by the GODR and approved by USAID. The plan will be reviewed and approved annually by USAID.
  - b. A contract for technical advisory services acceptable to AID has been executed.
  - c. A maintenance management and reporting system has been designed and established within DGCV.
  - d. Delegation of authority and transfer of responsibility for equipment and staff to Regional Centers necessary to implement decentralization of maintenance are carried out by DGCV.
4. Covenants
  - a. DGCV will covenant that it will use equipment to be procured under the project only for rural road rehabilitation and maintenance work, unless otherwise agreed by AID.
  - b. DGCV will covenant to recruit and maintain sufficient qualified personnel at all levels required to carry out the rural roads maintenance program effectively.

#### Negotiating Status

The program has been developed jointly by DGCV and USAID personnel. The project has been discussed at various stages of development with the Secretary of Public Works and on a regular basis with the Director General of Caminos Vecinales. The Director General has appointed a project coordinator who has worked with USAID personnel on a daily basis during project development and who reports on a regular basis to the Director General. The project has been submitted to the Technical Secretariat for approval and a formal request for the project from the Technical Secretariat has been received by USAID. The project has also been discussed with and approved by the Secretary of State for Agriculture. It has been described and commented upon by all regional chiefs of SEA and each regional office of SEA has been requested to fill out a questionnaire requesting data and comments on project designs. Responses to this questionnaire have been received by USAID. Since the project has the full support of the GODR, no problems are anticipated in negotiating a project agreement.

## ANNEXES

- A-1 DAEC Guidance Cable
- A-2 Logical Framework
- A-3 Statutory Checklist
- A-4 Environmental Threshold Decision
- A-5 611 Certification
- A-6 GODR Application Letter
- A-7 Draft Authorization
- B-1 Map of Dominican Republic Showing Mountainous Areas
- B-2 Rainfall Map of Dominican Republic
- C-1 Organization Chart for SEOPC
- C-2 Organization Chart for Maintenance Section
- C-3 Encuesta para Caminos Vecinales
- C-4 SEA Regional Divisions
- C-5 ODC Community Development Offices
- C-6 Proposed DGCV Regional Divisions
- C-7 Existing DGCV Regional Divisions
- C-8 Equipment Purchases
- C-9 Types of Equipment Required for Regional Shops
- C-10 GODR Equipment Operating Costs
- C-11 Comparisons, Equipment Hourly Rates
- C-12 Hand Tool Purchases
- C-13 Hand Tool Requirements for Rehabilitation

- C-14 Tool Set for Hand Labor Maintenance
- C-15 Bases Teóricas, Esfuerzos y Coordinación para la Implementación de las Juntas Coordinadoras de Caminos Vecinales (JUCAVE)
- D-1 Economic Annex
- D-2 Road Design Standards
- D-3 Proposed DGCV National Office Staff - Maintenance Section
- D-4 Equipment and Hand Tool Replacement
- D-5 IBRD Studies on Equipment vs. Hand Labor Costs
- D-6 Site Organization for Rehabilitation
- D-7 Estimated Rehabilitation Costs
- D-8 Site Organization of Routine Maintenance
- D-9 Operable Equipment Owned by SEOPC Highway Department

# TELETYPE ACTION COPY

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TAGS:

SUBJECT: PID - RURAL ROADS MAINTENANCE AND REHABILITATION

1. THE SUBJECT PID WAS REVIEWED AND APPROVED BY THE DAEC ON MAY 10, 1979. THE FOLLOWING GUIDANCE IS PROVIDED TO ASSIST THE MISSION IN PREPARING THE PROJECT PAPER.

2. POLICY REVISION. A PRINCIPAL OBJECTIVE OF THE PROPOSED PROJECT WOULD BE TO REORIENT THE GODR AND PARTICULARLY THE DGCV AWAY FROM A CONSTRUCTION AND RECONSTRUCTION POLICY TO ONE OF MAINTENANCE AND REHABILITATION. AID EXPERIENCE WITH SIMILAR PROJECTS IN OTHER COUNTRIES SHOWS THAT THIS IS AT BEST A VERY DIFFICULT OBJECTIVE TO ACHIEVE BECAUSE SUCH A POLICY OFTEN CONFLICTS WITH DESIRES OF BOTH THE POPULACE AND PUBLIC OFFICIALS WHO WANT NEW ROADS AND ARE RELUCTANT TO USE SCARCE PUBLIC FUNDS TO MAINTAIN OLD ROADS. THE PP SHOULD FULLY DESCRIBE THE ACTIONS THAT THE GODR HAS TAKEN, OR IS PLANNING, TO IMPROVE ITS ROAD MAINTENANCE CAPABILITY, AND DISCUSS THE STRATEGY THAT WILL BE FOLLOWED DURING PROJECT IMPLEMENTATION TO BRING ABOUT THE REQUIRED CHANGES IN ATTITUDES.

3. SOCIAL AND ECONOMIC ANALYSIS.

A. SAMPLE DESIGN. BECAUSE THE PROJECT WILL INVOLVE A LARGE NUMBER OF PARTICIPATING COMMUNITIES AND SUBPROJECT AREAS, THE MISSION SHOULD DEVELOP THE SOCIO-ECONOMIC ANALYSIS BASED ON A REPRESENTATIVE SAMPLE OF THOSE COMMUNITIES/AREAS. THE SAMPLE SHOULD BE SUFFICIENTLY BROAD TO TAKE INTO ACCOUNT DIFFERING SOCIAL AND ECONOMIC CONDITIONS IN VARIOUS PARTS OF THE COUNTRY. THE SAMPLE MAY HIGHLIGHT THE NEED FOR POSSIBLE VARIATIONS TO THE BASIC PROJECT DESIGN IN DIFFERENT REGIONS OF THE COUNTRY. SUCH A SAMPLE

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COULD INCLUDE THOSE COMMUNITIES/AREAS THAT WILL BEGIN PARTICIPATING IN THE PROJECT DURING ITS FIRST YEAR, THEREBY FACILITATING INITIAL PROJECT IMPLEMENTATION.

B. ECONOMIC ANALYSIS. THE PROJECT WILL CLEARLY NEED TO BE JUSTIFIED IN TERMS OF THE ECONOMIC BENEFITS ACCRUING TO THE TARGET GROUP. HOWEVER, CONCERN WAS EXPRESSED THAT THE ECONOMIC BENEFITS OF THE PROJECT CANNOT BE EASILY ANALYZED AND SUBSEQUENTLY EVALUATED GIVEN THAT THE MAINTENANCE ACTIVITY ESSENTIALLY INVOLVES LOSS PREVENTION RATHER THAN A MAJOR IMPROVEMENT OR EXPANSION OF THE ROAD SYSTEM. IN ORDER TO ASSESS LIKELY BENEFITS, THE MISSION SHOULD CONSIDER ESTABLISHING A MODEL WHICH WOULD PROJECT ROAD DETERIORATION WITHOUT MAINTENANCE UNDER TROPICAL CIRCUMSTANCES, AND THEN DETERMINE THE BENEFITS TO BE DERIVED FROM THE MAINTENANCE ACTIVITIES WHICH AVOID SUCH DETERIORATION.

C. SOCIAL ANALYSIS. IT APPEARS THAT THE PROPOSED SCOPE OF WORK FOR THE PP'S SOCIAL ANALYSIS MAY PROVE TOO AMBITIOUS, AND THAT SOME OF THE INFORMATION BEING CALLED FOR MAY NOT BE ESSENTIAL TO DEMONSTRATE PROJECT FEASIBILITY OR PROVIDE A BASIS FOR PROJECT DESIGN. THE MISSION MAY WISH TO RECONSIDER THE SCOPE OF THE SOCIAL ANALYSIS, EMPHASIZING THOSE FACTORS WHICH DIRECTLY AFFECT THE PROJECT'S DESIGN AND FEASIBILITY.

4. SELECTION CRITERIA. IT IS RECOGNIZED THAT THE PP'S SOCIO/ECONOMIC ANALYSES CAN COVER ONLY A LIMITED PORTION OF THE TOTAL NUMBER OF COMMUNITIES/AREAS THAT WOULD BE SERVED UNDER THE PROJECT. THEREFORE, IT IS IMPORTANT THAT SUBPROJECT SELECTION CRITERIA BE FORMULATED IN A WAY TO ENSURE THAT THE BASIC TENETS UNDER WHICH THE LOAN

WOULD BE AUTHORIZED CONTINUE TO BE OBSERVED. A SYSTEM SHOULD BE ESTABLISHED TO ENSURE THAT THE MAJORITY OF SUBPROJECT BENEFICIARIES FALL WITHIN THE TARGET GROUP AND THAT PRIOR TO COMMITMENT OF RESOURCES, SUBPROJECTS ARE APPRAISED FOR TECHNICAL, SOCIAL, AND ECONOMIC FEASIBILITY. THE SELECTION OF THE SUBPROJECTS WILL VERY

LIKELY REQUIRE AN INFORMATION GATHERING EFFORT TO ENSURE THAT THE CRITERIA ARE SATISFIED. GIVEN THE IMPORTANCE OF THE ECONOMIC JUSTIFICATION AND THE MAJOR EMPHASIS ON THE RURAL POOR IN THE PROJECT, IT IS RECOMMENDED THAT THE MINISTRY OF AGRICULTURE, AND POSSIBLY OTHER GOVERNMENT AGENCIES CONCERNED WITH OFF-FARM EMPLOYMENT, PLAY A ROLE IN THE DEVELOPMENT AND IMPLEMENTATION OF THE SELECTION PROCEDURES. IT IS ALSO RECOMMENDED THAT THE INFORMATION GATHERED BE UTILIZED TO ESTABLISH A DATA BASELINE TO EVALUATE PROJECT BENEFITS ACCRUING TO THE TARGET GROUP.

5. COMMUNITY DEVELOPMENT FUND (CDF). DURING THE INTENSIVE REVIEW THE MISSION SHOULD CONFIRM THE LEGALITY OF THE CDF AS WELL AS ITS SOCIAL FEASIBILITY. ASSUMING CONFIRMATION, THE PP SHOULD EXPLAIN THE RULES AND GUIDELINES FOR ADMINISTRATION OF THE CDF. THE SYSTEM OF

ADMINISTRATION SHOULD REMAIN SIMPLE AND CLEAR GUIDELINES ON UTILIZATION OF FUND RESOURCES SHOULD BE ADOPTED TO ENSURE CONSISTENCY WITH AID GOALS AND OBJECTIVES.

6. ABSORPTIVE CAPACITY. CONCERN WAS EXPRESSED ABOUT THE GODR'S CAPACITY TO IMPLEMENT THE PROJECT DUE TO ITS COMPLEXITY AND LARGE SIZE. PROJECT ACTIVITIES WILL BE IMPLEMENTED AT BOTH THE NATIONAL AND LOCAL GOVERNMENT LEVEL. IN ADDITION, EXTENSIVE INPUTS OF HUMAN AND FINANCIAL RESOURCES WILL BE REQUIRED TO ESTABLISH A NEW INSTITUTIONAL INFRASTRUCTURE AND TO CARRY OUT THE REHABILITATION AND MAINTENANCE ACTIVITIES ON A NATIONAL BASIS. THE PROBLEM MAY BE COMPOUNDED BY THE GODR'S ONGOING AND PLANNED PARTICIPATION IN LARGE ROAD CONSTRUCTION AND MAINTENANCE PROJECTS WITH THE IDB AND IBRD. IN VIEW OF THIS, THE PP SHOULD INCLUDE AN INSTITUTIONAL ANALYSIS OF THE GODR AGENCIES RESPONSIBLE FOR IMPLEMENTATION OF ROAD PROJECTS, DESCRIBE THEIR RESPECTIVE ROLES AND INTER-RELATIONSHIPS UNDER THE VARIOUS PROJECTS, AND ASSESS WHETHER THEIR INDIVIDUAL AND COLLECTIVE CAPABILITIES WILL BE OVERTAXED.

7. INSTITUTIONAL DEVELOPMENT. THE PID INDICATES THAT THE AMOUNT OF ROAD WORK WHICH WILL BE COMPLETED IS SECONDARY TO ACCOMPLISHING THE INSTITUTIONAL

DEVELOPMENT OF THE DGCV. HOWEVER, AS NOTED IN THE DAEC THIS PROJECT IS CONCEPTUALLY SIMILAR TO A RURAL SERVICES PROJECT IN WHICH (A) TA IS PROVIDED TO DEVELOP AND INSTITUTIONALIZE A CENTRAL CAPACITY FOR ADMINISTERING AND EVENTUALLY EXPANDING A RURAL DELIVERY SYSTEM, (E.G., HEALTH CARE), WHILE AT THE SAME TIME (B) CAPITAL FINANCING IS PROVIDED TO CONSTRUCT THE PHYSICAL INFRASTRUCTURE (E.G., HEALTH POSTS) FOR THAT SYSTEM. THE OUTREACH CAPACITY OF THE INSTITUTION AND IN TURN THE DEGREE OF SUCCESS IN ACHIEVING THE PROJECT'S GOAL OF IMPROVING THE QUALITY OF LIFE OF THE RURAL POOR ARE DEPENDENT ON THE NUMBER OF HEALTH POSTS COMPLETED OR, IN THE CASE OF THE PROPOSED PROJECT, THE AMOUNT OF ROADS REHABILITATED AND MAINTAINED. ALSO IN THE CASE OF THIS PROJECT, THE SUCCESS OF THE INSTITUTION BUILDING EFFORT IS BEST SHOWN THROUGH THE DGCV'S DEMONSTRATED CAPACITY TO REHABILITATE AND MAINTAIN SECONDARY ROADS. THEREFORE, THE PP SHOULD SPECIFY TARGET AMOUNTS OF WORK TO BE ACCOMPLISHED BY THE DGCV DURING THE LIFE OF PROJECT WHICH CAN SERVE AS BENCHMARKS TO MEASURE PROJECT PROGRESS AND AS A BASIS ON WHICH TO DEVELOP THE PROJECT'S FINAL COST ESTIMATES AND EQUIPMENT REQUIREMENTS. THE PP SHOULD ALSO DESCRIBE THE METHODOLOGY USED BY THE MISSION IN ARRIVING AT THOSE TARGETS.

8. MAINTENANCE ACTIVITY.

A. DGCV-COMMUNITY MAINTENANCE RESPONSIBILITIES. THE PP

SHOULD DISCUSS THE TRADE-OFFS BETWEEN CENTRALIZED DGCV RESPONSIBILITY VS COMMUNITY RESPONSIBILITY AND INDICATE THE BASIS FOR THE PARTICULAR DIVISION OF RESPONSIBILITIES THAT IS PROPOSED.

B. PROCUREMENT OF SERVICES. THE PID PROPOSES THAT PARTICIPATING COMMUNITIES WILL SELECT ONE LOCAL PERSON WHO WILL BE CONTRACTED BY THE DGCV TO PERFORM HAND MAINTENANCE FOR EACH FIVE KMS OF FEEDER ROAD. ALSO, A DGCV SUBREGIONAL SUPERVISOR WILL INSPECT THIS LOCAL CONTRACTOR'S WORK AND OUTLINE FUTURE TASKS ON A BIWEEKLY OR MONTHLY BASIS. HOWEVER, CONCERN WAS EXPRESSED IN THE DAEC OVER POTENTIAL ABUSE OF THE CONTRACTING SYSTEM IN TERMS OF CONTRACTOR SELECTION, CONTROL OF FUNDS AND CONTRACTOR SUPERVISION. THE VIEW WAS ALSO EXPRESSED THAT THE PRESENTLY PROJECTED SUBREGIONAL STAFF SIZE MAY BE INSUFFICIENT TO SUPERVISE THE LARGE NUMBER OF CONTRACTORS REQUIRED TO MAINTAIN 3,500 KMS OF ROAD. DURING THE INTENSIVE REVIEW, THE MISSION SHOULD CONSIDER CONTROL

MEASURES THAT COULD BE UTILIZED TO ELIMINATE POTENTIAL ABUSE OF THE CONTRACTING SYSTEM AND EXAMINE THE STAFFING IMPLICATIONS OF THE SYSTEM FOR THE SUBREGIONAL OFFICES OF THE DGCV.

9. EQUIPMENT PROCUREMENT-CAPITAL LABOR MIX. DESPITE THE PROPOSED UTILIZATION OF LABOR INTENSIVE METHODS, A LARGE PORTION OF PROJECT FUNDS ARE BUDGETED FOR THE PROCUREMENT OF EQUIPMENT. IN ADDITION, AN ASSESSMENT OF EQUIPMENT CAPACITY CARRIED OUT FOR THE SWINE FEVER PROJECT CONCLUDED THAT THE GODR CURRENTLY HAS EXCESS CAPACITY. DURING THE INTENSIVE REVIEW, THE MISSION SHOULD DEVELOP A REVISED PROCUREMENT PLAN WHICH IS BASED ON A THOROUGH REVIEW OF THE GOVERNMENT'S NON-MILITARY CONSTRUCTION EQUIPMENT INVENTORY. THE PROJECT'S PROPOSED CAPITAL LABOR MIX AND THE PERFORMANCE TARGETS DISCUSSED IN PARAGRAPH 7. IN JUSTIFYING THE EQUIPMENT TO BE PROCURED UNDER THE PROJECT THE PP SHOULD NOTE THE RESULTS OF THE REVIEW AND INDICATE UNDER WHAT CONDITIONS AND FOR WHAT USES THE EQUIPMENT WILL BE UTILIZED. THE PP SHOULD ALSO INDICATE WHAT CONSIDERATIONS LED TO THE SELECTION OF THE PARTICULAR MIX, OR RANGE OF MIXES OF LABOR AND CAPITAL-BASED MAINTENANCE TECHNIQUES TO BE UTILIZED UNDER THE PROJECT.

10. ENVIRONMENTAL CONCERNS. THE PROPOSED PROJECT WOULD IMPROVE ACCESS TO REMOTE AREAS WHICH COULD LEAD TO DEGRADATION OF ENVIRONMENTALLY SENSITIVE AREAS SUCH AS PARKS, FOREST RESERVES, AREAS OF STEEP SLOPES, HABITATS OF THREATENED OR ENDANGERED SPECIES, ETC. FOR THIS REASON THE MISSION SHOULD ALSO CONSIDER INCORPORATING ALTERNATIVE METHODS OF PROTECTING THE ENVIRONMENT INTO THE

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RURAL ROAD DESIGN AND MAINTENANCE STANDARDS. EXAMPLES  
CITED IN THE DAEC WERE CULVERT AND SWALE DESIGN, AND  
SEEDING OF DRAINAGE DITCHES AND ROAD CUTS.

11. COMMUNITY DEVELOPMENT. THE PID NOTES THAT THE SUB-  
PROJECT SELECTION CRITERIA MAY TEND TO ELIMINATE COMMUNI-  
TIES WHICH ARE ORGANIZATIONALLY WEAK AND THAT THESE ARE  
OFTEN THE POOREST COMMUNITIES.  
THE PP SHOULD INCLUDE AN ANALYSIS OF THE GODR'S EXISTING  
AND PLANNED COMMUNITY DEVELOPMENT ACTIVITIES WHICH COULD  
BE EXPANDED TO ASSIST COMMUNITIES MEET SUBPROJECT  
SELECTION CRITERIA.

12. EVALUATION. SIN-- PROJECT JUSTIFICATION IS BASED ON  
UNCONSIDERABLE LIST OF BENEFITS THAT WOULD ACCRUE TO THE  
POOR, THE PP SHOULD DESCRIBE HOW THE MISSION PLANS TO

EVALUATE PROJECT EFFECTIVENESS IN REACHING AND ASSISTING  
THIS TARGET GROUP. SPECIFICALLY, THE PP SHOULD DESCRIBE  
THE INFORMATION THAT WILL BE SOUGHT AND THE METHOD-  
OLOGY FOR OBTAINING IT. IT WAS SUGGESTED THAT THE MIS-  
SION CONSIDER USING THE INFORMATION GATHERED DURING THE  
SUBPROJECT SELECTION PROCESS, DISCUSSED IN PARAGRAPH  
FOUR (4) AS BASELINE DATA FOR PROGRESS EVALUATIONS.  
ALSO, IT WAS NOTED THAT AID HAS DEVELOPED SOME METHODOLOG-  
IES FOR MEASURING IMPACT IN SIMILAR TYPES OF PROJECTS.  
SOURCES OF ASSISTANCE IN ADDRESSING DATA GATHERING AND  
ANALYSIS ISSUES FOR RURAL INFRASTRUCTURE PROJECTS, ESPE-  
CIALLY FOR MEASURING IMPACT ON BENEFICIARY GROUPS,  
INCLUDE THE PCI CONSULTANCY WITH DS/RAD AND THE SURVEYS  
AND EVALUATION UNIT OF BUCEN.

13. REHABILITATION ACTIVITIES. CONCERN WAS EXPRESSED  
THAT THE LIMITS PLACED ON THE REHABILITATION COMPONENT  
MAY BE SO RESTRICTIVE THAT THE DGCV COULD NOT TAKE  
ADVANTAGE OF OPPORTUNITIES TO MATERIALLY IMPROVE A ROAD  
THROUGH CONSTRUCTION ACTIVITIES REQUIRING A LOW INCREMENTAL  
COST. THEREFORE, DURING THE INTENSIVE REVIEW THE MISSION  
SHOULD CONSIDER INCLUDING MINOR CONSTRUCTION  
WORK IN SUCH AREAS AS CUTTING AND FILLING, REALIGNMENT  
AND BRIDGE CONSTRUCTION WITHIN THE LIST OF ACCEPTABLE  
REHABILITATION ACTIVITIES.

14. TO ASSIST THE MISSION WITH FINAL PROJECT PREPARATION  
AND DESIGN WE ARE POUCHING A SUMMARY OF COMMENTS MADE  
AT THE RECENT AID WORKSHOP ON RURAL ROADS ALONG WITH A  
COPY OF THE DISCUSSION PAPER PRESENTED AT THE WORKSHOP.  
CHRISTOPHER  
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## LOGICAL FRAMEWORK MATRIX - PROP WORKSHEET

Summary	Objectively Verifiable Indicators	Important Assumptions																					
<p><b>A.1. Goal</b></p> <p>Improve income, economic productivity and quality of life of rural poor.</p> <p><u>Subgoal</u> - 5-6,000 kms. stable rural road network in good condition, under regular maintenance, assured by appropriate institutional structure and financed by regular claim on GODR budget.</p>	<p><b>A.2. Measurement of Goal Achievement</b></p> <p>Improved income: national statistics on prices and production, household surveys, and research unit studies reflecting improved income.</p> <p>Improved access to social services: records of GODR Secretariats providing health and education services; household surveys; research unit studies.</p> <p>GODR records, AID evaluation; GODR budget allocations to rural road maintenance. Sub-goal assumption: achievement of project purpose by EOP.</p>	<p><b>A.3. (as related to goal)</b></p> <ul style="list-style-type: none"> <li>- Services affecting farm income and productivity including access to inputs, credit and marketing continue or are provided at adequate levels.</li> <li>- Economic benefits not subverted to transport sector.</li> <li>- Social services are continued or expanded as currently planned.</li> <li>- No major slowdown in economic conditions or political upheaval which breaks continuity of program.</li> </ul>																					
<p><b>B.1. Purpose</b></p> <p>Develop institutional capacity at national, regional and local levels to maintain rural roads.</p>	<p><b>B.2. End of Project Status</b></p> <ol style="list-style-type: none"> <li>1. C.I. outputs achieved as projected.</li> <li>2. GODR plans maintain budget and personnel levels at or above levels achieved under project financing.</li> <li>3. Rural roads under regular maintenance cycles.</li> <li>4. Newly constructed and rehabilitated roads brought under maintenance cycle as routine matter.</li> <li>5. Long term plan provides for equipment replacement, new hiring, training in future.</li> <li>6. AID and GODR records and budgets inspection.</li> <li>7. Evaluation.</li> </ol>	<p><b>B.3. (as related to purpose)</b></p> <ol style="list-style-type: none"> <li>1. Continued political and administrative support and stability through LOP.</li> <li>2. Local communities receive benefits of sound maintenance.</li> </ol>																					
<p><b>C.1. Outputs</b></p> <ol style="list-style-type: none"> <li>1. Functionary rural roads maintenance department in DGCV.</li> <li>2. Regional and subregional organization and facilities to support rural road maintenance.</li> <li>3. 700 local organizations trained and capable of local maintenance activities.</li> <li>4. 3,500 kms. of rural roads under annual maintenance cycle.</li> <li>5. 1,200 kms. of roads rehabilitated.</li> <li>6. Research unit established and program of studies developed.</li> <li>7. DGCV employees trained.</li> <li>8. Inventory of Rural Roads</li> </ol>	<p><b>C.2. Output Indicators</b></p> <table border="0"> <tr> <td>1. Output targets achieved</td> <td>AID, GODR records Inspection</td> </tr> </table>	1. Output targets achieved	AID, GODR records Inspection	<p><b>C.3. (as related to outputs)</b></p> <p>GODR and community resources provided as planned.</p> <p>Personnel available for training.</p>																			
1. Output targets achieved	AID, GODR records Inspection																						
<p><b>D.1. Inputs</b></p> <ol style="list-style-type: none"> <li>1. AID Inputs Technical Assistance and Training Commodities Local Currency</li> <li>2. GODR Inputs Staff Office Equip. Rehab. &amp; Maintenance</li> <li>3. Local Communities</li> </ol>	<p><b>D.2. Budget/Schedule</b></p> <p style="text-align: center;">(\$U.S. 000)</p> <table border="1"> <thead> <tr> <th></th> <th>1980</th> <th>1981</th> <th>1982</th> <th>1983</th> <th>1983</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>AID</td> <td>4,660</td> <td>3,285</td> <td>785</td> <td>685</td> <td>585</td> <td>10,000</td> </tr> <tr> <td>GODR</td> <td>1,348</td> <td>2,994</td> <td>3,761</td> <td>4,370</td> <td>4,827</td> <td>17,400</td> </tr> </tbody> </table>		1980	1981	1982	1983	1983	Total	AID	4,660	3,285	785	685	585	10,000	GODR	1,348	2,994	3,761	4,370	4,827	17,400	<p><b>D.3 (as related to inputs)</b></p> <p>AID funds available as planned. Suitable TA arrangements carried out. Local communities respond. Assistance of other GODR agencies forthcoming.</p>
	1980	1981	1982	1983	1983	Total																	
AID	4,660	3,285	785	685	585	10,000																	
GODR	1,348	2,994	3,761	4,370	4,827	17,400																	

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

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%)?

(a) The project was included in the FY 80 Congressional Presentation as an FY 80 project. A Congressional notification is required.

(b) Yes

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?

(a) Yes.

(b) Yes.

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?

No. No further legislative action needed.

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 Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Not applicable.

5. 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. See Mission Director's certification, pursuant to this section, in the Project Paper, Annex A-5.
6. FAA Sec. 209,619. Is project susceptible of execution as part of regional or multi-lateral 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 multi-lateral organizations or plans to the maximum extent appropriate? The Project cannot be executed as part of a regional project.
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. The project will encourage international trade, private commerce and cooperatives indirectly by improving the road infrastructure of rural areas, lowering transportants and improving the efficiency 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). It is anticipated that a portion of the technical assistance and the equipment for the project will be procured from U.S. private sector sources.
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. Loan agreement will require that counterpart contribution will be used.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

There is no excess, U.S. owned local currency available for this program.

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 our 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?

This project is designed to benefit marginal groups and strengthen their development by providing them with access to markets, medical attention etc. The improvement of the Dominican road system will allow these groups to participate in development activities.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available? (include only applicable paragraph -- e.g., a, b, et. -- 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;

The proposed loan program directly addresses the problem of income, productivity and quality of life for the poor in rural areas with a subgoal of the rural feeder road network in good condition and under regular maintenance as more fully described in the Project Paper.

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 "relatively least-developed" country)?

Yes. See Borrower's letter of request in the Project Paper, Annex A-6

- 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? Not applicable.
- 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; (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. This project will contribute to the objectives reflected in item (5) by strengthening the transportation communication system, to enable it to meet economic and social needs of the poorest strata in Dominican Society.
- 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. The project directly recognizes and utilizes the needs, desires and capabilities of the population and of the implementing agencies. The need for good rural roads is a high priority demand of rural people. The project develops institutions, local and national, to meet those needs.
- 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 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? As indicated in the Project Paper, the program will contribute directly to the overall development and related programs and to the country's long-range objectives. See the Project Paper, Section IV for detailed economic activities and technical soundness information and conclusion.

h. FAA Sec. 201(b)(6); Sec. 211(a), (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.

No adverse effects on the U.S. economy are expected.

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.

Other principal International donors have indicated they do not contemplate financing any of the proposed activities (see Project Paper, Section II "A.I.D." and other Donor Assistance to the GODR transportation Sector"). Financing from private funds are unavailable for this purpose.

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.

b.1 The prospect for repayment is good EAA 611(e) Certification by the Mission Director (Project Paper, (Annex A-5).

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?

2. The terms are legal and reasonable under U.S. and Dominican laws.

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?

c. Yes, see Project Paper Annex A-5 (Letter from the Secretariat of Public Works and Communication.

Yes. See Project Paper, Section III.

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?

See Project Paper, Section III.

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?

Not applicable.

3. Project Criteria Solely for Security Supporting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability?

Not applicable.

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, principles of Act of Bogotá and Charter of Punta del Este are taken into account. The program does not relate to international regional development or economic or political integration.

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 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?

Yes.

SC(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security supporting Assistance funds.

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, assistance will directly benefit the needy.
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? The Dominican Government has instituted adequate measures for the control of narcotics and other controlled substances.
3. FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba? No.
4. 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? The Secretary of State has determined that the Dominican Republic is not controlled by the international communist movement.
5. 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 a citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government? According to the information available, the Dominican Republic is not known to be so indebted.

6. 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.
7. FAA Sec. 620(f); App. Sec. 108. Is recipient country a Communist Country? Will assistance be provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos? No.
8. 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.
9. 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.
10. 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? The Dominican Government has signed and institute such agreement.
11. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penal or sanction against, any U.S. fishing activities in international waters? No.
- a. has any deduction required by Fishermen's Protective Act been made? Not applicable.
- b. has complete denial of assistance been considered by AID Administrator? Not applicable.
12. FAA Sec. 620(q); App. Sec. 504. (a) Is the government of the recipient No.

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?

- \*13. FAA Sec. 620(s). "If contemplated as assistance is development loan (including Alliance Loan) or security supporting assistance, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems?" (An affirmative answer may refer to the record of the taking into account, e.g.: "Yes as reported in annual report on implementation of Sec. 620(s)." This report is prepared at the time of approval by the Administrator of the Operational Year Budget.\*
- Yes. Total defense expenditures as percentage of government expenditures were 8.3% in 1975 and 10.9% in 1976. Preliminary 1977 data shows defense expenditures at 12.6% and the 1978 budget expects this percentage to drop to 8%. As percentage of GNP defense expenditures are running around 1.9%. The amount of foreign exchange spent on military equipment is very small, none of which is for sophisticated weapons.
- A13. \*Upward changes in the Sec. 620(s) factors occurring in the course of the year, of sufficient significance to indicate that an affirmative answer might need review should still be reported, but the statutory checklist will not normally be the preferred vehicle to do so.)\*
14. 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. Diplomatic relations have not been severed.
15. 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?
- GODR is current on U.N. obligations.

16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? No.
17. 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.
18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.? No.
19. 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 Yes. Criteria have been established by the GODR in their agricultural, health work, education sector analysis.
- 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,
- b. 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 for food storage and distribution. At present, the Dominican Republic is making a concerted effort to increase food production as well as to upgrade marketing and storage facilities.

2. Creating a favorable climate for foreign and domestic private enterprise and investment. (2) The Dominican Republic has taken numerous steps to improve the private investment climate, as evidenced by its support for expanded industrial and agricultural credit, participation in the AID investment guaranty programs, the passage of an updated Industrial Incentive Law, and more recently, a new Dominican Tourism Incentive Law, all designed to encourage foreign and domestic enterprise and investment.
3. Increasing the public's role in the developmental process.
4. (a) Allocating available budgetary resources to development. (3) The public's role is increasing through various means. Some specific examples are the programs under the Dominican Development Foundation, savings and loan associations, credit unions and agricultural cooperatives.
- (b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations. (4) The Dominican Government is allocating substantial budgetary resources to development. The total capital budget has averaged over 43% of the total expenditures. Over 93% of all budgetary surpluses are destined to investment projects.
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.
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.
- c. 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? (4.5) No
- d. FAA Sec. 115. Will country be furnished, in same fiscal year, either security supporting assistance or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs? (5) The Dominican Republic permits free expression; tax collection methods are improving; an active land reform is underway; the country is in compliance with the other criteria.
- (6) The Dominican Republic is maintaining a reasonable balance in its development program. Increasing emphasis is being placed in development of programs to help the rural poor.
2. Security Supporting Assistance Country Criteria
- a. FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally (2.3) Not applicable. This is not supporting assistance.
- c. Not applicable.
- d. Not applicable.

recognized human rights? Is program in accordance with policy of this Section?

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

2.b The same as above.

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

2.c Not applicable.

DEPARTMENT OF STATE LAC/DR-IEE-79-40  
 AGENCY FOR INTERNATIONAL DEVELOPMENT  
 WASHINGTON, D. C. 20523

ASSISTANT  
 ADMINISTRATOR

ENVIRONMENTAL THRESHOLD DECISION

Location : Dominican Republic  
 Project Title : Rural Roads Maintenance and Rehabilitation, 517-0130  
 Funding : FY 79 - \$10.0 million  
 Life of Project: Five Years

Mission Recommendation:

Based on the Initial Environmental Examination, the Mission has concluded that the project will not have a significant effect on the human environment and therefore recommends a Negative Determination.

The Development Assistance Executive Committee of the Bureau for Latin America and the Caribbean has reviewed the Initial Environmental Examination for this project and concurs in the Mission's recommendation for a Negative Determination.

AA/LAC Decision:

Pursuant to the authority vested in the Assistant Administrator for Latin America and the Caribbean under Title 22, Part 216.4a, Environmental Procedures, and based upon the above recommendation, I hereby determine that the proposed project is not an action which will have a significant effect on the human environment, and therefore, is not an action for which an Environmental Impact Statement or an Environmental Assessment will be required.

James J. Brown  
 Assistant Administrator for  
 Latin America and the Caribbean

July 12, 1979  
 Date

Clearances:

LAC/DR:Environmental Advisor:Rotto       
 DAEC Chairman:MBrown

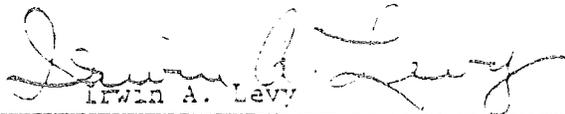
## INITIAL ENVIRONMENTAL EXAMINATION (IEE)

Project Location : The Dominican Republic  
Project Title : Rural Roads Maintenance and Rehabilitation  
Funding : FY 79 \$10.0 million  
Life of Project : 5 years  
IEE Prepared by : Dallas Dale Fowler, P.E., Asunción, Paraguay  
and  
Betty Facey, USAID/DR  
USAID Engineers  
Date : December 12, 1978; Revised April 25, 1979

Environmental Action Recommended:

It is recommended that a negative determination be made for this project. Based on careful observation and analysis of project conditions, the proposed project activities will have no significant detrimental effects on the physical or socio-cultural environment, and is, therefore, an activity for which neither an Environmental Assessment (EA) nor an Environmental Impact Statement (EIS), as defined in AID Regulation 16, will be required.

Concurrence:

  
Irwin A. Levy  
Acting Director

4-30-79  
Date

Assistant Administrator's Decision:

## INITIAL ENVIRONMENTAL EXAMINATION

DESCRIPTION OF THE PROJECT

A. General: This \$10,000,000 loan will assist financing a \$27,300,000 project to improve Dominican institutional capability at the national, regional and local levels to maintain rural feeder roads. The implementing agency is the Department General of Rural Roads (DGCV), a division of the Secretariat for Public Works. The project will provide technical assistance in administration; train mechanics, equipment operators supervisors and hand laborers; develop seven regional maintenance plants and seven sub-regional support facilities; promote a system of local organizations to help rehabilitate and maintain feeder roads, design a program of routine maintenance using locally contracted hand labor supervised by sub-regional personnel; organize a schedule for heavy equipment maintenance; and assist in financing feeder road rehabilitation and maintenance.

The project will be carried out in 14 rural feeder roads regional and sub-regional maintenance districts, representing a good cross section of the poorer of the small farmers in the Dominican Republic.

It is estimated that the project will rehabilitate 1,200 kms. of rural roads and have under regular maintenance program 3,500 kms. at the end of the 5 year life of the project; and, in addition, will create the institutional capability for the farmers to participate in the rehabilitation and emergency maintenance of their roads through planned heavy labor-intensive input.

Initial emphasis will be on rehabilitating existing roads which are in various degrees of deterioration for lack of maintenance. Emphasis will be on shaping the roads and providing adequate side ditches to give positive control of rainfall run-off, thereby minimizing roadway erosion which presently is the main enemy of the rural feeder road system. No new road construction will be done.

Immediately following the rehabilitation of each road, a local person will be contracted by the DGCV for each 5 kms. of road, to perform routine hand maintenance. Twice yearly, heavy equipment from the Regional or Sub-regional centers will grade, compact, repair major structures, if necessary, and deliver materials.

Training of workmen, foremen, engineers and key administrative staff personnel for both the central office and each district and sub-district office is a key element of the program.

The major portion of loan funds for this project will be used for the purchase of road maintenance equipment and tools (trucks, graders, bulldozers, picks, shovels, wheelbarrows, etc.) to make for an optimum mix of labor-intensive and machine utilization for both rehabilitation and maintenance.

B. Geography, Geology and Topography of the Project Area: The project area embraces the full range of land forms from flat, recent sedimentary plains, to fairly flat river valley lands between mountains, to rolling foothills, to higher mountain valleys, and on up to sharply breaking and heavily eroded mountains. Only on rare occasions does one see either contour planting or terracing, thus field erosion is serious.

In the lower regions outcroppings of limestone are common. In the mountains the dominant intrusive is porphyry which weathers deeply.

Rural roads in the hills and mountains frequently cut into the rock outcroppings and this gives rise to side ditches being cut very shallow or not at all. It is anticipated that most of the rock outcrops can be ripped to satisfactory ditch depth with a heavy ripper. The plan is that adequate side ditches will then be shaped by hand laborers following the ripper.

C. Habitation Patterns: Only about half of the farms in the project area have their buildings near and facing the rural roads. Many farms have their buildings set well back from the road and with no particular orientation; a good number of these have only a foot or mule path for access. The farmstead generally consists of the house plus one or more small out-buildings.

Small agri-business in the rural areas are almost always located at some roadway corner or intersection where a few farmers have formed their farmsteads into a tiny community. These communities sometimes have a school and a small health facility but not always. In general these tiny communities do not have the facilities where the farmers can sell their crops and buy seed or other farm needs.

Farm within the project area, based on 1971 data, may be classified by size as follows:

<u>Size Hactares</u>	<u>%</u>	<u>Area Total Ha.</u>	<u>%</u>
Less than 0.5	16.3	12,208	0.5
0.5 to 4.9	60.8	339,618	12.4
5.0 to 49.9	20.6	819,164	29.9
50.0 to 449.9	2.2	785,295	28.7
500 and more	0.1	779,951	28.5
	100.1	2,736,236	100.0

D. Governmental Implications: This project, designed for an optimal mix labor-intensive and machine input for rural feeder road rehabilitation and maintenance, is suited to the governmental organizational structure which the GODR presently has, in nucleus form, in its rural road maintenance districts. In combination with this, the rural farm communities of the GODR continue to demonstrate their eagerness to effectively participate in labor-intensive road work projects. The DGCV exercises a loose administrative control over the voluntary local labor to be utilized with or without the support of road working and maintenance machinery. Several rural feeder roads have been entirely built by locally organized laborers using picks, shovels and wheelbarrows. A much higher degree of local participation on road rehabilitation can be expected under the close guidance which this project will provide.

E. Identification and Evaluation of Environmental Impacts:

Note: This evaluation of the real and/or potential impact of this project takes into account both detrimental and beneficial projected impacts. These are appropriately indicated on the attached Impact Identification and Evaluation Form with plus (+) or minus (-) signs to indicate whether the impact will be beneficial (+) or detrimental (-).

1. Land Use: A small increase in the amount of land under cultivation may be expected to result from the successful improvement of farm to market transportation resulting from maintained roads. With reduced transport costs the farmers should benefit somewhat through increased prices paid at delivery points. Some farmers, but certainly not all, will put some more land into crops when it is shown that prices have increased. These new lands for cultivation will come from those presently used primarily for pasture or are bush and tree covered.

a. Changing the character of the land through:

i) Increasing the population. The populations in the rural parts of the project area have slowly been decreasing due to out-migration, particularly of the younger people seeking job opportunities in the cities. It may be expected that in the long term the improved rural roads may tend to stabilize populations by providing better incomes and access to social benefits such as health facilities and schools, as well as markets.

ii) Extracting natural resources. This will be limited to minor increased utilization of cultivation methods and possible subsequent depletion of soil nutrients. Applications of fertilizers will have to be taught to the few small farmers who do increase cultivation to overcome this.

iii) Land Clearing. Clearing lands of bush for added crop areas may increase somewhat but since there are very few commercial grade tree stands in the project area, any wood cutting will be quite limited. The forest conservation laws of the GODR are fairly rigidly enforced.

Rehabilitation of the rural roads will call for very little clearing of more right-of-way, only a few square meters per kilometers in extreme circumstances. Road maintenance will require no additional land clearing except for the possible need to open a new borrow area for gravel or select road surfacing materials.

- (a) Altering natural defenses. No foreseeable consequences.
- (b) Foreclosing important uses. No foreseeable consequences.
- (c) Jeopardizing man or his works. No foreseeable consequences.

(d) Other factors concerning land use. The only foreseeable factor affecting land use will be erosion and erosion control. As planned, the project proposes to make deeper, wider, well-shaped side ditches on all rural roads as part of the effort to provide positive drainage. A major aim will be to eliminate the multitude of cases where the roadway presently is, in fact, the main water carrier during and after rains. This will be accomplished by having both good side ditches and by shaping the roads with a center or crown, always some 7 to 8 centimeters higher than the edges. These improvements will tend to substantially reduce conditions where quantities of water flowing directly along the roads rapidly erode gravel surfacings. In the mountain areas many of the side ditches will be cut into rock and there will be no erosion. Where side ditches are in soil and have gradients where erosion may start, stone rip-rapping or stake dams are to be specified for eliminating possibilities of scouring. The improved run-off control through major improvements in the side ditches is an aspect of the project which has the decided secondary benefit of providing controlled positive drainage. This benefits the adjacent farm lands as well as the road itself.

## 2. Water Quality:

a. The physical state of water within the project area will not be changed. However, there will be some extra silt burdens for short periods during and shortly following road and ditch reshaping work when sections of road are being rehabilitated. This effect will be strictly temporary, however, since in soil areas the natural vegetation will soon recover denuded areas and in rocky areas any loose material will soon be carried away. As noted above, in potential erosion problem areas special steps will be made to minimize erosion.

b. No other significant changes in water quality can be ascertained.

3. Atmosphere:

a. Air Additives: During rehabilitation and maintenance work there will be some increase in dust but this will be minimal and for short duration. Dust generated by traffic movements will be very light because in most cases the traffic on these roads will be counted by a few vehicles per week and not by several per day. In the valley and flat land areas, the soils are more conducive to dust generation than in the hills and mountains where good amounts of rocky material bind the road surfaces more tightly.

b. Air pollution: Expected increases in traffic movements on improved roads will put some more traffic smoke into the air, but, as noted, the numbers of vehicle movements will still be few. The pristine air quality in these rural areas and the frequent rains and prevailing winds, especially in the growing and marketing season, should quickly wash out all pollutants so as to make any short term increases almost undetectable.

c. Noise pollution: During rehabilitation work the earth moving equipment will be noisy, but this will be for short duration on any given section. Further, considerable of the rehabilitation and much of the maintenance will be done by labor-intensive methods. During crop marketing times some added heavy truck noises will be noted.

4. Natural resources:

a. There will be no altered use of water resulting from project actions.

b. There are no irreversible, irrevocable or inefficient commitments of natural resources contemplated in this project.

5. Cultural:

a. Altering physical symbols. Since all rehabilitation and maintenance work will be on existing rural roads which have been commonly traveled for a few to several years, there will be no disturbance of cemeteries, shrines, churches or other cultural sites within the project area.

b. Dilution of Cultural Tradition. The rural culture of the Dominican Republic is highly oriented on broad based family lines. There should be little, if any, dilution of this tradition. A possible secondary benefit may be the strengthening of this tradition by making less desirable the present out-migration from some parts of the project area.

c. Changes in family structure. See 2 above.

6. Socio-economic:

a. Changes in economic/employment patterns: One of the substantive benefits expected of the improved rural roads is that there will be an increase in disposable farm income due to several factors including decreases in the cost of transporting farm products to markets.

No changes in types of employment within the project area is anticipated. However, it is expected that on-farm employment may rise due to the potential increase in land put under cultivation and also the reduction of out-migration.

b. Changes in cultural patterns: Cultural pattern changes, which the out-migration of young people have been producing, should slow down with increased farming activity. This should stabilize population shifts and fortify the traditional extended family system.

c. Changes in population patterns: Facilitating transport may lead to some increases in cross-roads marketing and pick-up points. Likewise small agri-businesses and service businesses (coffee houses and soft drink sales) may locate at these points. These are seen as being rather minor and at most represent no significant impact on the environment.

7. Health:

a. Changing a natural environment: No significant impacts are anticipated.

b. Eliminating an ecosystem element: Since all road rehabilitation and maintenance work will be limited to existing rural roads there will be little if any disturbance to natural ecosystem elements.

c. Other factors - changing and existing man-made environment: Malaria appears to be the only water related disease in the Dominican Republic which can be associated with project activity and this is limited to those areas in the western parts of the country, near the border with Haiti. Improved ditching and water run-off should eliminate all or nearly all pooling of water near the roads, thereby having a positive effect in helping to reduce the incidence of malaria.

Borrow areas for road surfacing materials will be so used as to prevent the pooling of water. This will be done to minimize muddy conditions in the borrow areas as well as for health reasons.

Improved roads will provide for better distribution of malaria control efforts and also of anti-malarial drugs. Likewise, other health conditions should improve or have the opportunity to improve with improved ingress and egress of the rural communities. Health centers should expand in numbers and services with the improvements in transportation.

8. General:

a. International Impacts: The only possible international impact might be the improvement of health conditions near the border with Haiti resulting from the improved transport system providing more health care to this area as well as reducing the areas where mosquitoes might breed by having positive roadside drainage. Such health improvements could result in minor betterment of health on both sides of the immediate border areas.

b. There are no impacts of a controversial nature foreseen.

c. There are no larger program impacts of a detrimental nature foreseen.

d. Other factors - endangered species: With swine fever a serious problem in the Dominican Republic, necessary drastic steps are being taken to control the disease which infects not only domestic pigs but the native wild pigs as well. The GODR's program for control of swine fever calls for the total elimination of all their wild pigs. The improved rural feeder roads will provide much better access to many of the mountain areas where these wild pigs must be hunted down by the GODR Army teams responsible for this work.

According to available data and knowledge, there are no other known endangered species of either flora or fauna in the project areas of the Dominican Republic.

E. Other possible Impacts: None are foreseen.

RECOMMENDATION FOR ENVIRONMENTAL ACTION

Field observation, interviews and other data search indicate that little or no significant detrimental environmental impact will be brought about by this project; rather, measurable significant benefit impacts will be forthcoming.

It is, therefore, recommended that no Environmental Assessment (EA) or Environmental Impact Statement (EIS) is required. Further, it is recommended that a negative determination be made.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact  
Identification  
and  
Evaluation\*

Impact Areas and Sub-areas

A. LAND USE

1. Changing the character of the land through:

- a. Increasing the population . . . . . L+
- b. Extracting natural resources . . . . . L+
- c. Land clearing . . . . . L-
- d. Changing soil character . . . . . N

2. Altering natural defenses . . . . . N

3. Foreclosing important uses . . . . . N

4. Jeopardizing man or his works . . . . . N

5. Other factors

Erosion of land . . . . . H+

B. WATER QUALITY

1. Physical state of water . . . . . L-

2. Chemical and biological states . . . . . N

3. Ecological balance . . . . . N

4. Other factors

- 
- \* N - No Environmental impact
  - L - Little environmental impact
  - M - Moderate environmental impact
  - H - High environmental impact
  - U - Unknown environmental impact

Impact ratings have been given a (+) or (-) value depending on the rater's knowledge of whether the impact will generally be of a beneficial (+) or detrimental (-) nature.

C. ATMOSPHERIC

- 1. Air additives . . . . . L-
  - 2. Air pollution . . . . . L-
  - 3. Noise pollution . . . . . L-
  - 4. Other factors
- 

D. NATURAL RESOURCES

- 1. Diversion, altered use of water . . . . . N
  - 2. Irreversible, inefficient commitments . . . . . N
  - 3. Other factors
- 

E. CULTURAL

- 1. Altering physical symbols . . . . . N
- 2. Dilution of cultural traditions . . . . . N
- 3. Other factors
- Changes in family structure L+

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns . . . . . M+
- 2. Changes in population . . . . . L+
- 3. Changes in cultural patterns . . . . . L+
- 4. Other factors . . . . .
- Changes in population patterns L

G. HEALTH

- 1. Changing a natural environment . . . . . N
- 2. Eliminating an ecosystem element . . . . . N
- 3. Other factors
- Changing an existing man-made environment M+

H. GENERAL

- 1. International impacts . . . . . Y
  - 2. Controversial impacts . . . . . N
  - 3. Larger program impacts . . . . . N
  - 4. Other factors
- Endangered species Y

I. OTHER POSSIBLE IMPACTS (Not listed above)

\_\_\_\_\_

\_\_\_\_\_

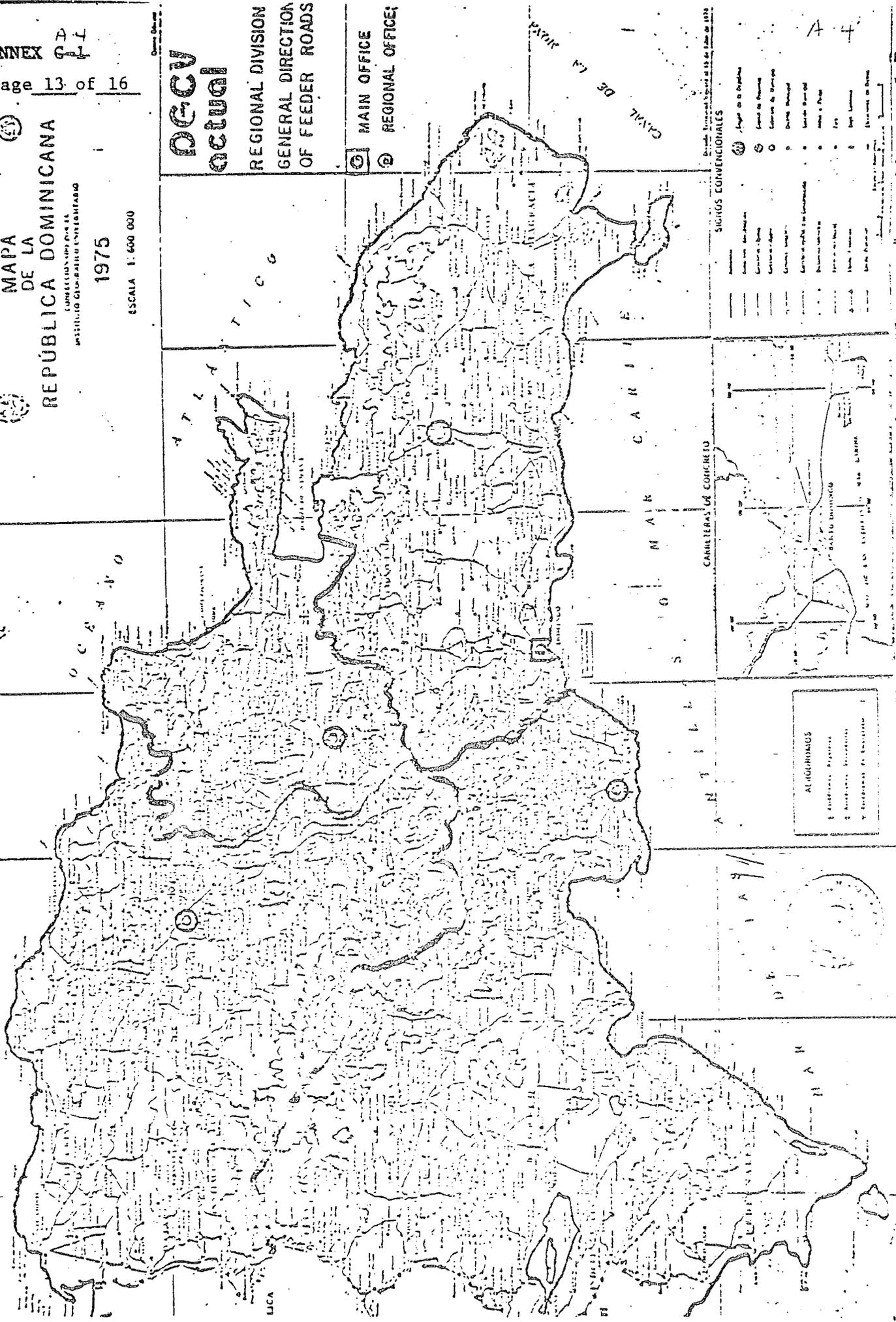
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MAPA DE LA REPUBLICA DOMINICANA  
 COMPLECCION DEL PLAN GENERAL DE OBRAS DE LA CARRETERA  
 1975

ESCALA 1:600 000

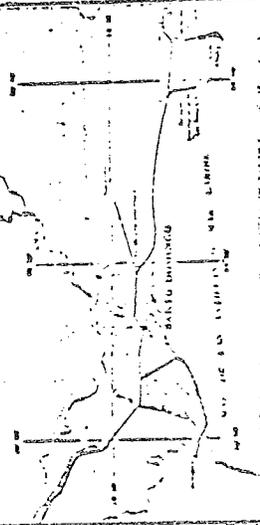
**DECV actual**  
 REGIONAL DIVISION  
 GENERAL DIRECTION  
 OF FEEDER ROADS

① MAIN OFFICE  
 ② REGIONAL OFFICE



SÍMBOLOS CONVENCIONALES

①	Alcaldía
②	Comuna
③	Comuna
④	Comuna
⑤	Comuna
⑥	Comuna
⑦	Comuna
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ALICORNIO  
 ① Alcornico  
 ② Alcornico  
 ③ Alcornico





DGCV LINKAGES WITH OTHER GODR INSTITUTIONS

Camino Vecinales was incorporated as a separate division of the Secretariat of Public Works in 1970, in an effort to coordinate all rural road construction activities and to establish an overall GODR policy regarding the location and construction of rural roads.

Since its inception, Caminos Vecinales has, unsuccessfully, attempted to gain the support of the various GODR institutions with rural road building programs in the development of a National Rural Road Plan.

With the arrival of the new government, there has been an attempt to centralize similar activities in the most appropriate agency in each sector. The new government has stated that the construction and maintenance of rural roads will be the sole responsibility of Caminos Vecinales.

Given this new mandate Caminos Vecinales is taking steps to gather the information necessary to develop a National Plan for the construction and maintenance of rural roads.

Since the primary role of rural roads has been to serve the agriculturally based rural economy, Caminos Vecinales is making a strong effort to develop a coordinating committee comprised of the major GODR institutions whose programs service the agricultural needs of the rural areas.

The proposed Coordinating Committee for Rural Roads will be comprised of representatives of:

1. Caminos Vecinales
2. Secretariat of Agriculture
3. Office of Community Development (ONC)
4. Agrarian Reform Institute
5. Cooperative Credit Development Institute
6. Director General of Forestry
7. Agricultural Bank
8. Special Fund for Agricultural Development (FEDA)
9. National Planning Office
10. National Sugar Institute

The Secretariat of Agriculture (SEA) has appointed a coordinator at the national level and has instructed its regional directors to work with Caminos Vecinales to develop regional plans. In its first month of operations, SEA-Caminos Vecinales teams identified 150 kms. of priority rural roads that need to be rehabilitated.

The Office of Community Development (ODC), which is the government agency primarily concerned with community development, has appointed a liaison with Caminos Vecinales. The ODC, an agency created partly with AID funds in 1967, has a national network of 185 promoters. It has organized over 1,300 community groups. Many of these community organizations were established for the immediate task of participating in a community infrastructure project such as the construction of a community well or a rural school. The ODC has the institutional capacity to work with Caminos Vecinales in the development of community road committees that would work on the rehabilitation and maintenance of rural roads.

Other GODR institutions with programs in rural areas have been contacted and have voiced interest in the proposed project. The Mission is supporting these efforts which will increased the interrelationship between rural road construction, rehabilitation and maintenance efforts and priority agricultural activities under the Agriculture Sector Loan Program.

CERTIFICATION PURSUANT TO

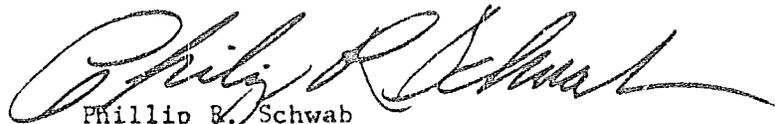
Section 611 (e) of the

FOREIGN ASSISTANCE ACT

As Amended

I. Phillip R. Schwab, the principal officer of the Agency for International Development in the Dominican Republic, do herewith certify that in my judgment, the Dominican Republic has both the financial capability and human resources to maintain and utilize effectively goods and services procured under the capital assistance project entitled the Rural Roads Maintenance and Rehabilitation.

This judgment is based upon the record of implementation of AID-financed projects in the Dominican Republic and the results of the consultations undertaken during intensive review of this new project.

  
Phillip R. Schwab  
Director, USAID Dominican Republic

August 10, 1979  
Date



REPUBLICA DOMINICANA  
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
DESPACHO DEL SECRETARIO DE ESTADO  
AÑO INTERNACIONAL DEL NIÑO

12586

6 de Agosto de  
Santo Domingo,

JUL 26 1979  
RECEIVED  
2 13 PM '79  
GENERAL RESOURCES  
INTERNATIONAL OFFICE

Señor  
Philip R. Schwab,  
Director de la Agencia para  
el Desarrollo Internacional,  
Santo Domingo, República Dominicana.

Distinguido Señor Schwab:

El Gobierno de la República Dominicana, bajo la presidencia de Su Excelencia, Sr. Silvestre Antonio Cuzmán Fernández, ha iniciado un programa para desarrollar la capacidad institucional de la República Dominicana para el mantenimiento y rehabilitación de caminos vecinales a nivel nacional, regional y comunitario, utilizando además las relaciones interdepartamentales entre otras instituciones ligadas al desarrollo agropecuario. Para este fin, he informado a Su Excelencia, el Señor Presidente sobre los trámites de solicitud a esa Agencia para el Desarrollo Internacional, de un préstamo por valor de US\$10,000,000, bajo los más favorables términos, para así poder realizar las acciones tendientes al logro de nuestros objetivos.

Como es de su conocimiento, durante los últimos meses, técnicos de esta Secretaría de Estado, en coordinación con representantes de la A.I.D. han diseñado un proyecto basado en los atinados propósitos del Gobierno.

La Secretaría de Estado de Obras Públicas y Comunicaciones contempla desarrollar un programa que contenga los elementos esenciales que aseguren la capacidad institucional de caminos vecinales para la Rehabilitación y Mantenimiento de Caminos Vecinales. Nuestras principales metas en la implementación de este programa serían:

- 1- Promover un sistema de organizaciones locales proveyendo las herramientas para ayudar a mantener y rehabilitar Caminos Vecinales.

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.../

NON:  
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REPUBLICA DOMINICANA

1256 SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES

DESPACHO DEL SECRETARIO DE ESTADO

AÑO INTERNACIONAL DEL NIÑO

Sr. Philip R. Schwab...

-2-

- 2- Diseñar un programa de mantenimiento rutinario usando mano de obra contratada localmente y supervisado por personal de Caminos Vecinales.
- 3- Poner bajo el programa de mantenimiento regular 3,500 Kms. de Caminos Vecinales durante la ejecución de este proyecto.
- 4- Financiar la rehabilitación de 1,200 Kms. de Caminos Vecinales.
- 5- Desarrollo de siete centros regionales de mantenimiento con personal suficiente para manejar los proyectos.
- 6- Entrenamiento de mecánicos, operadores de equipo, supervisores, trabajadores y promotores de comunidades.
- 7- Desarrollo y equipamiento de siete talleres de mantenimiento regionales y facilidades de respaldo sub-regional.
- 8- Establecer un sistema para la compra el uso y mantenimiento de equipo pesado para respaldar las actividades locales de mantenimiento.
- 9- Desarrollo de un inventario nacional del sistema actual de todos los caminos vecinales y su estudio socio-económico en el área de influencia.
- 10- Asistencia técnica en administración y planificación.

Esta Secretaría de Estado, se compromete a través de la Dirección General de Caminos Vecinales emprender las tareas de administración, controles financieros y el apoyo técnico necesario para llevar a cabo con éxito este proyecto, con el fin de continuar las actividades mencionadas después de finalizada la ejecución del programa.

En espera de una pronta y favorable acogida, queda de usted muy atentamente,

ING. RAFAEL COROMINAS PEPIN,  
Secretario de Estado de Obras Públicas y Comunicaciones.

PROJECT AUTHORIZATION AND REQUEST FOR  
ALLOTMENT OF FUNDS

Name of Country: DOMINICAN REPUBLIC

Name of Project: RURAL ROADS MAINTENANCE AND  
REHABILITATION LOAN

Project Number : 517-0130

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan to the Dominican Republic (the "Borrower") of not to exceed ten Million United States Dollars (\$10,000,000.00) (the "Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services requested for the project as described in the following paragraph.

The project consists of assisting in a program implemented by the Borrower's Secretariat of Public Works and Communication through the Directorate General of Rural Roads (DGCV) to develop the institutional capacity of the DGCV to rehabilitate and maintain rural roads (hereinafter referred to as the "Project"). The entire amount of the A.I.D. financing herein authorized for the Project will be obligated when the Project Agreement is executed.

I hereby authorize the initiation of 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 and covenants and major conditions together with such other terms and conditions as A.I.D. may deem appropriate:

A. Interest Rate and Terms of Repayment

The Borrower shall repay the Loan to A.I.D. in United States Dollars within twenty-five (25) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Borrower shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of two percent (2%) per annum during the first ten (10) years, and three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

B. Source and Original of Goods and Services

Except for ocean shipping, goods and services financed by A.I.D. under the Loan shall have their source and origin in the Dominican Republic or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Loan shall be procured in any eligible source country except the Dominican Republic.

C. Conditions Precedent to Disbursement

1. Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, Borrower shall, except as A.I.D. may otherwise agree in writing:

- a. Confirm its commitment to establish a fully staffed rural roads maintenance unit within the DGCV.
- b. Provide USAID with evidence of its intention to create a separate line item in the national budget for the DGCV maintenance unit.
- c. Confirm a permanent rural roads maintenance budgeting objective of \$850 dollars per km. (in present value) for rural roads brought into the maintenance system established under the project.
- d. Appoint a full time coordinator for the project.

2. Prior to the first disbursement, or the issuance of any commitment documents under the Project Agreement to finance procurement of equipment, Borrower shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D. evidence of:

- a. A plan for commodity procurement, delivery, distribution to regional centers and warehousing.
- b. A plan for a preliminary inventory system.

3. Prior to the first disbursement, or the issuance of any commitment documents under the Project Agreement to finance Rehabilitation and maintenance operations, Borrower shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance satisfactory to A.I.D. evidence of:

- a. A plan for rehabilitation and maintenance operations.
- b. An executed contract for technical advisory services.
- c. Establishment of a maintenance management and reporting system within DGCV.
- d. Delegation of authority and transfer of responsibility for equipment and staff by DGCV to Regional Centers necessary to implement decentralization of maintenance.

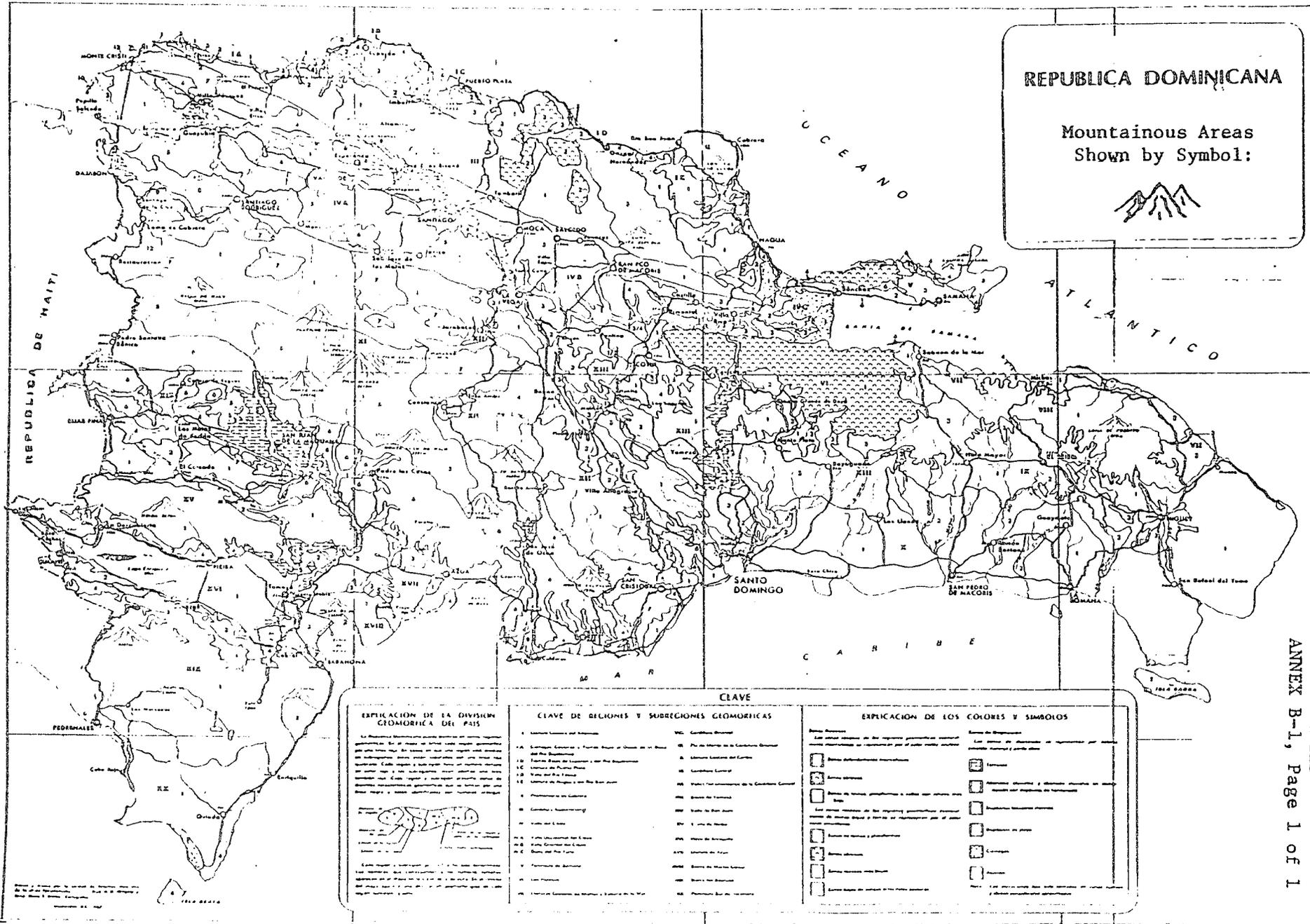
D. Covenants

The GODR will covenant to:

- a. Use equipment to be procured under the project only for rural road rehabilitation and maintenance work, unless otherwise agreed by AID.
- b. Recruit and maintain sufficient qualified personnel at all levels required to carry out the rural roads maintenance program effectively.

E. Waiver

Motorcycles financed by A.I.D. for the project under the Loan shall have their source and origin in countries included in A.I.D. Geographic Code 899 (Free World).



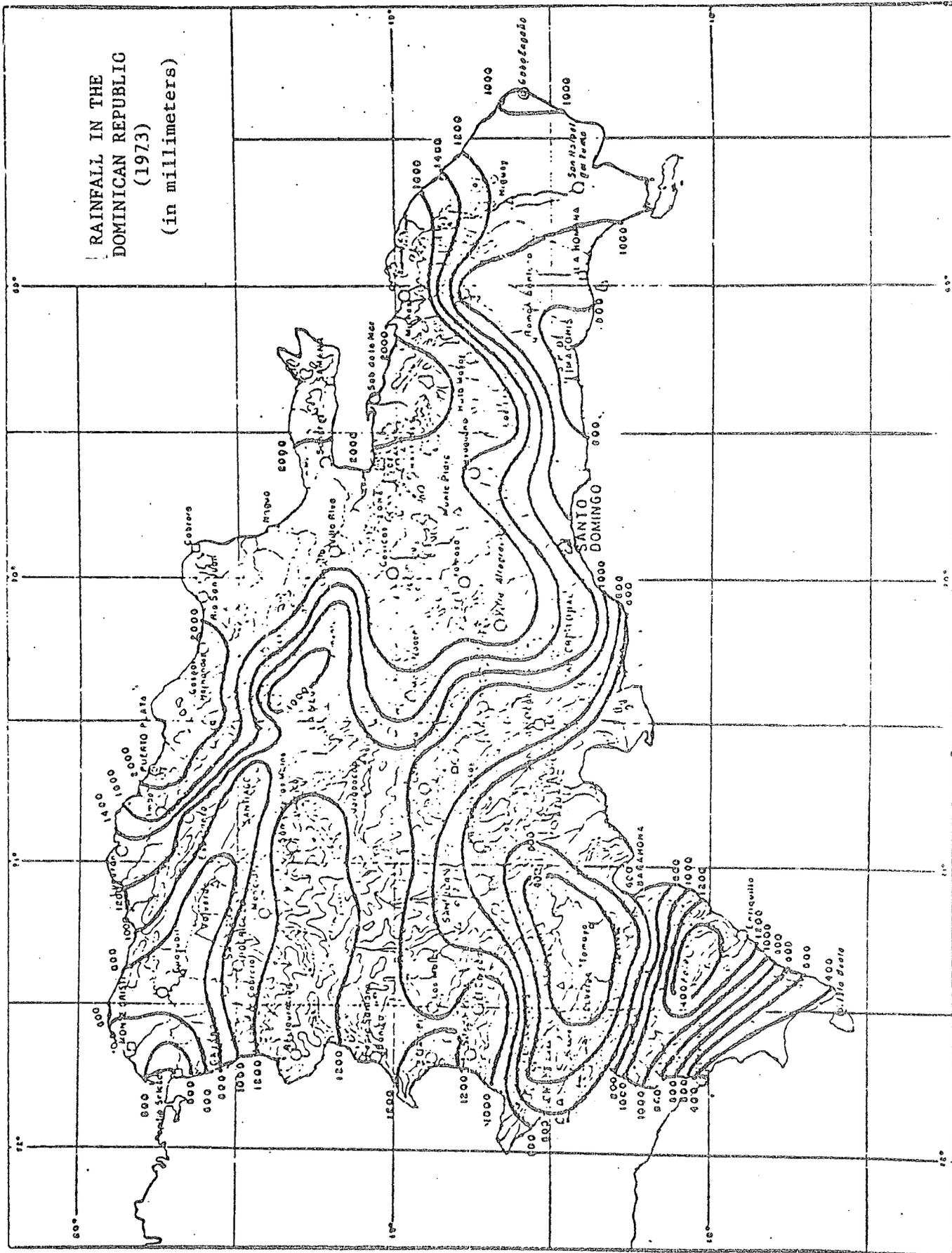
**REPUBLICA DOMINICANA**

Mountainous Areas  
Shown by Symbol:

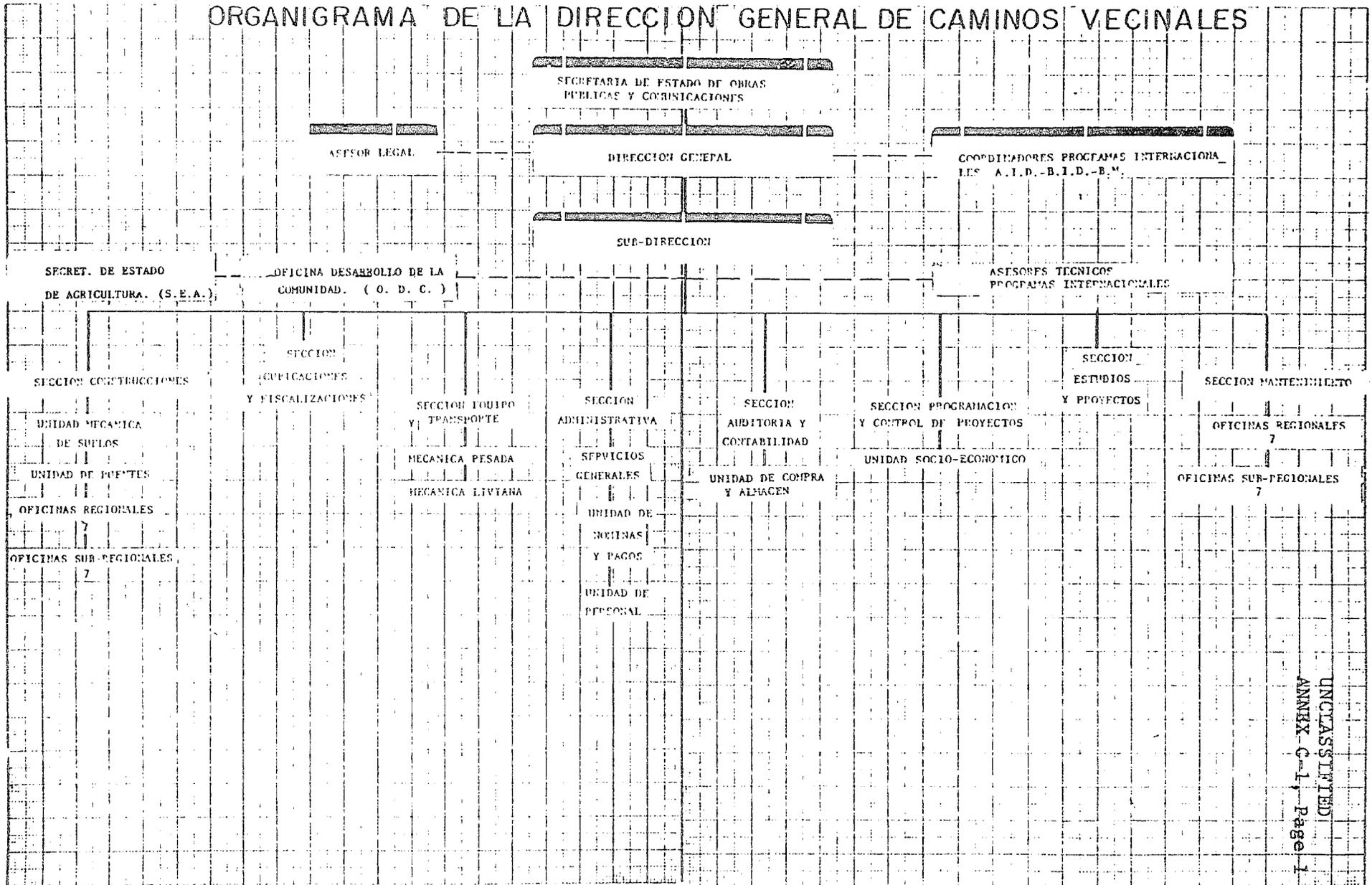
**CLAVE**

<p><b>EXPLICACION DE LA DIVISION GEOMORFICA DEL PAIS</b></p> <p>Las divisiones geomorfológicas del país se basan en los tipos de relieve que predominan en cada una de ellas. Estas divisiones son:</p> <ul style="list-style-type: none"> <li>I. Cordillera Occidental</li> <li>II. Cordillera Oriental</li> <li>III. Cordillera Septentrional</li> <li>IV. Cordillera Meridional</li> <li>V. Cordillera de Parícuti</li> <li>VI. Cordillera de Parícuti</li> <li>VII. Cordillera de Parícuti</li> <li>VIII. Cordillera de Parícuti</li> <li>IX. Cordillera de Parícuti</li> <li>X. Cordillera de Parícuti</li> <li>XI. Cordillera de Parícuti</li> <li>XII. Cordillera de Parícuti</li> <li>XIII. Cordillera de Parícuti</li> <li>XIV. Cordillera de Parícuti</li> <li>XV. Cordillera de Parícuti</li> <li>XVI. Cordillera de Parícuti</li> <li>XVII. Cordillera de Parícuti</li> <li>XVIII. Cordillera de Parícuti</li> <li>XIX. Cordillera de Parícuti</li> <li>XX. Cordillera de Parícuti</li> </ul>	<p><b>CLAVE DE REGIONES Y SUBREGIONES GEOMORFICAS</b></p> <ul style="list-style-type: none"> <li>1. Cordillera Occidental</li> <li>2. Cordillera Oriental</li> <li>3. Cordillera Septentrional</li> <li>4. Cordillera Meridional</li> <li>5. Cordillera de Parícuti</li> <li>6. Cordillera de Parícuti</li> <li>7. Cordillera de Parícuti</li> <li>8. Cordillera de Parícuti</li> <li>9. Cordillera de Parícuti</li> <li>10. Cordillera de Parícuti</li> <li>11. Cordillera de Parícuti</li> <li>12. Cordillera de Parícuti</li> <li>13. Cordillera de Parícuti</li> <li>14. Cordillera de Parícuti</li> <li>15. Cordillera de Parícuti</li> <li>16. Cordillera de Parícuti</li> <li>17. Cordillera de Parícuti</li> <li>18. Cordillera de Parícuti</li> <li>19. Cordillera de Parícuti</li> <li>20. Cordillera de Parícuti</li> </ul>	<p><b>EXPLICACION DE LOS COLORES Y SIMBOLOS</b></p> <ul style="list-style-type: none"> <li>1. Cordillera Occidental</li> <li>2. Cordillera Oriental</li> <li>3. Cordillera Septentrional</li> <li>4. Cordillera Meridional</li> <li>5. Cordillera de Parícuti</li> <li>6. Cordillera de Parícuti</li> <li>7. Cordillera de Parícuti</li> <li>8. Cordillera de Parícuti</li> <li>9. Cordillera de Parícuti</li> <li>10. Cordillera de Parícuti</li> <li>11. Cordillera de Parícuti</li> <li>12. Cordillera de Parícuti</li> <li>13. Cordillera de Parícuti</li> <li>14. Cordillera de Parícuti</li> <li>15. Cordillera de Parícuti</li> <li>16. Cordillera de Parícuti</li> <li>17. Cordillera de Parícuti</li> <li>18. Cordillera de Parícuti</li> <li>19. Cordillera de Parícuti</li> <li>20. Cordillera de Parícuti</li> </ul>
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RAINFALL IN THE  
DOMINICAN REPUBLIC  
(1973)  
(in millimeters)



# ORGANIGRAMA DE LA DIRECCION GENERAL DE CAMINOS VECINALES



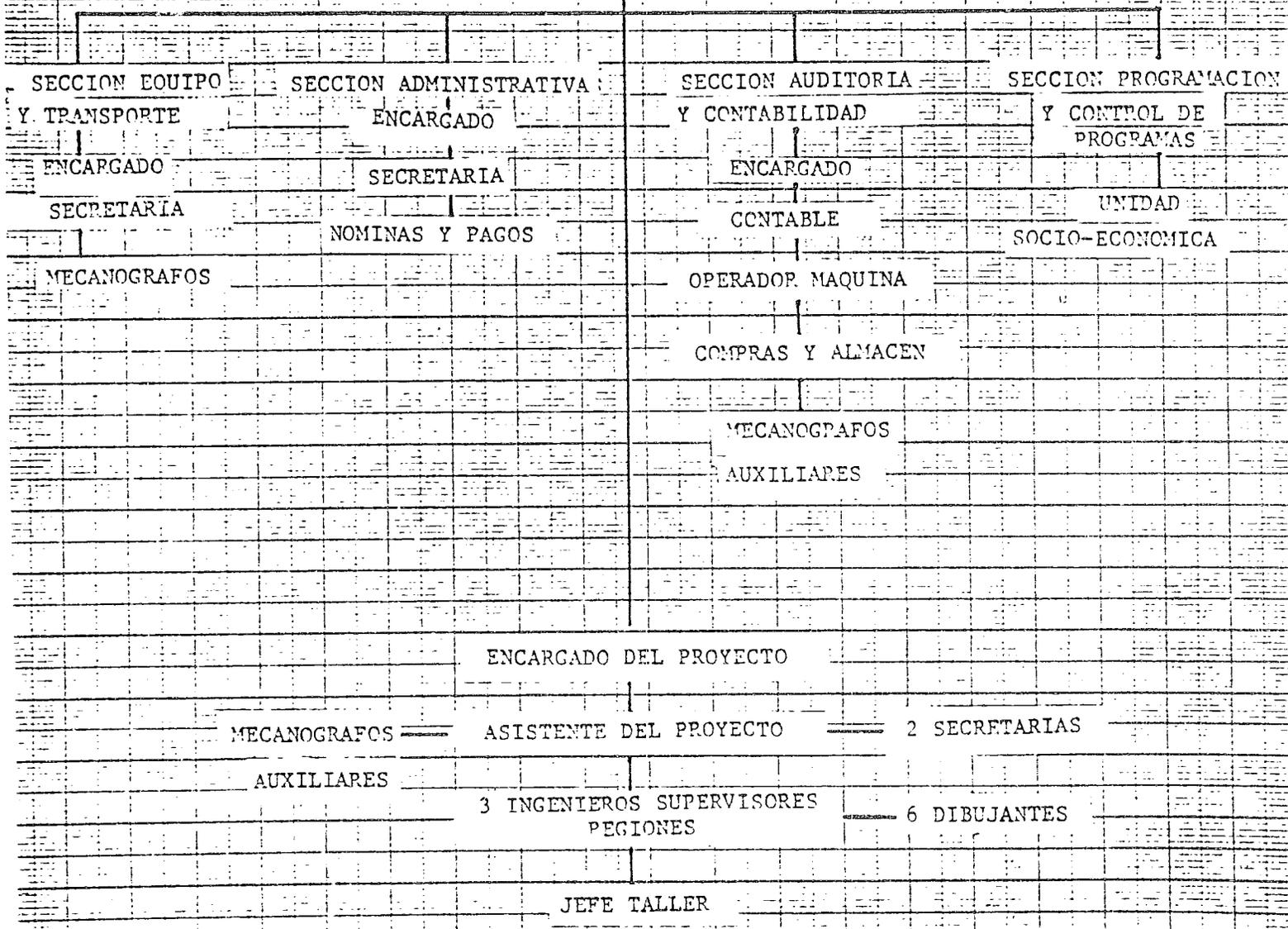


REPUBLICA DOMINICANA  
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
DIRECCION GENERAL DE CAMINOS VECINALES

# ORGANIGRAMA - SECCION MANTENIMIENTO

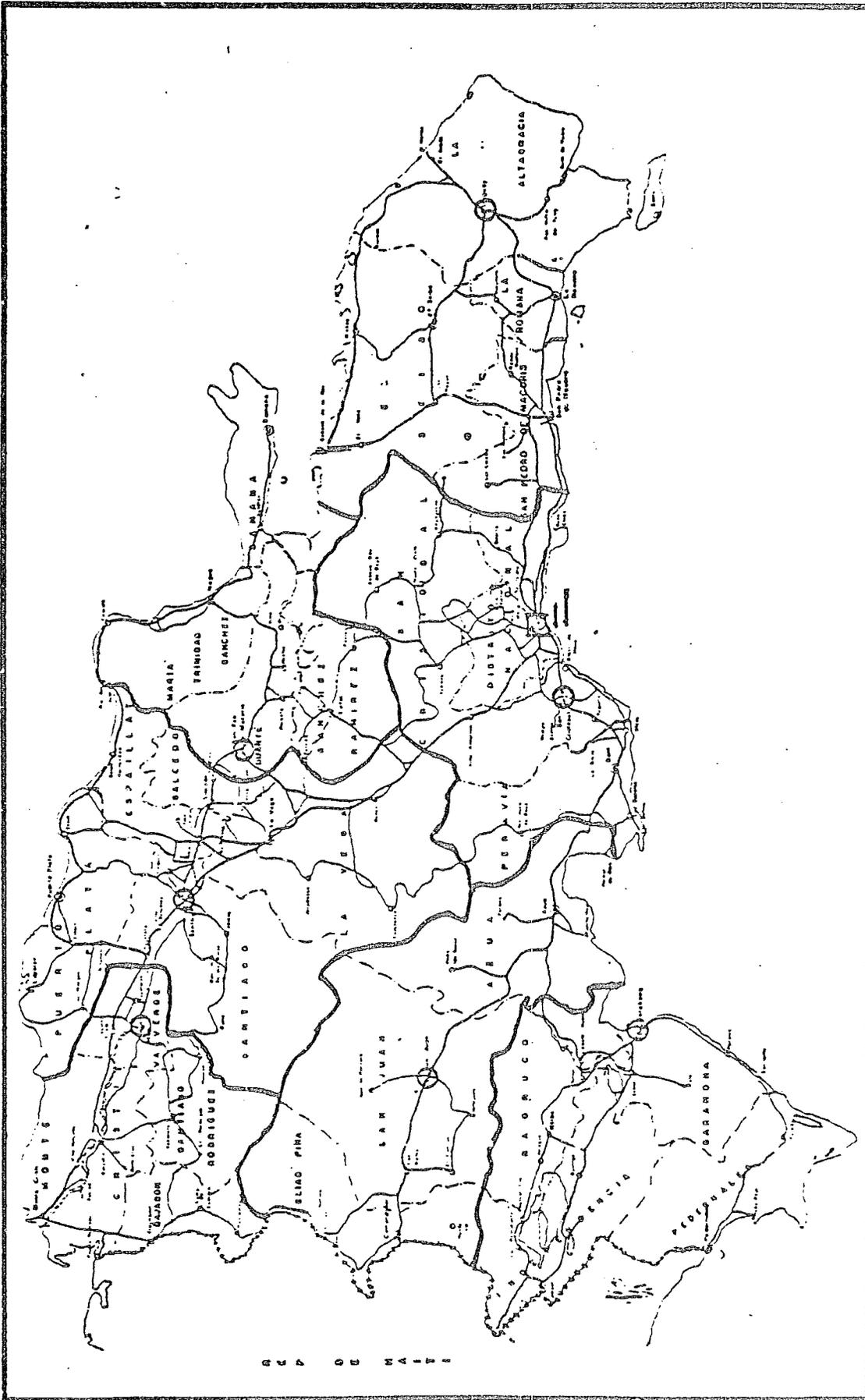
## OFICINA CENTRAL

### SECCION MANTENIMIENTO

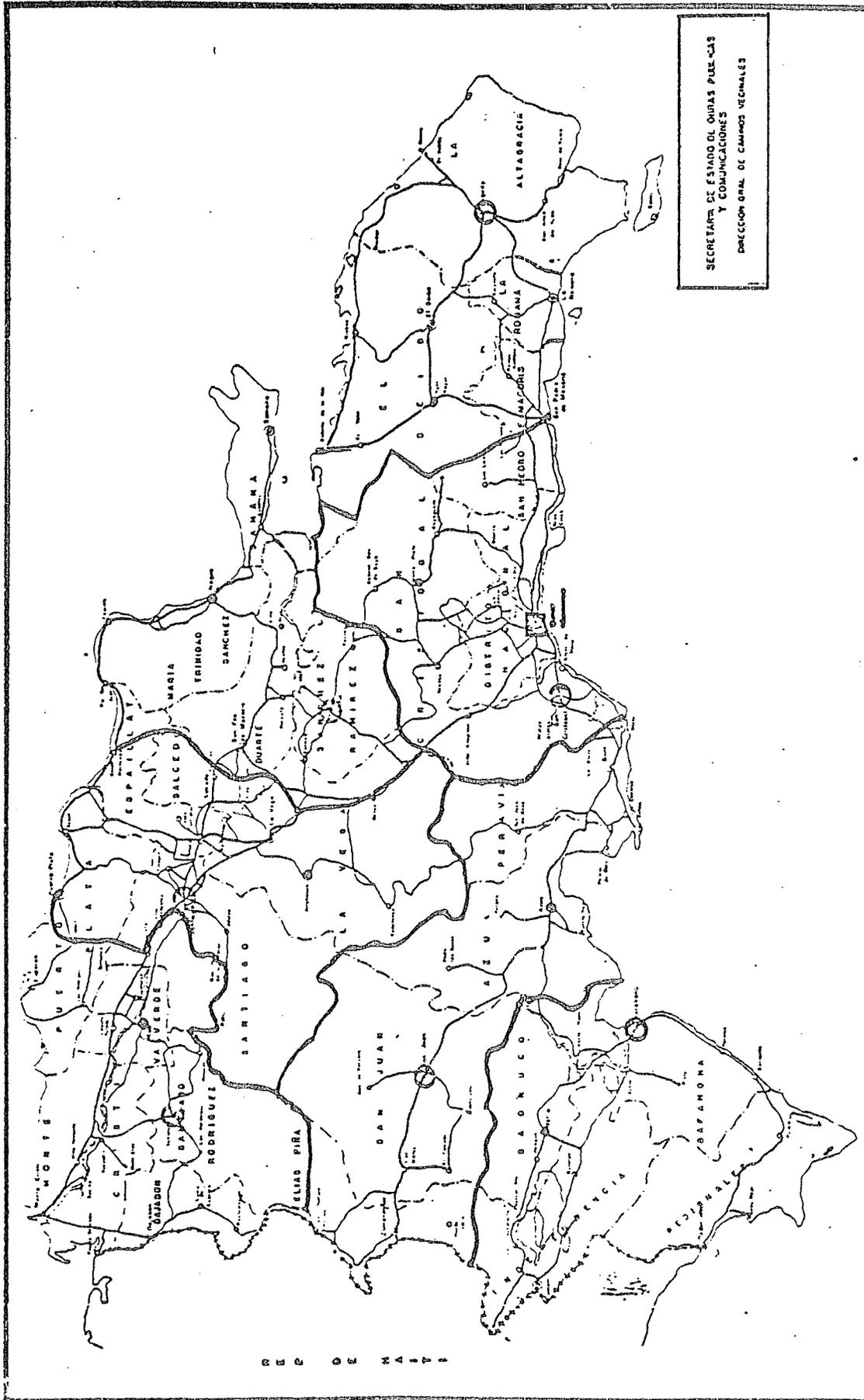




REGIONAL DIVISIONS SECRETARIAT OF STATE FOR AGRICULTURE (SEA)









EQUIPMENT PURCHASES

	<u>CIF/Santo Domingo</u>	<u>(\$000)</u>
7 Front End Loaders 3 yd <sup>3</sup> .150- 180 HP Diesel	\$60,000	420
7 Compactors - 8 to 10 ton. - 170 HP Diesel	43,500	304
7 Motorgraders - 125-150 HP Diesel	45,000	315
7 Tractors W/Rippers - 150 HP Diesel	85,000	595
16 Pickups 4 x 2.1/2 - 3/4 tons. Diesel	9,000	144
7 Truck Tank Water 1.000 gls. 190 HP Diesel	18,500	130
7 Lube Trucks - Diesel	22,000	154
7 Mobile Shop Trucks - Diesel	30,000	210
4 Jack Hammers	1,000	4
2 Air Com pressors - 350 CFM	22,000	44
2 Portable Rock Crushers	30,500	71
7 Aggregate Classifiers, Portable	15,000	105
45 Dump Trucks 5 M <sup>3</sup> . 190 HP Diesel	27,000	1,215
3 Truck Tank Fuel, 2000 gls. Diesel	29,000	87
2 Low Bed Trailer Trucks - 30-35 ton. Diesel	90,000	180
14 Tank Fuel. 1000 gls.	1,500	21
14 Trail Motorcycles. Street-Trail	1,000	14
14 Radio Receivers	<u>350</u>	<u>5</u>
		4,018
	Spare Parts - 20%	<u>803</u>
		4,821
	Hand Tools	<u>316</u>
	Total	5,137
	7% inflation	<u>359</u>
		\$5,496

TYPES OF EQUIPMENT REQUIRED FOR REGIONAL WORKSHOPS

	<u>(U.S.\$000)</u>
1. Cleaning Equipment	10.0
2. Lube Equipment	3.0
3. Tooling	15.0
4. Parts and Tool Storage	1.0
5. Tire Repair	3.0
6. Battery Service	1.0
7. Welding Facilities	7.0
8. Vehicle Tune Up	.5
9. Refueling Facilities	3.0
10. Air Compressor 5HP	1.7
11. Guard House	1.5
12. Loading Ramp	2.5
13. Grease Ramp	5.0
14. Fence (Masonry and chainlink)	<u>15.0</u>
Sub-total	69.2
Spare Parts 10% of 45.2 (excluding items 11-14)	4.5
Sub-total	73.7
Inflation 7%	<u>5.1</u>
Total, one regional shop	78.8
Seven regional shops x 78.8 =	<u><u>551.6</u></u>

GODR EQUIPMENT OPERATING COSTS

Monthly Operating Cost for 176 Hours and Hourly Cost (July 1979)  
(RD\$)

	Operator	Helper	Fuel	Filter, Lubes, Oil	Spare Parts	Battery	Tires	Special Items	Misc.	Total	Deprec.	Total
Tractor 150 H.P.	280	140	425	240	825	20	0		97	2027	1085	3112
								Hourly Cost		(11.52)	(6.16)	(17.68)
Motorgrader 125 H.P.	280	140	545	240	550	15	110		94	1974	935	2909
								Hourly Cost		(11.22)	(5.31)	(16.53)
Front End Loader 180 H.P.	280	140	345	150	285	15	265		74	1554	765	2319
								Hourly Cost		(8.83)	(4.34)	(13.17)
Compactor 170 H.P.	280	140	370	135	264	10	0		60	1259	792	2051
								Hourly Cost		(7.15)	(4.50)	(11.65)
Dump Truck 5 M <sup>3</sup>	225	0	775	340	265	15	60		84	1764	510	2274
								Hourly Cost		(10.02)	(2.90)	(12.92)
Water Truck 190 H.P. 1000 Gal.	225	115	775	340	265	15	60		90	1865	510	2395
								Hourly Cost		(10.71)	(2.90)	(13.61)
Pick-up 3/4 ton diesel	175	0	775	340	265	10	35		80	1680	280	1960
								Hourly Cost		(9.55)	(1.59)	(11.14)
Lo-Boy 30-35 ton	280	140	965	425	1570	15	315		185	3855	1232	5127
								Hourly Cost		(22.13)	(7.00)	(29.13)

COMPARISONS EQUIPMENT HOURLY RATES

(includes: operator, helper, fuel, lubricator, filter elements, spare parts, battery, tire, and misc.)

	CODR OPERATION COST			CONTRACTOR RENTAL RATE	DIFFERENCE
	Net	Deprec.	Hourly	Hourly	Hourly
Tractor	11.52	6.16	17.68	35.00 *	17.32
Motor Grader	11.22	5.31	16.53	25.00 *	8.47
Front End Loader	8.83	4.34	13.17	30.00 *	16.83
Compactor	7.15	4.50	11.65	15.00 *	3.35
Dump Truck	10.22	2.90	12.92	15.00 *	2.08
Water Truck	10.71	2.90	13.61	17.00 *	3.39
Pick-up	9.55	1.59	11.14	15.00 *	3.86
Lo-Boy	22.13	7.00	29.13	35.00 *	5.87

\* As of July, 1979, and includes the latest increases in fuel costs.

HAND TOOL PURCHASES  
(Shelf Prices)

		<u>Estimated Unit Price</u>	<u>Total</u>
2,400	Wheelbarrows	\$60	\$144,000
2,400	Picks	4	9,600
4,800	Shovels R.P.L.H.	6	28,000
1,200	Shovels S.P.L.H.	6	7,200
1,000	Mattocks	8	8,000
3,000	Machetes	3	9,000
6,000	Files	1	6,000
700	Hatchets	8	5,600
1,400	Road Rakes	9	12,600
300	Post Hole Diggers	10	3,000
700	Dirt Tampers, Square	16	11,200
700	5' Pry Bars	8	5,600
70	Cross cut Saws	30	2,100
700	Sledge Hammers 4 <sup>#</sup>	8	5,600
1,400	Hoes, Heavy Grubbing	9	12,600
700	Claw Hammers	5	3,500
700	Axes	10	7,000
700	Sets Mason's Tools	6	4,200
15,000	Handle Replacements	2	30,000
20	Heavy Duty Wire Cutters	15	300
30	10 Gallon Water Cans	25	750
			<u>\$315,850</u>

HAND TOOL REQUIREMENTS FOR REHABILITATION  
(30 man hand labor team)

<u>Hand Tools</u>	<u>Estimated Cost</u>
15 Wheelbarrows	\$ 900
30 Picks	120
30 R.P.L.H. Shovels	180
10 S.P.L.H. Shovels	60
15 Mattocks	120
30 Machetes	90-
60 Files	60
5 Hatchets	40
10 Road Rakes	90
2 Post Hole Diggers	20
4 Dirt Tampers, Square	64
4 Pry Bars, 5 foot	32
2 Cross Cut Saws	60
2 Sledge Hammer 4 <sup>#</sup>	16
15 Hoes, Heavy Grubbing	135
2 Sets, Mason's Tools	12
2 Claw Hammers	10
2 Axes	20
2 Heavy Duty Wire Cutters	30
3 10-gallon Water Cans	75
125 Replacement Handles	<u>250</u>
	\$2,384
	<u>26228</u>

TOOL SET FOR HAND LABOR MAINTENANCE

1	Wheelbarrow	\$60
1	Pick	4
1	R.P.L.H. Shovel	6
1	S.P.L.H. Shovel	6
2	Machetes	3
4	Files	4
1	Hatchet	8
1	Road Rake	9
1	Dirt Tamper, Square	16
1	Pry Bar, 5 foot	8
1	Sledge Hammer, 4#	8
1	Hoe, Heavy Grubbing	9
1	Set, Mason's Tools	6
1	Claw Hammer	5
1	Axe	10
10	Handle replacements	<u>20</u>
		\$182
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REPUBLICA DOMINICANA  
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
DIRECCION GENERAL DE CAMINOS VECINALES

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BASES TEORICAS

ESFUERZOS Y COORDINACION

PARA LA IMPLEMENTACION

DE LAS JUNTAS COORDINADORAS

DE CAMINOS VECINALES (JUCAVE)

SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES

DIRECCION GENERAL DE CAMINOS VECINALES

ABRIL 1979

Contacto y Programas con las Comunidades:

Concientes de que una buena programación en materia de caminos vecinales debe hacerse siguiendo la dirección de abajo hacia arriba, es decir, en vez de realizar una programación etérea sin la consulta directa de los sectores a quienes va dirigida esta programación y quienes realmente le dan vigencia a esta

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SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
DIRECCION GENERAL DE CAMINOS VECINALES

Dirección General, desde el mismo día en que comenzamos a laborar, nos pusimos en contacto con autoridades, entidades afines con el sector agropecuario y con agricultores y asociaciones de agricultores para oír sus necesidades y elaborar junto a ellos y con su colaboración un programa coherente que incluyera mantenimiento, reconstrucción y rehabilitación de caminos vecinales o de penetración, llegando de esta manera a ofrecer una cobertura de acuerdo con nuestras posibilidades actuales.

En cada uno de los caminos que hemos o estamos rehabilitando hemos formado brigadas de obreros residentes en la zona de trabajo para realizar reapertura de cunetas (cunetas trapezoidales con suficiente capacidad de desagüe para preservar el afirmado del camino), limpieza y reparación de alcantarillas; estas brigadas trabajan en combinación con el equipo normal de construcciones.

Coordinación con entidades afines:

Es nuestro parecer, que la labor de recuperación, construcción y conservación de caminos vecinales, no puede ni debe ser obra de una sola persona ni de una sola entidad, ni de un solo sector, creemos que todas las instituciones que tienen que ver algo con el sector agrario, agro industrial y de desarrollo de las comunidades, tienen que aunar esfuerzos y trabajar en una sola dirección, para realizar el anhelo y las promesas de quien dirige



REPUBLICA DOMINICANA  
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
DIRECCION GENERAL DE CAMINOS VECINALES

los destinos nacionales, el Exmo. Señor Presidente de la República. Por tal razón, ha sido nuestra inquietud ponernos en contacto con las entidades afines, para pedirles su concurso en la elaboración y ejecución de un programa nacional de caminos, de un inventario nacional de caminos vecinales, para obtener de ellos las prioridades que se requieren en la implementación del desarrollo del sector agropecuario.

Estas coordinaciones, aunque en forma incipiente, están rindiendo sus frutos, ya que mantenemos acuerdos y colaboraciones de la Secretaría de Estado de Agricultura, Instituto Agrario Dominicano, Oficina de Desarrollo de la Comunidad, entre otros.

JUNTAS DE CAMINOS O DE VECINOS:

Como síntesis de los programas coordinados con las comunidades y con entidades y organismos afines, tenemos la creación de las llamadas Juntas de Caminos, las cuales vienen a llenar y completar el esquema de operaciones que se ha impuesto como meta esta Dirección General. A tal efecto, hemos estado en varias oportunidades coordinando con la Oficina de Desarrollo de la Comunidad, organismo que posee vivencias en materia de trabajo social con las comunidades, a fin de implementar un programa de concientización entre los agricultores y usuarios de los caminos en las diversas zonas del país.

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REPUBLICA DOMINICANA  
SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
DIRECCION GENERAL DE CAMINOS VECINALES

DE LA INTEGRACION DE LA JUNTA

La Junta Coordinadora de Caminos Vecinales (JUCAVE), se formará a instancias y diligencias de la Dirección General de Caminos Vecinales y estará compuesta de la siguiente manera:

- 1.- Dirección General de Caminos Vecinales
- 2.- Secretaría de Estado de Agricultura
- 3.- Oficina de Desarrollo de la Comunidad (O.D.C.)
- 4.- Instituto Agrario Dominicano (I.A.D.)
- 5.- Instituto de Desarrollo y Crédito Cooperativo (IDECO)
- 6.- Dirección General de Foresta.
- 7.- Fondo para el Desarrollo Agropecuario (FEDA-PIDAGRO)
- 8.- Banco Agrícola de la R.D. (BAGRICOLA)
- 9.- Oficina Nacional de Planificación (ONAPLAN), principalmente sin descontar la coordinación que pudiera realizarse con otros organismos afines.

A tal efecto, en estos momentos mantenemos unas vivas coordinaciones con la Secretaría de Estado de Agricultura y con la Oficina de Desarrollo de la Comunidad, habiendo ambas designado una persona Enlace-Representante, para trabajar en coordinación con esta Oficina.

En la actualidad, se discute con el señor Julio Batista, representante de la O.D.C. en la mencionada actividad coordinadora, un plan nacional de integración de las Juntas, ya que este orga-

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SECRETARIA DE ESTADO DE OBRAS PUBLICAS Y COMUNICACIONES  
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nismo posee promotores sociales (185 promotores en todo el país) y 1,300 comunidades organizadas a nivel nacional y cuyas facilidades pone a disposición de la implementación de las llamadas Juntas de Caminos. Otro de los aspectos discutidos, aunque no se ha llegado a ningún acuerdo, ya que es un asunto algo complejo, es la forma o método a utilizar para incentivar las Juntas mencionadas.

De todas maneras, la Dirección General de Caminos Vecinales y la O.D.C., mantienen una ronda de discusiones periódicas, hasta obtener los resultados deseados.

Con la Secretaría de Estado de Agricultura, estamos determinando prioridades, tanto para construcción, reconstrucción o mantenimiento; debiéndose en las próximas semanas tener un listado completo de prioridades.

## Annex D-1: Project Economic Analysis

### 1. Introduction

This annex presents a two-stage analysis of the proposed project: first, the overall viability of the project is assessed to see whether the project as a whole would be a worthwhile use of scarce resources; and second, a more microeconomic analysis of a typical subproject is undertaken to see the effects of including some additional considerations, such as induced agricultural expansion, on project viability and to trace the incidence of project benefits on the AID target group and other people. A review of field experience to date confirms the usefulness of collecting and analyzing micro background and impact data. The analysis includes sections describing the energy savings and employment impacts of the project as designed.

### 2. The Overall Economic Justification of the Project

This analysis estimates the economic costs and benefits of the proposed project consisting of road rehabilitation and regular maintenance as compared with the alternative of no maintenance and the consequent need for continued rehabilitation of deteriorated roads. The analysis is done using both economic prices, which differ from financial prices in that taxes are excluded, and shadow prices which more closely represent the true costs to the economy of foreign exchange and unskilled labor. This analysis concludes that the project is eminently feasible at the general level.

For each of these two alternatives the analysis simulates for each year of the project life, the condition of the road surface, the vehicle operating costs, the road maintenance costs, and the required rehabilitation costs. This enables the calculation of annual total system costs. Comparison of these total system costs with and without the project then provides the information required to calculate the values of the economic indicators of the merit of the project, such as the Internal Rate of Return (IRR), the Benefit/Cost ratio (B/C), and the Net Present Value (NPV). The discount rate used for calculating the B/C ratio and the NPV is 11%, the same as that used by the World Bank and the Interamerican Development Bank.

### Costs and Benefits

The benefits from possible increased agricultural production induced by road improvement have not been included in the overall economic justification. There is very little useful information available in the Dominican Republic indicating what the induced effect of the road improvement might be. In any case, the induced effect is believed to be small since the feeder roads to be improved and maintained under the project already have considerable vehicle traffic, and the rehabilitation does not involve any heavy rehabilitation, or reconstruction of impassable roads from which significant

induced agricultural production might follow. However, part 4 of this Annex presents several case studies, and prepares quantitative estimates of the magnitude of induced agricultural production that might be expected from the rehabilitation proposed under the project.

Savings in travel time of passengers (most of whom are poor) also are not included as one of the project benefits because of lack of reliable information on passenger travel along feeder roads in the Dominican Republic. However, it is believed that these passenger travel time savings might be quite large and more significant than those from induced agricultural production. Savings in vehicle operating cost (VOC) due to the road improvement are very likely to be passed on to the passengers (unlike the case for transport of agricultural products where transport cost savings are not always passed on), and the smoother surface and higher speeds on the improved roads will significantly reduce travel and waiting times for passengers. Thus, the exclusion of possible passenger travel time savings from the analysis is conservative in that the project benefits and impact on the poor would have been larger if these savings could have been calculated and included.

The following basic assumptions apply to the overall economic analysis:

With the Project

1. The institutionalization is successful and the project roads continue to be well maintained after project completion and for the remaining life of the heavy equipment purchased under the project (see Section 3 of this Annex for discussions of the consequences of funds for institutionalization not being made available).

2. The heavy equipment has a nominal life of 14 years, although only a 12 year life was assured in the economic analysis, and no salvage values are assigned to such equipment at the end of the project. This introduces another conservative bias to the analysis. The light equipment, such as dump trucks and pickups, has a life of 6 years, and an equipment renewal cost of RD\$3,000,000 is shown for the sixth year of the project life. If this sum were not made available, the quality and level of effort of the periodic maintenance might be reduced, though not that of routine maintenance.

3. The average daily traffic over the project roads is held constant at 50 vehicles per day throughout the life of the project. This assumption is conservative in that calculated benefits would be somewhat increased if traffic were assumed to grow at a relatively modest annual growth rate of, say, five percent.

Without the Project

1. Roads are not regularly maintained. Instead, roads are allowed to deteriorate from good condition to fair condition in three years time,

and are rehabilitated to good condition after three years.

2. The DGCV is able to rehabilitate all the roads (3500 kms. by the end of 1984) in the project road network that require rehabilitation at the end of their third year. The average three year rehabilitation cycle requires rehabilitation of 1400 kms. each year for 2 of the 3 years cycle, and 700 kms. for 1 of those years. The average rehabilitation required would be about 1667 kms. per year. If, without the project, the DGCV is not able to maintain this schedule, some of the road would deteriorate to "bad" condition in about 6 years time, and would then have to be reconstructed at a much greater cost than that for rehabilitation. In addition, vehicle operating costs would rise rapidly during the deterioration of the road from fair to bad condition. Both of these considerations as shown in the sensitivity analysis would increase the economic feasibility of the "with project" alternative.

3. The cost of road rehabilitation "without the project" is assumed to be approximately the same as that for "with the project." This, again, is a conservative assumption because the utilization of road construction equipment without the shops, technical assistance, and training provided under the project would be considerably less than that for the "with project" case. Reduced equipment utilization due to lack of maintenance and training in proper handling would significantly increase the cost of road rehabilitation.

Table 1 presents a summary of the economic benefits and costs of the project. The total duration of the project is 12 years. Capital and recurring costs are the same as presented in the tables in Exhibit 1. The derivation of the vehicle operating costs with and without the project is presented in Exhibit 2. The net project benefits for each year of the project life is the difference between the total system costs without the project and with the project, and the time stream of the net benefits yields a project internal rate of return of 19.7 per cent. Since the opportunity cost of capital in the Dominican Republic is estimated at 11 per cent, the project is economically justified.

At a discount rate of 11 per cent, the B/C ratio is 1.40. At a discount rate of 15% the B/C ratio reduces to 1.20; the project stays feasible even at the higher discount rate.

### Sensitivity Analysis

Table 2 shows the sensitivity of the project benefit cost ratio to changes in the capital costs, recurring costs and vehicle operating cost. Shown in Table 3 are the break-even values, or the percentage changes in the various costs required to reduce the project benefit/cost ratio to unity.

The sensitivity analysis shows that the project stays well within the feasible range for variation in costs of plus or minus 25%, and that the B/C ratio is more sensitive to changes in capital costs than to

TABLE 1: ECONOMIC BENEFITS AND COSTS OF THE ROAD MAINTENANCE  
AND REHABILITATION PROJECT (R.D. \$1,000)

<u>Year</u>	<u>With Project</u>			<u>Without Project</u>		<u>Net Project Benefits</u>
	<u>Capital Costs</u>	<u>Recurring Costs</u>	<u>VOC<sup>(1)</sup></u>	<u>Recurring Costs</u>	<u>VOC<sup>(1)</sup></u>	
1980	5,125	1,010	2,080	0	2,080	-6135
1	3,555	1,495	4,160	1,200	4,600	-3410
2	1,195	2,185	6,250	4,000	7,540	1910
3	1,135	2,690	8,320	4,000	9,620	1475
4	1,075	3,140	10,410	4,000	12,140	1515
5	3,000	3,140	10,410	5,600	13,000	2050
6		3,140	10,410	5,600	12,560	4610
7		3,140	10,410	2,800	12,140	1390
8		3,140	10,410	5,600	13,000	5050
9		3,140	10,410	5,600	12,560	4610
1990		3,140	10,410	2,800	12,140	1390
1		3,140	10,410	5,600	13,000	5050
NPV @ 11%	11,207	16,137	50,590	22,464	60,003	IRR=19.66%
NPV @ 15%	10,242	13,039	40,529	17,879	47,930	
					<u>B/C Ratio</u>	
					11%: $\frac{60,003 - 50,590 + 22,464 - 16,137}{11,207} = 1.40$	
					15%: $\frac{47,930 - 40,529 + 17,879 - 13,039}{10,242} = 1.20$	

(1) Vehicle Operating Costs

changes in recurring costs and vehicle operating costs. The break-even values for these variables (i.e., the percentage change in the variable which reduces the B/C ratio of the project to unity) are more than a 70% decrease in recurring costs, a 48% decrease in vehicle operating cost, and a 40% increase in capital costs.

### Shadow Pricing

Because of the relatively large component of unskilled labor in the road maintenance and rehabilitation activities, and the undervaluation of foreign exchange at the official exchange rate, it is useful to repeat the economic justification of the project using shadow prices. These prices more accurately reflect the true cost to the economy of using unskilled labor, of which there is a surplus, and the cost of foreign exchange. The World Bank and the Interamerican Development Bank use a shadow price of unskilled labor that is 57% of the minimum wage. This reflects the fact that because of unemployment in the rural areas the payment of the minimum wage of R.D.\$3.50 per day to an unskilled laborer does not all represent an equivalent cost to society. Rather, because of the laborer's low opportunity cost, i.e., his marginal productivity in the best available alternative employment, and because of the value placed by the Government on increased consumption by the rural poor, and other considerations, the true cost to society is calculated to be only  $.57 \times \$3.50 = \$2.00$ . The World Bank and the IDB also estimate the shadow price of foreign exchange at 12% above the official exchange rate.

Table 4 presents for each of the project's cost elements the estimated component of foreign exchange, unskilled labor, and local costs. For example, equipment and tools are essentially a 100% foreign exchange cost and their value at the official exchange rate (1 RD\$ = 1 US\$) must be multiplied by a factor of 1.12 to obtain the shadow price. Workshops and shop equipment costs are a mixture of 70% foreign exchange, 21% unskilled labor cost and 9% local costs, and these three components must be multiplied by factors of 1.12, .57 and 1.00 respectively.

Table 5 presents the time streams of capital, recurring, and vehicle operating costs with and without the project, and the net benefits including shadow pricing. On the average, shadow pricing has the effect of increasing the capital cost time stream by about 8 per cent, decreasing the recurring costs with the project by 12 per cent, decreasing the recurring costs without the project by 4 per cent, and increasing the vehicle operating costs by 12 per cent. The net effect of these partly offsetting changes is to slightly increase the IRR from 19.7 per cent without shadow pricing to 20.9 per cent with shadow pricing. Thus, shadow pricing produces only a small but measurable increase in the economic feasibility of the project.

TABLE 4 - FOREIGN EXCHANGE, UNSKILLED LABORAND LOCAL COST COMPONENTS

<u>Cost Component</u>	<u>Foreign Exchange, Labor and Local Component</u>		
	<u>Foreign Exchange Cost</u>	<u>Unskilled Labor Cost</u>	<u>Other Local Cost</u>
Equipment and Tools	100%		
Shops and Shop Equip.	70%	21%	9%
Road Rehabilitation (operating costs only)	35%	35%	30%
Contingencies	50%		50%
Road Inventory	35%		65%
Training and Tech. Assistance	100%		
Office Equipment (Capital)	100%		
Administrative Salaries			100%
Road Maintenance (ope- rating costs only)	20%	40%	40%
Office Equipment (recurring)			100%
Vehicle Operating Cost	100%		
Multiplier for Shadow Price	x 1.12	x .57	x 1.00

TABLE 5 ECONOMIC BENEFITS AND COSTS OF THE ROAD MAINTENANCE PROGRAM VALUED AT SHADOW PRICES (R.D.\$ 000)

	<u>With Project</u>			<u>Without Project</u>		<u>Net Benefits</u>
	<u>Capital Costs</u>	<u>Recurring Costs</u>	<u>VOC<sup>(1)</sup></u>	<u>Recurring Costs</u>	<u>VOC<sup>(1)</sup></u>	
1980	5,744	1,004	2,330	0	2,330	-6748
1	3,745	1,505	4,659	1,152	5,152	-3425
2	1,140	1,921	7,000	3,841	8,445	2225
3	1,072	2,355	9,318	3,841	10,774	1870
4	1,005	2,745	11,659	3,841	13,597	2029
4	3,360	2,745	11,659	5,377	14,560	2173
6		2,745	11,659	5,377	14,067	5040
7		2,745	11,659	2,688	13,597	1881
8		2,745	11,659	5,377	14,560	5533
9		2,745	11,659	5,377	14,067	5040
1990		2,745	11,659	2,688	13,597	1881
1991		2,745	11,659	5,377	14,560	5533
NPV @ 11%	12,147	14,241	56,660	21,570	67,204	IRR=20.89%
NPV @ 15%	11,141	11,527	45,392	17,167	53,682	

B/C Ratio

at 11% discount rate:  $\frac{67204 - 56660 + 21570 - 14241}{12147} = 1.47$

at 15% " " :  $\frac{53682 - 45392 + 17167 - 11527}{11141} = 1.25$

(1) Vehicle Operating Costs

### 3. Benefits of Institutionalization

The essential justification of the project is not the short term beneficial effect of the feeder road rehabilitation that is provided under the project, but rather the contribution that the loan and technical assistance make to strengthen the institutional framework to ensure reliable performance of maintenance on a continuous basis after rehabilitation is completed.

To assess the incremental benefit of institutionalization, an analysis was performed comparing the "without project" case with a project that provided only the equipment and shops and the initial funds up to the year 1984 for rehabilitation and maintenance, but provided no funds for institutionalization such as technical assistance and training, the feeder road inventory, and the administrative salaries and office equipment necessary for the operation of the new central rehabilitation and maintenance division in the DGCV. It was assumed that, after 1984, the DGCV would revert to the traditional policy of no maintenance and would then be forced to expend funds on postponed maintenance to, in effect, rehabilitate deteriorated roads. Table 6 presents the capital and recurring costs that would be incurred without institutionalization, and Table 7 presents the time stream of the costs and net benefits.

As indicated in Table 7 the capital costs are lower because of the elimination of institutionalization costs; the NPV of the recurring costs stay essentially unchanged; but the vehicle operating costs without institutionalization increase substantially. Nevertheless, even without institutionalization the project is still marginally economically feasible with an IRR of 11.17%.

#### The Incremental Rate of Return of Institutionalization

The incremental rate of return of institutionalization is calculated by calculating the return of the incremental investment required for institutionalization, (such as technical assistance and training, salaries and office equipment for the new central Maintenance and Rehabilitation Division in the DGCV, and other items) with the incremental savings in rehabilitation costs and vehicle operating costs.

Table 7 presents the time stream of incremental benefits, and is simply the difference between the "without" institutionalization and the "with" institutionalization benefit time streams. For the first five years of the project the annual incremental benefits are negative, reflecting the additional investment costs required for institutionalization. Starting in the sixth year, however, the incremental benefits become positive, and the incremental IRR of institutionalization is 33.3 per cent.

TABLE 6: THE ECONOMIC BENEFITS AND COSTS OF INSTITUTIONALIZATION  
(R.D. \$,000)

	<u>With Project (but w/o institutionalization)</u>			<u>Without Project (1)</u>		
	<u>Capital Cost</u>	<u>Recurring Cost</u>	<u>VOC</u>	<u>Recurring Cost</u>	<u>VOC</u>	<u>Net Benefits</u>
1980	4200	940	2,080	0	2,080	-5140
1	3265	1,325	4,160	1,200	4,600	-2950
2	965	1,965	6,250	4,000	7,540	2360
3	965	2,445	8,320	4,000	9,620	1890
4	965	2,845	10,410	4,000	12,140	1920
5	3000	3,268 <sup>(2)</sup>	12,583 <sup>(3)</sup>	5,600	13,000	251
6	0	3,268	12,583	5,600	12,560	2309
7	0	3,268	12,583	2,800	12,140	911
8	0	3,268	12,583	5,600	13,000	2749
9	0	3,268	12,583	5,600	12,560	2309
1990	0	3,268	12,583	2,800	12,140	911
1991	0	3,268	12,583	5,600	13,000	2749
NPV @ 11%	9952	15,797	56,666	22,464	60,003	<u>IRR=11.17%</u>

(1) Without Project Costs are identical to those of Table 1, Annex B-16.2.

(2) Postponed maintenance: an average of  $1/3 \times 3500 = 1167$  km per year, at a cost of  $\frac{840,000}{300} = \$2800$  per km,  $1167 \text{ km. per year} \times \text{R.D. } \$2800 \text{ per km.} = \text{R.D. } \$3,268,000 \text{ per year.}$

(3)  $\text{VOC} = 3500 \text{ km.} \times 50 \text{ ADT} \times 36 \text{ days per year} \times .197 \text{ RD\$ per veh. km.} = \text{RD\$}12,583,000 \text{ per year.}$

TABLE 7: CALCULATING THE INCREMENTAL INTERNAL RATE OF RETURN  
OF INSTITUTIONALIZATION

Time Stream of Benefits (R.D. \$1,000)

<u>Year</u>	<u>With Institutionalization</u>	<u>w/o Institutionalization</u>	<u>Net Benefits</u>
1980	-6135	-5140	= 995
1	-3410	-2950	= 460
2	1910	2360	= 450
3	1475	1890	= 415
4	1515	1920	= 405
5	2050	= 251	2301
6	4610	2309	2301
7	1390	= 911	2301
8	5050	2749	2301
9	4610	2309	2301
1990	1390	= 911	2301
1991	5050	2749	2301

Incremental Internal Rate of Return = 33.3%

#### 4. Microeconomic Impact

The above analyses considered project viability at the systems level. In contrast, this analysis looks at individual subproject-type situations for representative values for: (a) internal rate of return; (b) benefit-cost ratio; and (c) distribution of benefits. In addition, a review is undertaken of the field survey undertaken as part of project development to assess likely micro level impacts of subprojects. The analysis concludes that the project is feasible at the micro level.

##### A. Farm-level Example

As discussed in other sections of the Project Paper, a representative feeder road subproject would involve a gravel-surface seven kilometer road in fair condition (i.e., in need of rehabilitation), located in rolling hills. Rehabilitation costs on such a road would approximate \$4,000 per kilometer, whereas if badly deteriorated, the road reconstruction costs would be about \$9,500 per kilometer. Vehicular traffic corresponding to its area of influence of 15,000 acres (one fourth of which is cultivated and yielding RDS30 per area in production) would be about 10 vehicles per day. Vehicle operating costs would start at RDS0.163/km (vehicle) and increase to RDS0.197 in the second year and to RDS0.225 in the third year if the road is not raised again. Annual maintenance costs would be about RDS850/km, but every five years a heavy maintenance effort costing RDS2,500/km. would be necessary. Without the project, landslides would eventually necessitate 25 person days of voluntary labor (shadow priced at the opportunity value of RDS2/day) to keep the roadway open to vehicular traffic, at least in the third year, just before a thorough rehabilitation was again necessary. Regular maintenance of the road would be expected to generate increased agricultural production of at least five percent.

##### Internal Rate of Return

The internal rate of return, defined as that discount rate that equalizes the present value of costs with the present value of benefits, is one common measure of the efficiency of resource utilization. Rather than using a particular discount rate, which may or may not be accepted by all decision makers as the appropriate measure of alternative resource use, the IRR instead calculates its own rate. It is, in that sense, a "clear figure." It is also a desirable measure for another reason: it does not depend on how one defines costs or benefits (either of which could include either gross amounts or only net increases), which in benefit-cost analyses could affect the calculated ratio and therefore project desirability. The reason that the IRR is little used in practice is that it is obtained either through a computer or programmable calculator or it is approximated through an iterative process involving extrapolation below and above the real rate.

A conservative IRR for this project's farm-level impact has been calculated at 103.76, a very high figure. Table 8 shows the format used for these calculations. (In the next section, the conservative nature of the assigned values is examined in more detail.)

#### Benefit Cost Calculation

This calculation of course uses the same basic data, but rearranges them such that costs include only the capital costs of rehabilitating the road, while benefits are taken to be savings in vehicle operating costs and road rehabilitation and reconstruction costs that would not be undertaken, plus increased agricultural production minus increased maintenance costs (a negative benefit). The time streams, shown in Table V, evaluated at 15% discount rate (more conservative than World Bank and IDB) give a present value of \$35,671 to costs and \$91,869 to benefits. The benefit cost ratio is 2.58, indicating that such an investment would be well worth its cost.

It should be pointed out here that heavy maintenance (or light rehabilitation) costs are included in the sixth and eleventh years of the analysis period to take into account the cost of repairing roadway damage for which normal maintenance does not compensate. Such costs are mainly for additional gravel. An analysis period of 15 years was used because there would be no residual values, in both "with" and "without" situations, assigned to previous costs. A 15% discount factor was used because an 11% factor probably does not distinguish enough between what are otherwise good subproject proposals to be of much use in prioritizing implementation.

This is only one of several conservative factors used in the micro level analyses. While costs are thought to be rather well defined, benefits are clearly understated. For example, a one-time induced increase in agricultural production is included in the third year, and taken to be only five percent. This increase could be the result of more agricultural extensionist visits or of changes in the nature or extent of production (new crops or new lands, or more intensive use of now-cheaper inputs). New crops could become feasible if transport services become cheaper or more dependable. In short, a five percent increase seems very reasonable, and zonal agricultural chiefs have estimated that a 5 percent increase could be achieved with increasing the average quality of roads over time from "fair" to "good" condition, with an additional 5 percent increase coming with roads now classified as "poor" being upgraded to "fair" condition. If a second 5 percent increase were achieved in the sixth year, the IRR would go from the 103.76% given in Table 8 to 108%, and the benefit cost ratio would increase from 2.58 to 3.03. Other conservative factors that were not explored include: (a) increased real incomes of rural residents due to lower costs of production and marketing, or to increased ease of finding off-farm employment; (b) reduced time and money spent by passengers

**TABLE 8**  
**TYPICAL ROAD - WITH AND WITHOUT PROJECT**  
 (7 km. long, Rolling Hills)

Yr.	WITHOUT PROJECT				WITH PROJECT					COST SAVINGS W/O - W
	Rehab./Recon.	Recurring Costs		= Total Cost	Rehab.	+ VOC	+ Maint.	- Ag Prod.	= Total Cost	
		+ VOC	+ Maint.							
1	28,000	20,823	0	48,823	28,000	20,823	5,950	0	54,773	- 5,950
2		25,167	0	25,167		20,823	5,950	0	26,773	- 1,606
3		29,383	350	29,733		20,823	5,950	6,562		9,522
4	28,000	20,823	0	48,823		20,823	5,950	6,562		28,612
5		25,167	0	25,167		20,823	5,950	6,562		4,956
6		29,383	350	29,733	17,500	20,823	5,950	6,562		- 7,978
7	63,000	20,823	0	83,823		20,823	5,950	6,562	20,211	63,612
8		25,167	0	25,167		20,823	5,950	6,562	20,211	4,956
9		29,383	350	29,733		20,823	5,950	6,562	20,211	9,522
10	28,000	20,823	0	48,823		20,823	5,950	6,562	20,211	28,612
11		25,167	0	25,167	17,500	20,823	5,950	6,562	37,711	-12,544
12		29,383	350	29,733		20,823	5,950	6,562	20,211	9,522
13	28,000	20,823	0	48,823		20,823	5,950	6,562	20,211	28,612
14		25,167	0	25,167		20,823	5,950	6,562	20,211	4,956
15		29,383	350	29,733		20,823	5,950	6,562	20,211	9,522

IRR = 103.76

TABLE 9

TYPICAL ROAD - BENEFIT/COST ANALYSIS  
(7 km. long, Rolling Hills)

<u>Costs</u>			<u>Benefits</u>									
<u>Yr.</u>	<u>Cost of Rehab.</u>	<u>PV of Costs</u>	<u>Saved VOC</u>	<u>+</u>	<u>Saved Rehab.</u>	<u>+</u>	<u>Increased Ag. Prod.</u>	<u>-</u>	<u>Increased Maint.</u>	<u>-</u>	<u>Total Benefits</u>	<u>PV of Benefits</u>
1	28,000	24,348	0		28,000		0		5,950		22,050	19,184
2			4,344				0		5,950		-1,606	-1,214
3			8,560				6,562		5,600		9,522	6,265
4			0		28,000		6,562		5,950		28,612	16,366
5			4,344				6,562		5,950		4,956	2,463
6	17,500	7,560	8,560				6,562		5,600		9,522	4,114
7			0		63,000		6,562		5,950		63,612	23,918
8			4,344				6,562		5,950		4,956	1,621
9			8,560				6,562		5,600		9,522	2,704
10			0		28,000		6,562		5,950		28,612	7,067
11	17,500	3,763	4,344				6,562		5,950		4,956	1,066
12			8,560				6,562		5,600		9,522	1,781
13			0		28,000		6,562		5,950		28,612	4,664
14			4,344				6,562		5,950		4,956	699
15			8,560				6,562		5,600		9,522	1,171
Total PV		35,671										91,869

$$\frac{B}{C} = \frac{91,869}{35,671} = 2.58$$

(a factor that could be, in fact, as important as increased agricultural production); (c) increased use of more efficient vehicles (larger trucks, presumably of lower cost to users, would more often use good roads); (d) decreased use of animals for cargo (animal transport per ton-kilometer is estimated to be about eight times as expensive as by light trucks); (e) decreased spoilage (although this benefit, due to better, more regular transport services and fewer jolts that damage produce, would probably accrue more to consumers and vendors than to producers); (f) no salvage values assigned to roads at the end of the project, even though with normal maintenance or, for a period, no maintenance -- they will obviously have a value; (g) fuel prices assumed to be constant relative to other prices, although they will probably increase, thereby causing an understatement of real benefits from reduced vehicle operating costs and from the difference in costs of maintenance and rehabilitation; and (h), finally, no indirect social benefits included, such as increased access to schools, health facilities and other government services and social amenities, and decreased unemployment and underemployment (except to the extent it reflects in direct project costs and benefits).

#### B. Distribution of Project Benefits

The total impact of these non-quantified factors and other conservative elements in the analysis would be hard to estimate, but they would certainly be a significant element overall. Since they would accrue primarily to the AID target group, however, their exclusion warps the picture we have of the incidence of benefits.

Excluding such elements, the distribution of the present value of micro level benefits in the typical case, before any adjustments, is as follows:

	<u>Amount</u>	<u>Percentage</u>
Agricultural Producers in General	27,722	30.2%
Vehicle Owners	22,824	24.8
GODR (Dominicans in General)	<u>41,323</u>	<u>45.0</u>
Total	\$91,869	100.0%

#### Agricultural Production

The proportion of total production increases undertaken by the target group will of course vary from case to case. On the average, however, it is clear that AID target group farmers presently market a smaller proportion of their crops than larger farmers (data in the Agriculture Sector Analysis confirm this) and that their new production would largely be sent to market. Thus, their production increases will be larger than those of larger farmers. This deduction does not help fix the absolute starting point for either group, however. For this, analysis of data on the size distribution of farms is necessary.

	<u>% of Farms</u>	<u>% of Area</u>
Under 5 ha.	77.1	12.9
5 ha. to 50 ha.	20.6	29.9
50 ha. to 500 ha.	2.2	28.7
500 ha. and more	<u>0.1</u>	<u>28.5</u>
Total	100.0	100.0

We assume that all farms of 500 ha. and above are not in the areas influenced by prospective subprojects, as are one half of those from 50 ha. These farms are much more likely in any case to front on and use higher quality roads for getting their produce to market. Taking this into account, the presumed size distribution of lands located in the areas that might be considered for the project would be as follows:

	<u>% of Area</u>	<u>Adj.</u>	<u>% Net</u>	<u>% of Total</u>
Under 5 ha.	12.9	1.00	12.9	27.3
5 ha. to 50 ha.	29.9	.67	20.0	42.3
50 ha. to 500 ha.	<u>28.7</u>	<u>.50</u>	<u>14.4</u>	<u>30.4</u>
Total	71.5	.66	47.3	100.0

Thus, at a minimum, we could expect at least 27% of producer benefits to flow to the target group. Taking into account the differential effects of shifts in production and ag extension, probably 40 percent of producer benefits would accrue to the target group. Since, however, selection criteria require a relatively high percentage of small farms in each subproject area, it is reasonable to project that over 60 percent of producer benefits would go to the target group.

#### Vehicle Owners

The project analysis at both macro and micro levels involves savings in vehicle operating costs (VOC) as a benefit. VOC do not represent actual costs of transporting people and goods from one place to another, as they exclude profit margins, which are usually about 50 percent of costs. Consumers of transport services would pay about \$1.50 for a service that costs the transporter \$1.00 to provide. The relative elasticities of supply and demand will determine how much of any cost savings could be passed along to consumers in normally competitive markets. It is believed that, in the absence of collusive market forces, transportation of goods would have an increasing inelastic demand curve and an increasingly elastic supply curve, whereas the

unskilled labor for rehabilitation and maintenance. Table 4 in the above section of this Annex estimates that 35 percent of rehabilitation costs and 40 percent of maintenance costs are of this type.

### Recapitulation

The project's combined incidence at the micro level on the target group will be substantial. The calculation on the following page shows that the target group will benefit by an amount equal to about 82.4 percent of the present value of micro level benefits as calculated in the benefit cost analysis. This is certainly above what has been believed to be the case in the past without careful analysis of incidence. The Mission believes, moreover, that inclusion of indirect costs (few, if any) and indirect benefits (substantial) would increase this proportion significantly.

### 5. Savings in Energy

The project would generate savings in the importation of fuel because fuel consumption of vehicles operating over well maintained roads in good condition is significantly below that of vehicles operating over rough and unmaintained roads. In addition, the fuel required for operating maintenance equipment, the predominant activity under the project, is less than that required for the extensive rehabilitation works without the project.

This section estimates the fuel savings that can reasonably be expected from consideration of these two factors.

#### A. Savings in Road Vehicle Fuel Consumption

It is assumed that fuel consumption over good, good/fair, and fair roads is proportional to the vehicle operating cost over these roads. Fuel consumption over a good road for the representative vehicle is assumed at .240 liters/km (see Table 10). In rolling terrain, the representative operating cost per vehicle kilometer increases from RD\$.163 over a good road to RD\$.197 over a good/fair road and to RD\$.230 over a fair road. Taking these same proportions for fuel consumption results in the fuel consumption shown in Table 11.

After project completion, the 3,500 kms. of road will be in good condition each year because of regular maintenance. But, without the project, the average road condition will be 1/3 good, 1/3 good/fair, and 1/3 fair condition during a given year. Total fuel consumption during the average year after completion of the project will therefore be as follows:

With project:  $50 \text{ vpd} \times 365 \text{ days} \times 3500 \text{ kms.} \times .240 \text{ l/km} =$   
15.33 million liters/year.

<u>Nature of Benefit</u>	<u>Unadjusted Benefits</u>	<u>Percent to Target Group</u>	<u>Total to Target Group</u>	<u>Percent of total</u>
Agricultural Production	27,722	60	16,633.2	22.0
Vehicle Operating Costs	22,824	90	20,541.6	27.1
Others				
1. General Cost Savings	41,323	30	12,396.9	16.4
(2. Employment Benefits	69,877)			
(a. Rehab.	35,671)	35	12,484.9	16.5
(b. Maint.	34,206)	40	13,682.4	18.0
Total	91,869		75,739.0	100.0
Percent	100%		82.4%	

Table 10: Consumption of Fuel by Vehicle Type  
(Gravel Road in Good Condition)

<u>Vehicle Type</u>	<u>Fuel Consumption</u>	<u>Vehicle Composition</u>
Car	.100	25%
Pickup	.167	48%
Light Truck	.500	27%
Representative Vehicle	.240	

Table 11: Fuel Consumption of the Representative Vehicle Over Good,  
Good/Fair and Fair Gravel Roads (Rolling Terrain)

<u>Road Condition</u>	<u>Fuel Consumption</u> (liters/km)
Good	.240
Good/Fair	.290
Fair	.339

Without project: 50 vpd x 365 days x 3500 km x 1/3 (.240 + .290 + .339) 1 km = 18.50 million liters/year.

Thus, the annual savings in fuel consumed by road vehicles amounts to 3.172 million liters per year or about 2400 metric tons/year.

B. Savings in Fuel Consumption by Road Equipment

After completion of the project, the average annual cost of road maintenance (RD\$3,140,000 per year) is about RD\$1,527,000 less than the road rehabilitation costs (RD\$4,667,000 per year) that would have been incurred without the project. These costs do not include depreciation, and represent only the recurring costs such as fuel, operators, spare parts, and labor.

It is estimated that about 10% of rehabilitation and 5% of maintenance costs represent fuel costs. Since most of this is diesel fuel selling at about RD\$.48 per gallon (ex-tax), the annual savings in fuel are:

(.10 x RD\$4,667.00 - .05 x RD\$3,140,000) / .48 = 645,208 gallons/year or about 1800 metric tons/year).

In sum, then, annual fuel savings from the project would be:

- (a) gasoline and diesel fuel-road use : 2,400 metric tons
- (b) diesel fuel-road improvement : 1,800 metric tons
- Total : 4,200 metric tons

6. Employment Effects

Field data confirm the generally observed tendency for significant rural unemployment and underemployment to exist throughout the year, although it is at reduced levels during harvest time. The Mission and the DGCV therefore thought it important to structure the project to make maximum economic use of available labor, in preference to more heavily equipment - based rehabilitation and maintenance methods. The Mission believes that the project design reflects this fact as the project was designed according to established methods of making best use of labor.\* At the same time, however, the Mission and the GODR are exploring ways of increasing the degree to which labor is utilized in project activities. To this end, an examination of labor-based road methods in Haiti (financed by AID) is expected to yield valuable insights for the Mission and the DGCV, plus the Secretariat of Public Works as a whole, due to the participation of the Secretary of Public Works in the group. The Mission and the DGCV are also watching the

\* Contained in IBRD, The Study of Labor and Capital Substitution in Civil Engineering Construction, Washington, September 1978, especially section six, pp. 86 and following.

development of the IBRD's second road reconstruction and maintenance project, which has an experimental element for the construction of roads under different construction techniques design to get comparative data on several mixes of labor-based versus equipment-based work methods.

According to present project design, unskilled local labor will be used in both rehabilitation and maintenance activities. Assuming that average cost figures are correct, including the average cost of structures the DGCV will rehabilitate 1,200 kilometer-years of maintenance. Since each kilometer of rehabilitation will provide about 220 person-days of employment for unskilled labor (target group), employment generation comes to 1,340 person-years in total over the five years, assuming the normal work week of 5.5 days will be followed in the project. Since each 5 kilometers of maintenance will provide one person-year of village person employment and a small amount of unskilled labor employment on the grader crew, each kilometer can be expected to provide about a quarter year of target group employment (of course we do not count voluntary labor for maintenance as an employment effect of the project). Thus, maintenance will contribute another 2,625 person-years of employment over the five years. Adding a small amount of unskilled labor employment for the construction of equipment sheds and other zonal infrastructure, over 4,000 person-years of direct employment will be generated during project life, and about 750 person-years will continue each year thereafter.

Although consumption would increase greatly as a result of these jobs, the existence of widespread underemployment would limit the generation of indirect employment. It would therefore be difficult to claim many permanent jobs would be created through indirect multiplier effects.

#### 7. Short-Form Benefit-Cost Calculation

Section III of the Project Paper presents a short-form benefit-cost calculation formula for use in preliminary screening of proposed subprojects, along with an example based on a typical rural road rehabilitation/maintenance situation. This section provides two more examples of roads which might be encountered.

Example 1: 12 km. road, of which 4 km. is flat with 20,000 tareas under cultivation producing RD\$50 per tarea per year, 3 km. is rolling hills having 6,000 tareas under cultivation producing RD\$35 per tarea per year, and 5 km. is mountainous land with 6,500 tareas under cultivation producing RD\$20 per tarea per year.

This proposal, assuming other selection criteria are met, would be eligible for consideration beyond the prefeasibility stage but would stand only about an even chance of being accepted for inclusion in the project once the feasibility study was completed.

#### EXHIBIT 1: Capital and Recurring Costs, With and Without the Project

The capital costs of the program, expressed in RD\$1979 (net of taxes) are given in Table 12. The major components of the capital costs are: equipment and handtools; shop equipment for the seven districts; technical assistance and training; the rural road inventory; road rehabilitation; contingencies; and the fixed assets component of office equipment.

The recurring costs under the project consist of: administrative salaries for the new maintenance and rehabilitation division in the DGCV; annual requirements of office equipment and materials; road maintenance costs; and contingencies. The maintenance cost does not include equipment depreciation since this cost is already fully represented in the capital costs.

The project life is estimated to extend to the year 1991 inclusive, at which time the major pieces of equipment acquired under the project would need replacement (such as graders and tractors). The conservative assumption is made that the roads rehabilitated under the project would have zero salvage value.

Without the project, the only cost is that of road rehabilitation, as shown in Table 13. For the sake of simplicity the road rehabilitation cost without the project includes depreciation. In addition, road reconstruction costs are not shown, although they would be necessary from time to time without the project. The economic analysis assumes that, without the project, no road would be allowed to decay to a level that would require its reconstruction, even though history has shown this has not always been the case.

#### Annual Vehicle Operating Costs, With and Without the Project

Table 14 presents the rate at which roads are improved and placed under maintenance with the project, and their rate of deterioration without the project. During the years 1980 through 1984 roads are rehabilitated under the project at a rate of 300 kms. per year, and these roads are immediately placed under maintenance. The rehabilitation improves the road from fair to good condition. In addition, 400 kms. per year are rehabilitated, constructed or reconstructed by other programs (such as by the IDB) and are also immediately placed under maintenance. In total therefore, as shown in the table, 700 kms. of road per year are

TABLE 12

PROJECT CAPITAL AND RECURRING COSTS (CONSTANT 1979 RDS,000, NET OF TAXES)

<u>Capital Costs</u>	<u>YEAR</u>							<u>Per Year</u>	
	1980	1981	1982	1983	1984	1985	1986	1987	1988-1991
Equip. & Tools	3500	2000				3000			
Shop Equipment	700	300							
Techn. Assistance	300	250	200	150	100				
Rehab. (excl. depr.)		840	840	840	840				
Contingencies		125	125	125	125				
Road Inventory	525								
Training	50	40	30	20	10				
Office Equipment	50								
<b>Total</b>	<b>5125</b>	<b>3555</b>	<b>1195</b>	<b>1135</b>	<b>1075</b>	<b>3000</b>			
<u>Recurring Last</u>									
Admin. Salaries	50	150	200	225	275	275	275	275	275
Road Maintenance	940	1200	1840	2320	2720	2720	2720	2720	2720
Contingencies		125	125	125	125	125	125	125	125
Office Equip. & Mtrls.	20	20	20	20	20	20	20	20	20
<b>Total</b>	<b>1010</b>	<b>1495</b>	<b>2185</b>	<b>2690</b>	<b>3140</b>	<b>3140</b>	<b>3140</b>	<b>3140</b>	<b>3140</b>
Kms. of roads Rehabilitated		300	300	300	300				
Kms. of roads Maintained	700	1400	2100	2800	3500	3500	3500	3500	3500

TABLE 13: COSTS WITHOUT PROJECT IN KMS. AND CONSTANT 1979 RD\$,000, NET OF TAXES)

<u>Roads Rehabilitated</u>	<u>YEAR</u>											
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
New Rehabilitation, kms.	-	300	300	300	300							
Re-rehabilitated, kms.	-		700	700	700	1400	1400	700	1400	1400	700	1400
Total kms. rehabilitated	-	300	1000	1000	1000	1400	1400	700	1400	1400	700	1400
Rehabilitation Cost (including depreciation) RD\$,000.	-	1200	4000	4000	4000	5600	5600	2800	5600	5600	2800	5600

TABLE 14: TOTAL LENGTH AND CONDITION OF PROJECT ROADS AND ANNUAL OPERATING COSTS (EXCLUDING TAXES)  
OF VEHICLES USING THE ROADS, WITH AND WITHOUT THE PROJECT (1980 - 1991)

Year	Road Condition, Kms.				Annual Vehicle Operating Cost (R.D.\$000)	Road Condition, Kms.	Annual Vehicle Operating Cost (R.D.\$000)
	Good	Good/Fair	Fair	Total		Good	
1980	700			700	2,082	700	2,082
1981	700	700		1400	4,599	1400	2,082
1982	700	700	700	2100	7,537	2100	2,082
1983	1400	700	700	2800	9,620	2800	2,082
1984	1400	1400	700	3500	12,140	3500	2,082
1985	700	1400	1400	3500	12,992	3500	2,082
1986	1400	700	1400	3500	12,500	3500	2,082
1987	1400	1400	700	3500	12,140	3500	2,082
1988	700	1400	1400	3500	12,992	3500	2,082
1989	1400	700	1400	3500	12,560	3500	2,082
1990	1400	1400	700	3500	12,140	3500	2,082
1991	700	1400	1400	3500	12,992	3500	2,082

1. ADT assumed constant at 50 vehicles per day

2. Vehicle operating cost on gravel road net of taxes:  
 Good gravel: R.D.\$ .163 per vehicle km  
 Good/Fair gravel: R.D.\$ .197 per vehicle km  
 Fair gravel: R.D.\$ .230 per vehicle km

placed under maintenance until the year 1984, at which time rehabilitation of roads under the project is discontinued, and all resources are used in maintaining the stable network of 3500 kms.

Without the project, the roads are not maintained, but are allowed to deteriorate to the point where rehabilitation is required. The conservative assumption is made that, without the project, all of the roads that deteriorated to "fair" condition at the end of the third year can indeed be rehabilitated. For example, at the end of the year 1986 a total of 1400kms have deteriorated to "fair" condition, and after rehabilitation appear at the beginning of 1987 in "good" condition.

The assumption regarding the DGCV's rehabilitation is conservative because, if it were not possible for the DGCV to adhere to a policy of rehabilitating those roads that have deteriorated to "fair" condition, further degradation after three more years to "bad" condition would take place. This would result in increased vehicle operating costs and a road reconstruction cost of approximately RD\$7500 per km. rather than the \$4000 per km. required for rehabilitation. And, even though the reconstruction cost would not be incurred until three years after the year where rehabilitation would be required, the net present value of the RD\$7500 reconstruction cost discounted at 11% is larger than the RD\$4000 rehabilitation cost.

The annual vehicle operating costs (net of taxes) of the vehicles using the road system maintained with and without the project are calculated by multiplying the number of kilometers of road in good, good/fair, and fair condition by the appropriate vehicle operating cost per km., and the annual vehicle operating cost would be:

$$(699 \times .163 + (1400 \times .197) + (1400 \times .230)) \times 50 \text{ vehicles/km of road day} \times 365 \text{ days/year} = \text{RD\$12,992,000/yr.}$$

## EXHIBIT 2: Vehicle Operating Costs

### Unit Vehicle Operating Costs

Unit vehicle operating costs were obtained from the recently completed (July 1978) National Transport Sector Study performed by Delcanda International Limited with funding from the IDB. This report gives vehicle operating costs for various terrain conditions and for three gravel surfaces defined as follows:

a) Good Gravel - This road provides a smooth surface without potholes, ruts, or deformation and corresponds to a newly constructed or rehabilitated gravel road.

b) Fair Gravel - The surface of this road is rough with pot-holes, ruts and surface deformations that cause severe vehicle rocking and vibration. The average vehicle operating speed is reduced by about 40% below that of a road with a good surface.

c) Poor Gravel - This case corresponds to a surface partially or completely destroyed with large potholes, and with deep ruts that can cause serious damage to the vehicle chassis and tires. The surface provides reduced traction to vehicle tires, especially in steep terrain. Average vehicle operating speeds over such a road is between 10 and 30 kms. per hour.

Table 15 presents the vehicle operating costs for flat, rolling and mountainous terrain and for gravel roads in good, fair and bad condition. These costs include the usual cost components of fuel, oil, vehicle depreciation, vehicle maintenance, and the salaries of vehicle drivers but excluded the value of passenger travel time.

Vehicle operating costs are presented for four vehicle types: Auto (Datsun 130-K), pick up/jeep (Datsun 1500), light truck (6-ton Toyota diesel), and a representative vehicle composed of the observed proportion of the vehicle types on the feeder roads. Field observation indicated that, on the average, vehicle composition on the feeder roads was 25% auto, 48% pickup/jeep, and 27% light truck. Thus, to illustrate, the vehicle operating cost of the representative vehicle on a fair feeder road in rolling terrain would be:

$$(25 \times .086) + (48 \times .159) + (.27 \times .490) = .230 \text{ R}\$/\text{km}.$$

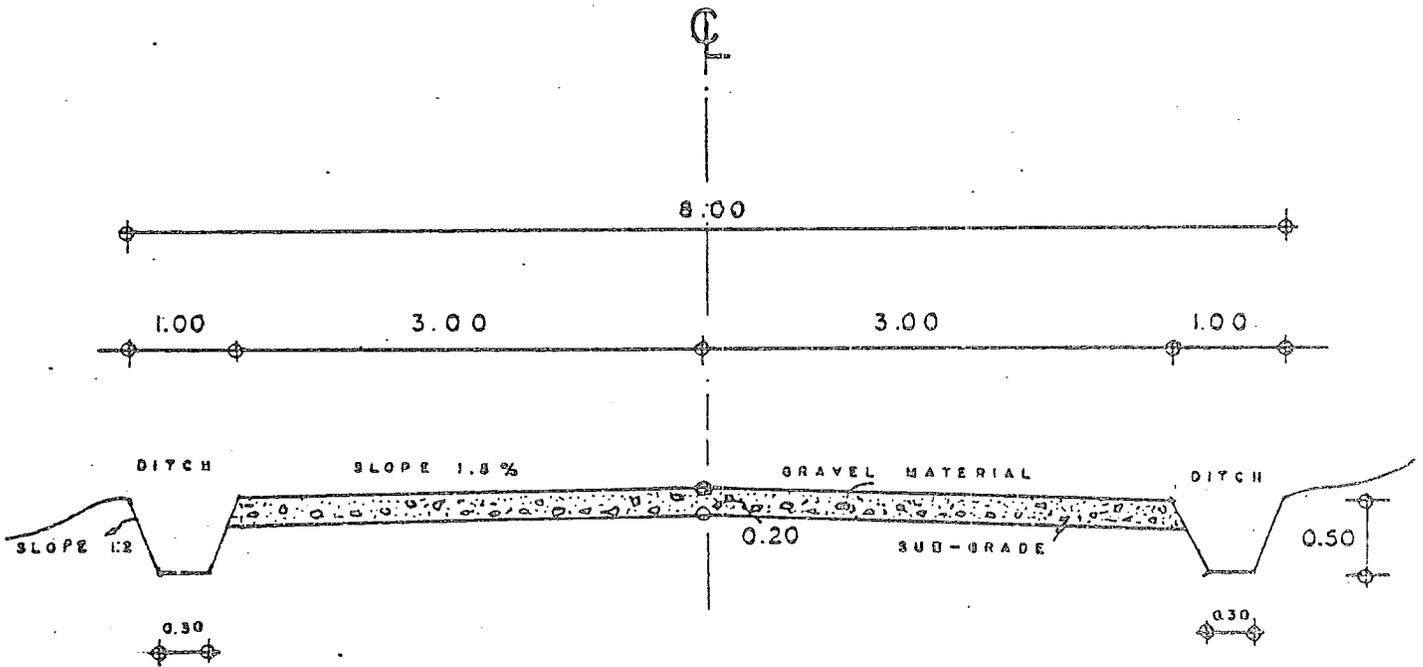
TABLE 15

VEHICLE OPERATING COSTS BY TERRAIN TYPE AND SURFACE CONDITION  
FOR GRAVEL ROADS (RD\$/KM)

	<u>Fiat Terrain</u>			<u>Rolling Terrain</u>			<u>Mountainous Terrain</u>		
	<u>Good</u>	<u>Fair</u>	<u>Bad</u>	<u>Good</u>	<u>Fair</u>	<u>Bad</u>	<u>Good</u>	<u>Fair</u>	<u>Bad</u>
Auto	.058	.074	.102	.065	.086	.123	.071	.093	.132
Pick up/jeep	.100	.135	.190	.111	.159	.236	.122	.168	.245
Light truck	.324	.440	.653	.346	.490	.743	.383	.512	.765
Representative Vehicle	.150	.202	.293	.163	.230	.345	.180	.242	.357

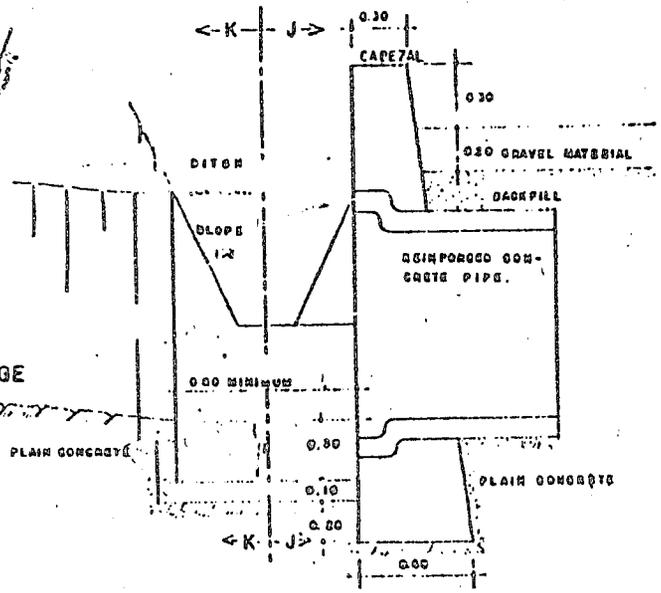
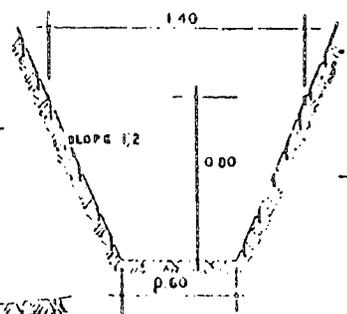
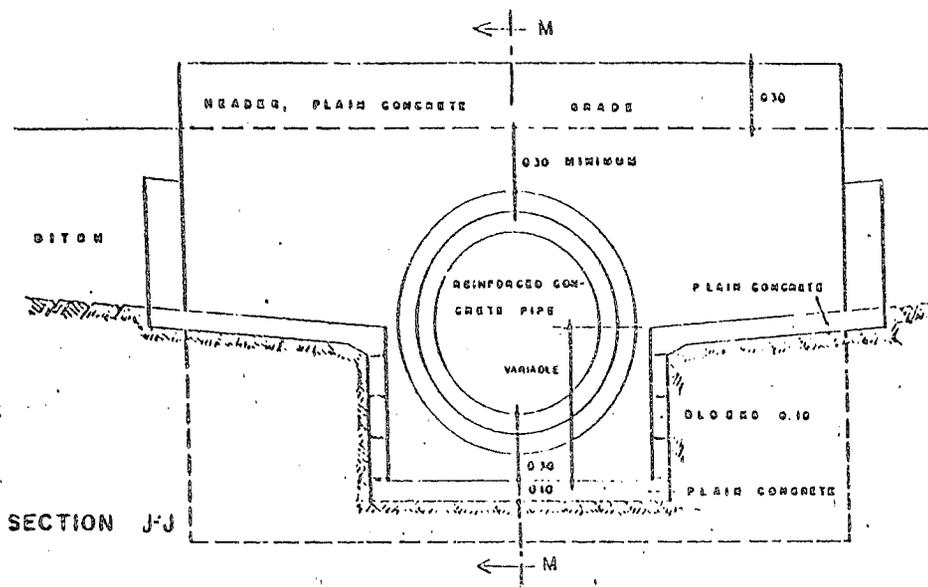
Source: Estudio Técnico - Económico del Sector Transporte, Delcanda International Limited, República Dominicana, July 1978.

# TYPICAL CROSS SECTION FEEDER ROAD

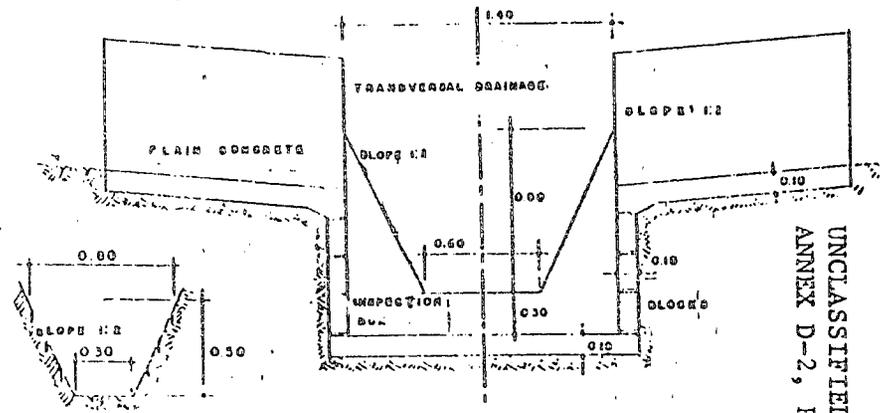
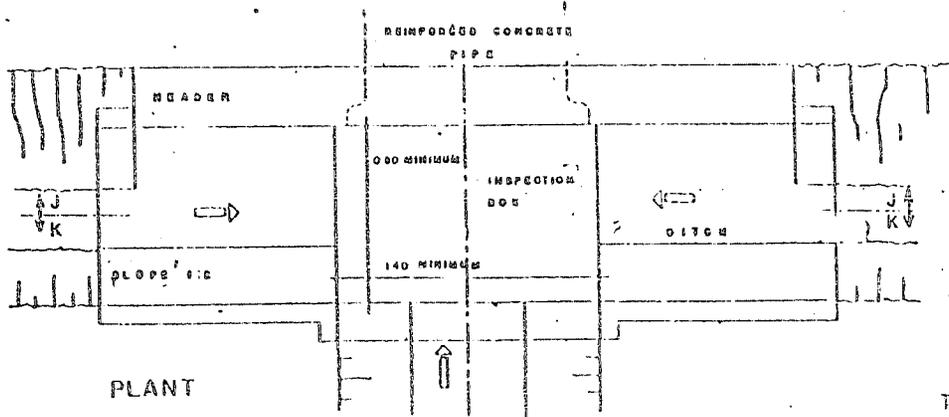


SCALE 1:50

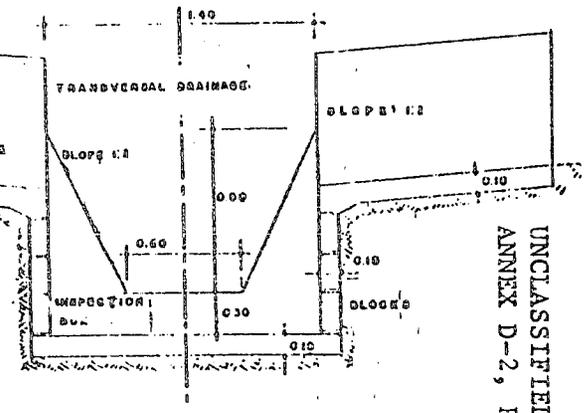
ALL DIMENSIONS ARE IN METERS.



CULVERTS AND DRAINAGE DETAILS. SCALE 1:20 SECTION -M-M



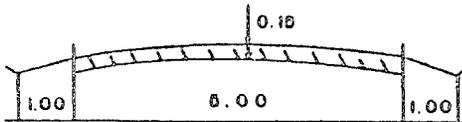
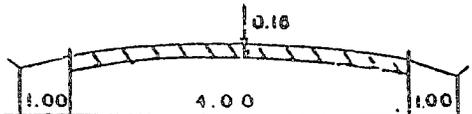
TYPICAL SECTION DITCH



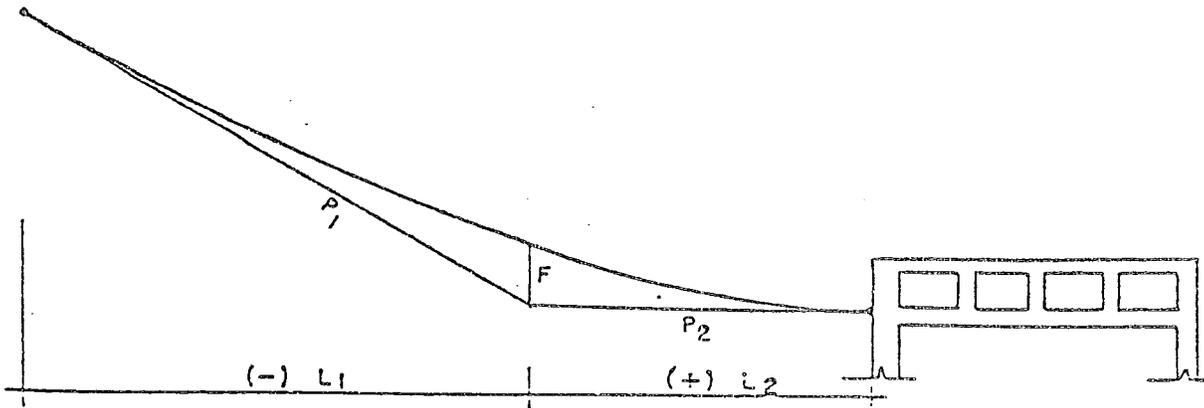
SECTION K-K

# DIRECCION GENERAL DE CAMINOS VECINALÉS

## CLASIFICACION Y ESPECIFICACIONES DE DISEÑO

CARACTERISTICAS	TIPO	
	PRIMER ORDEN	SEGUNDO ORDEN DE PENETRACION
Clase de Terreno	Llano, Ondulado Montanoso	Llano, Ondulado Montanoso
Velocidad Maxima en K/H	45	30
Drenaje	Algo Definitivo	Algo Definitivo
Carga Calculo Para Estructura de Drenaje	H - 15 - 44 - Minimo	H - 10 - 44
Superficie de Rodamiento	Con Afirmado de Material Seleccionalado	Con Afirmado de Material Aladoño
Grado Maximo en Curvas	14 <sup>g</sup>	25 <sup>g</sup>
Radio Minimo de Curvas	30.00 Mts.	20.00 Mts.
Perfil de la Banca		
Derecho de Via	15.00 Mts.	10.00 Mts.
Pendientes Maximas	12 %	12 %
Bombao Lateral	3 %	3 %
Tangente Comin Entre Curvas Consecutivas	No Necesariamente	No Necesariamente

CURVA VERTICAL ASIMETRICA



$$F = \frac{L_1 \times L_2}{2(L_1 + L_2)} \times (\text{D.P.} = 0.527)$$

Diferencia de pendientes D.P. =  $\frac{(-) P_1 - (-) P_2}{100}$

RAMA L1

RAMA L2

$$Y_1 = F (10/L_1)^2$$

$$Y_{1'} = F (10/L_2)^2$$

$$Y_2 = F (20/L_1)^2$$

$$Y_{2'} = F (20/L_2)^2$$

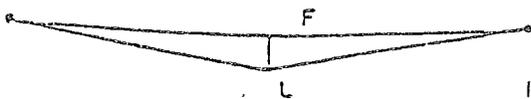
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$$Y_n = (n \times 10/L_1)^2$$

$$Y_{n'} = F (n \times 10/L_2)^2$$

FLECHA DE UNA CURVA VERTICAL ASIMETRICA



$$F = \frac{L \times \text{Dif. de Pendiente}}{8}$$



REPUBLICA DOMINICANA

DIRECCION GENERAL DE LA OFICINA COORDINADORA DE CAMINOS VECINALES

TECNICA Y ESFUERZO HUMANO AL  
SERVICIO DEL CAMPESINO DOMINICANO  
—0000—

TABLA DE DISEÑOS PARA CURVAS VERTICALES.

- L..... Longitud de la curva vertical en metros.
- K..... Constante que depende de las distancias visibles y de las características de la curva parabólica.
- A. Diferencia algebraica de las pendientes en %.

CONSTANTES PARA CURVAS VERTICALES.

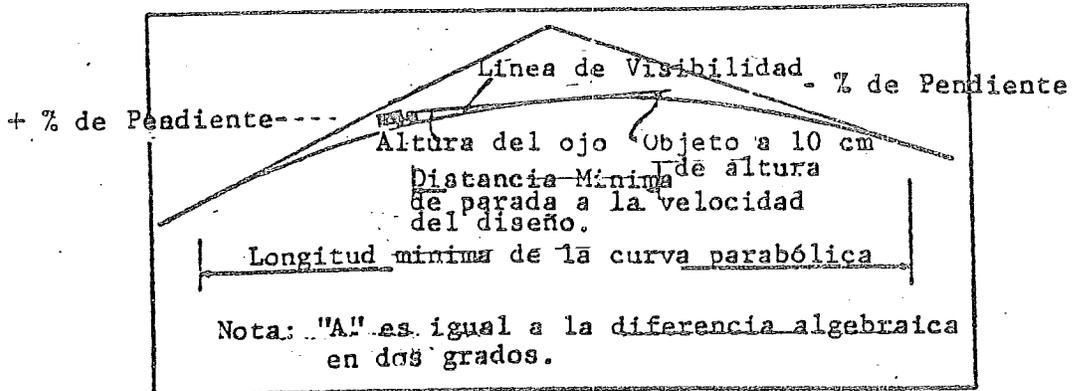
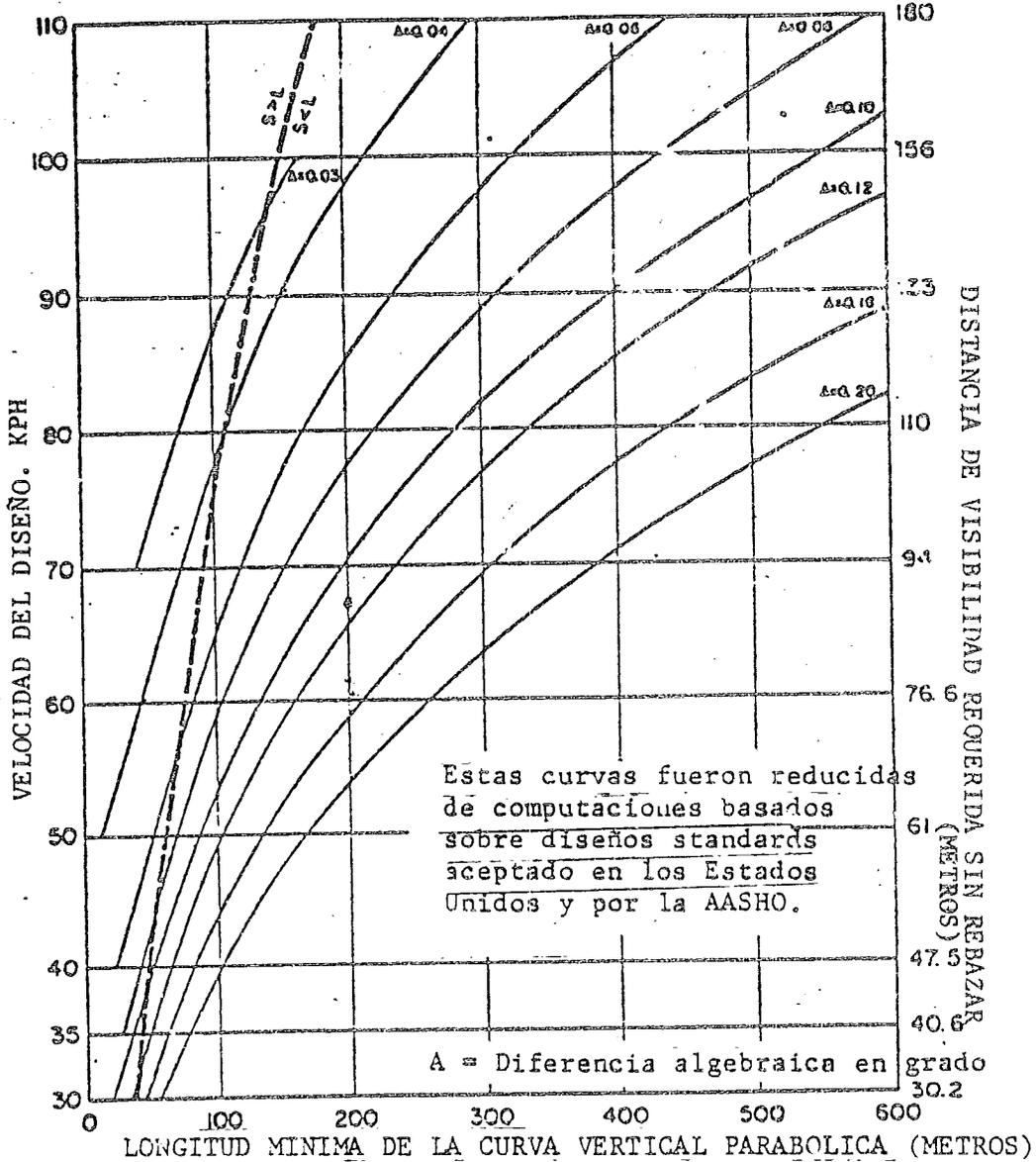
Longitud de la curva	Constante	Longitud de la curva	Constante
20	0.0250	200	0.00250
40	0.0125	220	0.00227
60	0.00833	240	0.00208
80	0.00625	260	0.00192
100	0.00500	280	0.00179
120	0.00417	300	0.00167
140	0.00357	320	0.00156
160	0.00313	340	0.00147
180	0.00278	360	0.00139

$$K = \frac{0.025 \times 20}{L}$$

- K..... Constante buscada.
- L..... Longitud de la curva vertical de acuerdo.
- F..... Flecha de la curva vertical o corrección máxima.

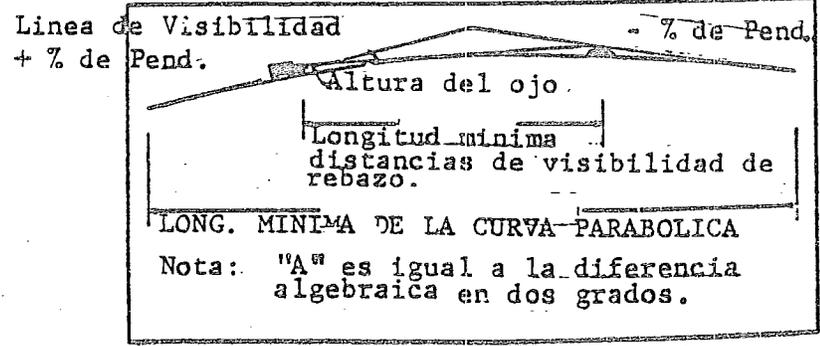
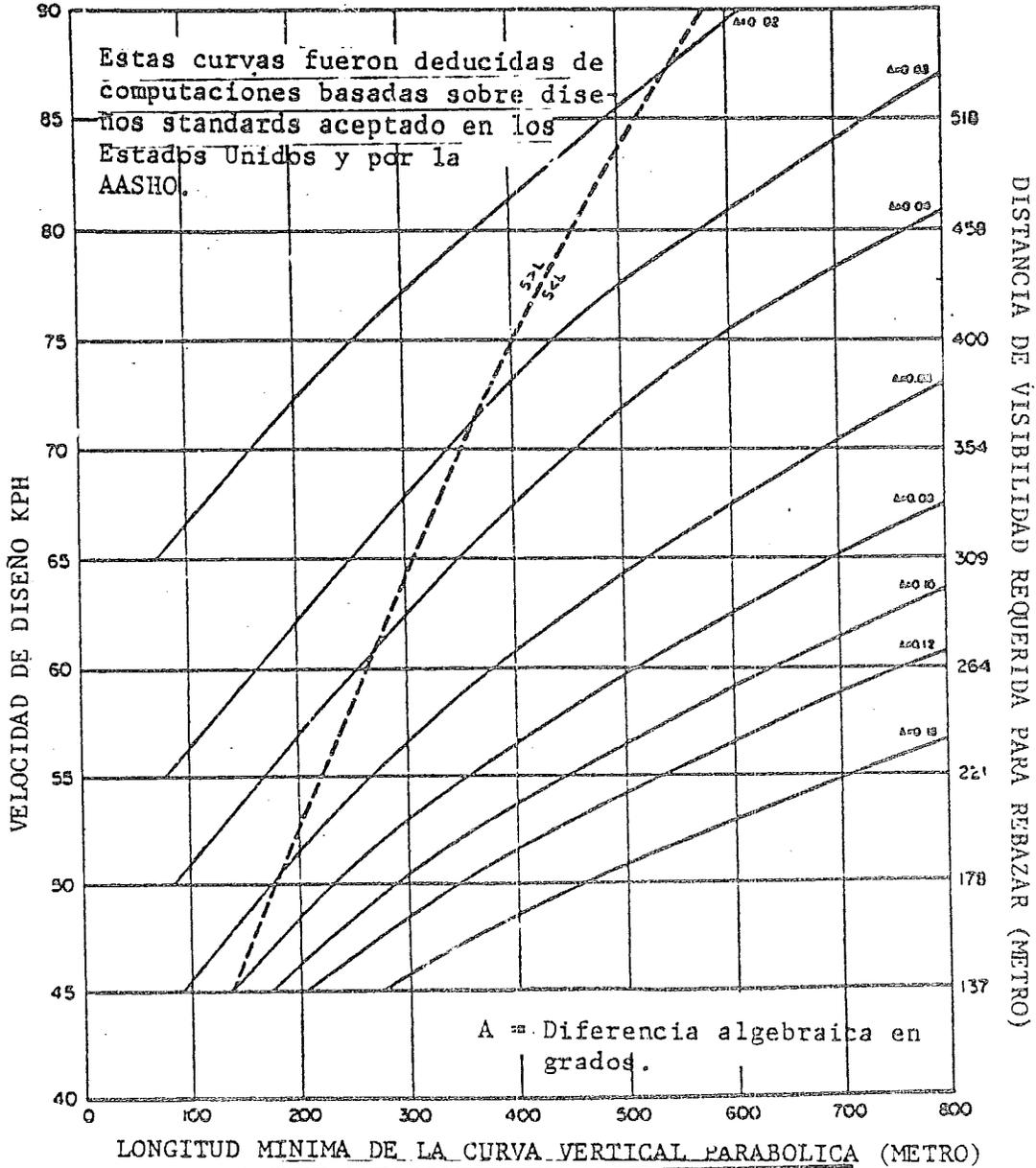
NORMAS DE DGCV

DISTANCIA DE VISIBILIDAD  
LONGITUD DE LA CURVA VERTICAL PARABÓLICA



NORMAS DE DGCV

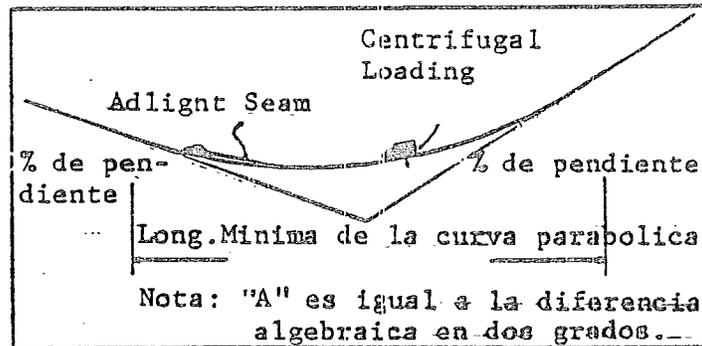
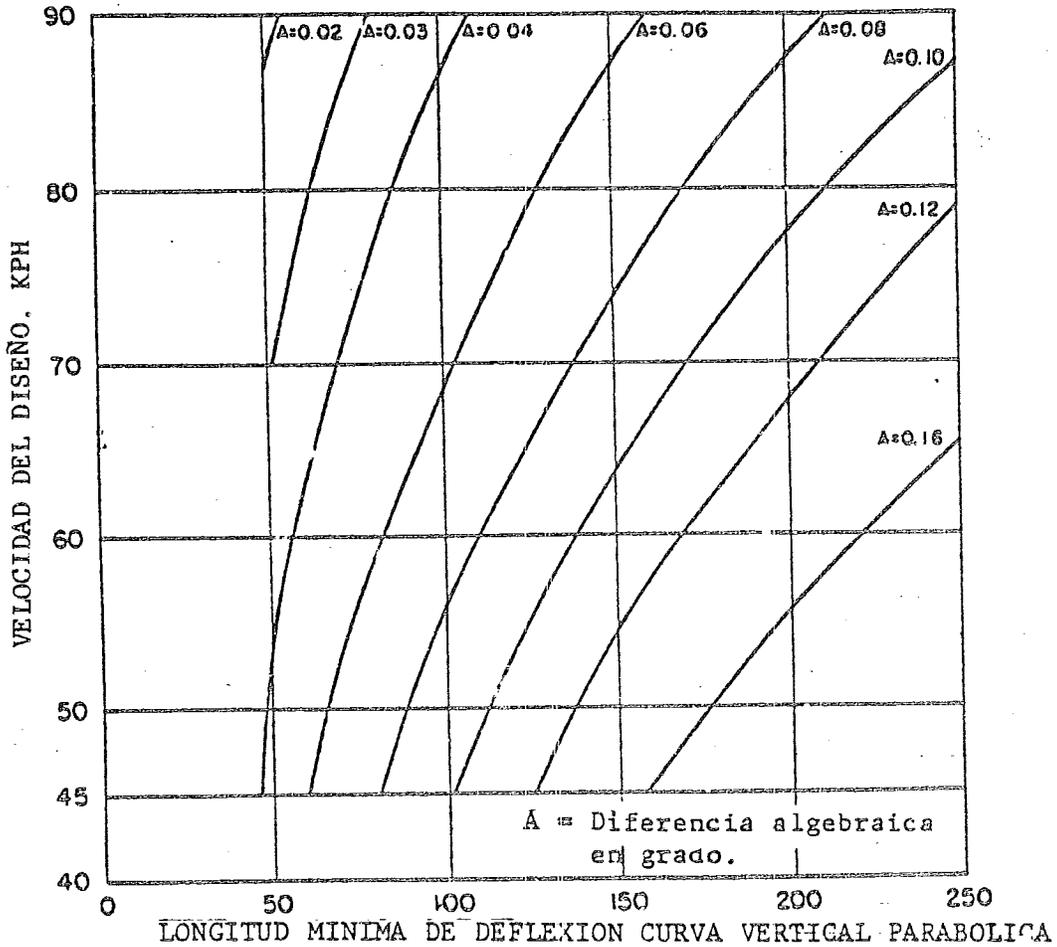
DISTANCIA DE VISIBILIDAD PARA REBAZAR.  
LONGITUD DE LA CURVA



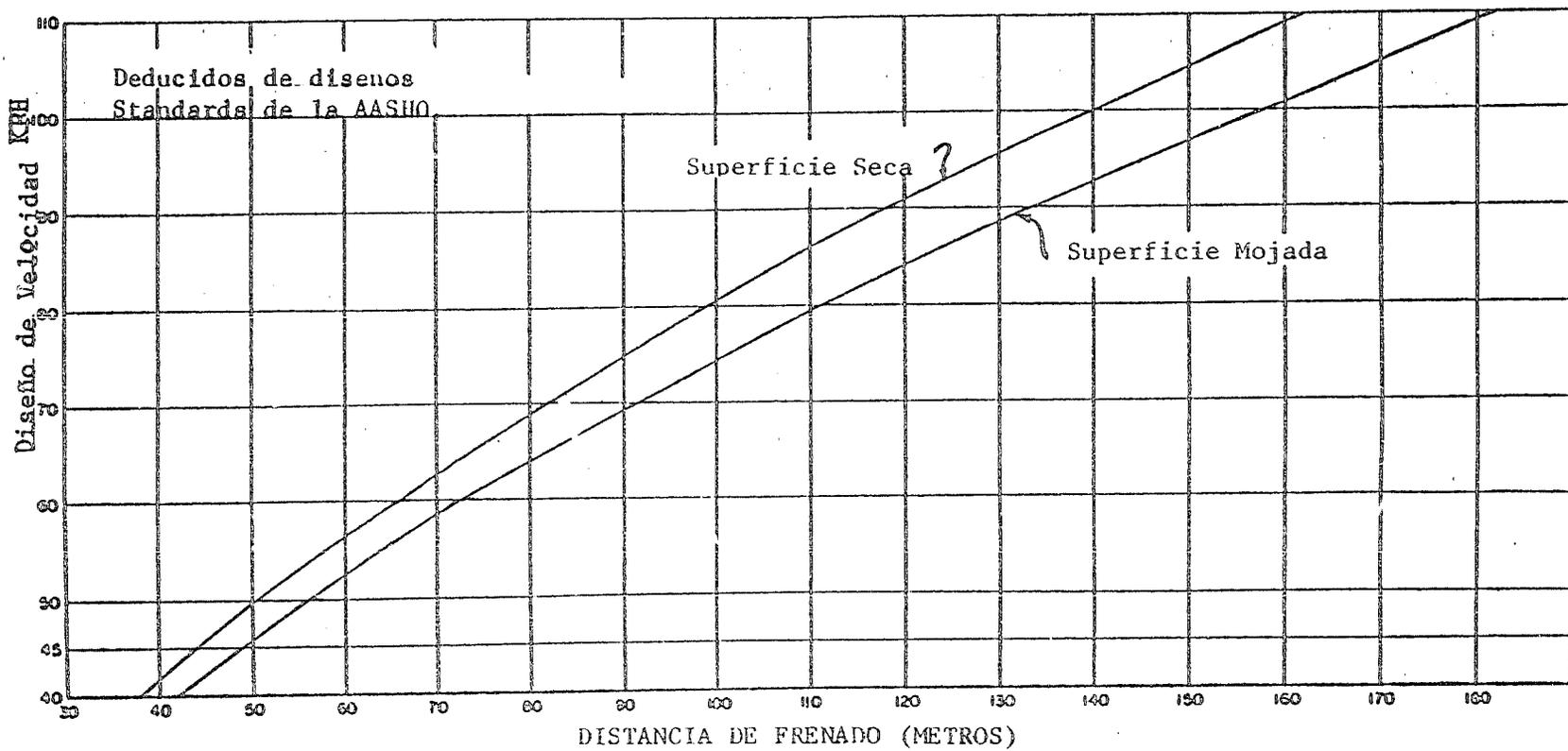
NORMAS DE DGCV

LONGITUD MINIMA DE DEFLEXION CURVA  
VERTICAL PARABOLICA

Estas curvas fueron reducidas de computaciones basadas sobre diseños standards aceptado en los Estados Unidos y por la AASHO.



DISTANCIA DE FRENADO PARA LA DETERMINACION DE LA DISTANCIA DE VISIBILIDAD HORIZONTAL  
 SEGUN DISEÑO DE VELOCIDAD, KPH



NORMAS DE DCCV

PROPOSED DGCV NATIONAL OFFICE STAFF  
MAINTENANCE DIVISION

	Current DGCV Staff	1980	1981	1982	1983	1984	PL-480 1980-81
Administrator/Engineer	1	1	1	1	3	1	1
Engineers	2	5	6	6	6	6	(3)
Draftsmen	2	6	6	3	3	3	
Data Analysts	2	4	4	4	4	4	(2)
Planning & Programming		2	2	2	2	2	(1)
Socio Economists		2	2	2	2	2	
Research Coordinator		1	1	1	1	1	(1)
Controller		1	1	1	1	1	(1)
Accounting	2	3	3	3	3	3	(2)
Payroll		2	2	2	2	2	(1)
Secretaries	1	4	4	4	4	4	(1)
Training Coordinator		1	1	1	1	1	
Equipment & Transport		1	1	1	1	1	
Chief Mechanic		1	1	1	1	1	
Inventory Control		1	1	1	1	1	(1)
Professional/Technician TOTALS	10	35	35	35	31	31	
Truck Chauffeurs for materials and fuel		5	5	5	5	5	(2)
Chauffeurs		2	2	2	2	2	(2)
<u>TOTALS</u>	10	42	42	42	38	38	18 (Part- Time)

EQUIPMENT & HAND TOOL REPLACEMENT

Year	Programmed Costs GODR Counterpart (US\$000)	Estimated Basic Replacement	Totals
1980	20	200 wheelbarrows - 12 500 road rakes - 4.5 350 heavy grubbing hoes 3.1	19.6
1981	80	2 dump trucks - 60 1 pickup - 9 100 wheel barrows - 6 500 road rakes - 4.5	79.5
1982	200	2 motorgraders - 90 2 aggregate classifiers 30 2 dump trucks - 60 250 Hatchets 3.2 500 road rakes 4.5 100 wheel barrows - 6.0 100 dirt tampers - 1.6 10 cross cut sawe .3 350 heavy grubbing hoes 3.1	198.7
1983	300	1 portable rock crusher 35 8 dump trucks 240 200 wheel barrows 12 500 heavy grubbing hoes 5 500 road rakes 5	297
1984	400	10 dump trucks 300 5 pickups 50 2 water tank trucks 40 100 wheel barrows 6 400 road rakes 4	400
<b>Totals</b>	<b>1,000</b>		<b>994.8</b>

ACTIVITIES RESULTING IN LOWER TOTAL COST  
IF DONE BY LABOR THAN BY EQUIPMENT

UNCLASSIFIED  
ANNEX D-5, Page 1 of 2

Operation	Man-day Labor Cost (US\$)		
	0-1.0	1.0-2.0	2.0-3.0
Site clearance	*	*	*
Excavation (a) ditches & trenches	*	*	*
(b) bulk (soft, loose soils)	*	*	
(c) bulk (other soils, soft rock)	*		
(d) caissons and open wells (soft, loose soils)	*	*	*
(e) caissons and open wells (other soils, rock)	*	*	
(f) terracing & contouring	*	*	
Refilling pipe and culvert excavations	*	*	*
Loading & unloading bulk materials	*	*	
Short haulage (a) labor up to 200m	*	*	
(b) animals up to 1 km	*	*	*
Placing, spreading & shaping bulk materials	*	*	
Mixing concrete (cement or bituminous)	*		
Stone production -			
(a) aggregate 25 to 50mm	*	*	
(b) undressed stone 50mm	*	*	*
(c) dressed stone	*	*	*
Bricklaying/masonry construction			
(a) Structures	*	*	*
(b) Pavements	*	*	*
Laying pipes (a) non-pressure	*	*	*
(b) pressure	*	*	*
(c) culverts (concrete)	*	*	*
(d) " (cor.metal)	*	*	*
Carpentry (a) formwork	*	*	*
(b) roof & bridge trusses	*	*	*
Reinforcement (a) bending	*	*	*
(b) fixing	*	*	*
Steelwork (structural)			
(a) fabrication	*	*	*
(b) erection	*	*	*

Note: 1976 Prices

IBRD STUDIES, 1978

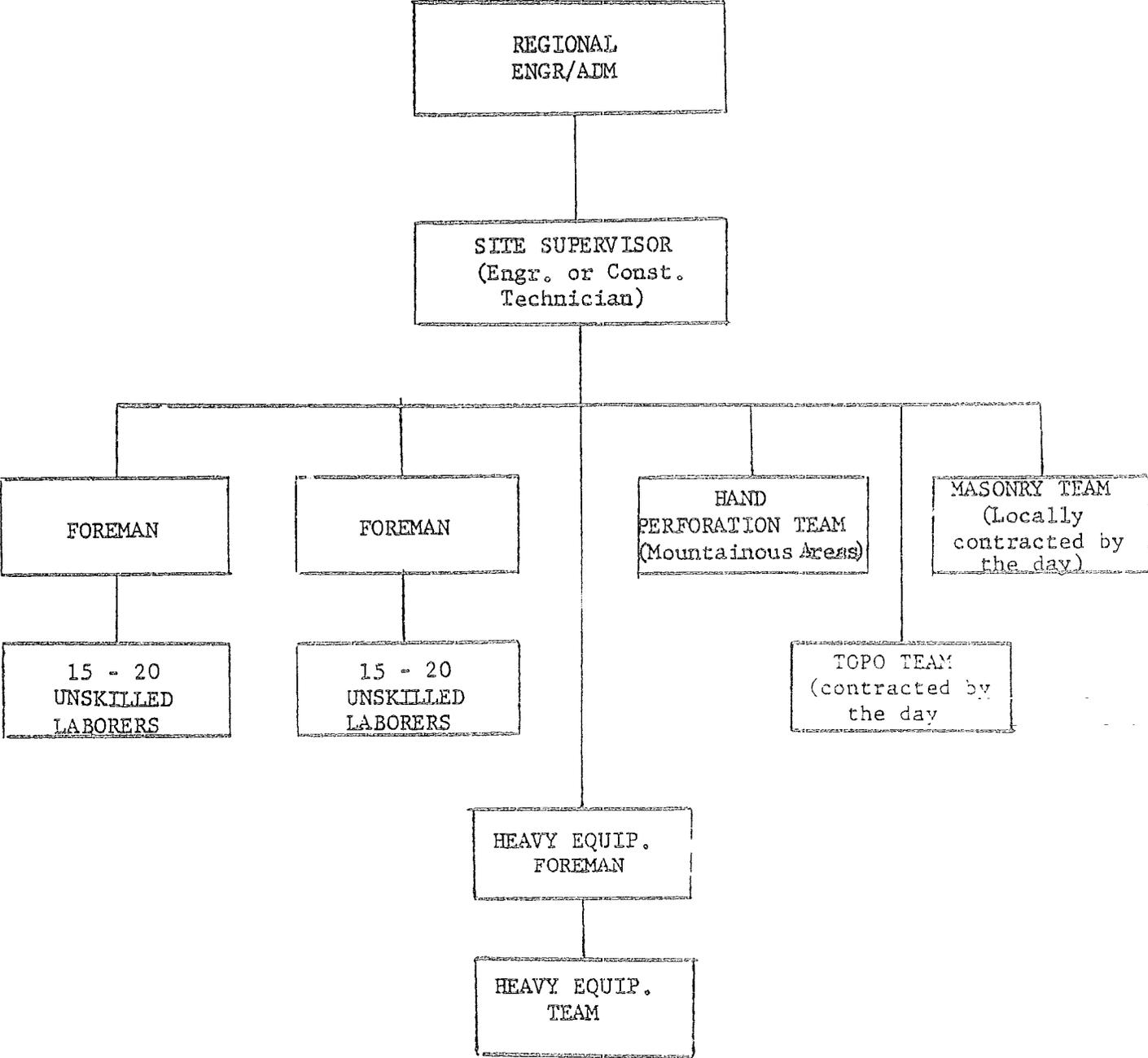
SUITABILITY OF PROGRAMS/PROJECTS FOR CONSTRUCTION BY  
LABOR-BASED METHODS AT DIFFERENT DAILY UNSKILLED LABOR WAGES

Type of Program/Project	Comments (Size of Project, Degree of Dispersion, etc)	Man-day Labor Cost (US\$)			
		0-1.0	1.0-2.0	2.0-3.0	3.0-4.0
Surfaced roads (1)	Minor roads	o			
Gravel roads (2)	Dispersed projects	o	o	o	
	Average projects	o	o		
	Large, concentrated projects	o			
Dirt roads	Very dispersed projects	o	o	o	o
	Fairly dispersed projects	o	o	o	
	Other projects	o	o		
Road widening, upgrading dirt roads by gravalling	Large concentrated projects	o			
	Other projects	o	o		
Periodic road maintenance programs	Dirt and gravel roads, very dispersed	o	o	o(3)	o(3)
	Other dirt and gravel roads	o	o	o(3)	
	Other un surfaced roads	o	o		
	Surfaced roads	o			
Small unlined canals and ditches	Small, dispersed projects	o	o	o	
	Average projects	o	o		
	Large, concentrated projects	o			
Large unlined canals and ditches		o			
Brick lining for canals and ditches		o	o(b)		
Routine maintenance of canals and ditches	Minor canals, very dispersed	o	o	o	o
	Other minor canals	o	o	o	
	Major canals	o	o		
Pipelines (5)		o(6)	o(7)		
Earthfill dams (incl. fishponds) (8)	Small dispersed projects	o	o	o(9)	
	Other small projects	o	o		
	Large, concentrated projects without important time constraints	o			
Masonry dams		o			
Rockfill dams		o			
Concrete dams (10)	Small (incl. weirs)	o	o(11)		
	Large (incl. gated barrages)	o			
Soil conservation & erosion control (12)		o	o		
Unsurfaced airfields		o	o(13)	o(13)	
Low-cost building	Traditional construction	o	o	o	
	Non-traditional construction	o	o		
Small bridges	Timber or masonry	o	o		
	Concrete	o			

Notes: (a) Parts of large concentrated projects may still be suitable  
at labor costs higher than those shown.  
(b) 1976 prices.  
(c) An asterisk indicates possible suitability.

IBRD STUDIES, 1978

REHABILITATION PROGRAM  
SITE ORGANIZATION

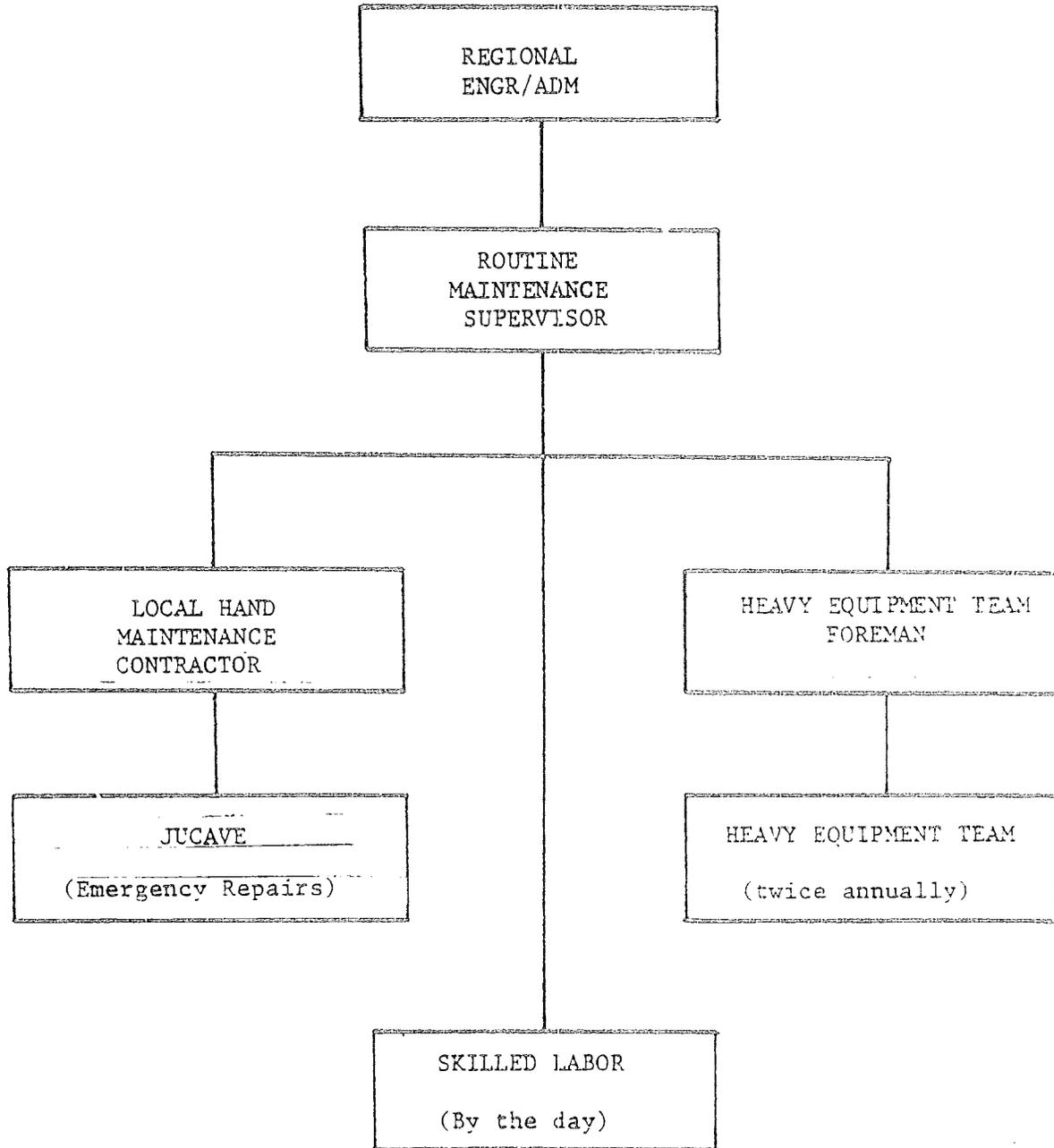


ESTIMATED REHABILITATION COSTS  
(Typical Road of 5 kms.)

	<u>Equipment &amp; Fixed Costs</u>	<u>Unskilled Labor Costs</u>
<u>Mobilization</u>		
Rented or skid mounted store room/office	RD\$ 350	RD\$
Equipment transport	150	
<u>Clearing and Grubbing</u>		
Hand tools usage - 3 months	300	
Labor - 75 MD at 3.50		262
<u>Road Shaping and Grading</u>		
Heavy Equipment, Compactor, grader, water wagon, etc., 7 days at 450/day	3,150	
Labor - 80 MD at 3.50		280
<u>Surfacing and Hauling</u>		
Loading & Hauling at 4.00/m <sup>3</sup> x 1500 m <sup>3</sup>	6,000	
Stockpiling - 1.25/m <sup>3</sup> x 1500 m <sup>3</sup>	1,875	
Spreading labor: 250 MD at 3.50		875
Tools	60	
<u>Culverts (48 Lin. Ft.)</u>		
Pipe: 36" O.D. Reinforced concrete at 45.38/4 Ft. Section	544	
Inspection Boxes: 4 at \$50 each	200	
Excavation & Placement - 48 MD/3.50		168
Joints backfill & compaction 48 MD/3.50		168
Headwalls: 12 - 24 MD at 3.50		84
Materials at \$25/Headwall	300	
<u>Ditching</u>		
10 km - 900 MD/3.50		3,150
<u>Compaction</u>		
Hand tamping in addition to equipment compacting - 25 MD/3.50		90
<u>Skilled Labor</u>		
2 foremen at 200/mon. x 3 months -	1,200	
1 foreman at 300/mon x 2 weeks -	150	
Sub totals	RD\$ 14,279	RD\$ 5,077
Total: RD\$19,356 ÷ 5 km = RD\$3,872/km		

SITE ORGANIZATION FOR ROUTINE  
MAINTENANCE PROGRAM

LOCAL LEVEL



OPERABLE EQUIPMENT OWNED BY THE GODR HIGHWAY DEPARTMENT \*  
(1979)

Dump trucks	112
Asphalt trucks	6
Motorgraders	29
Front End Loaders	21
Compactors	15
Pickups	45

\* From an equipment survey for the Highway Department by  
Roy Jorgensen Associates, Inc., consultants for a Highway  
Maintenance Program under contract to SEOPC.