UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

GUATEMALA

PROJECT PAPER

FARM-TO-MARKET ACCESS ROADS
Amendment No. 2

AID/LAC/P-410
CR P-230

Project Number; 520-0332

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: C (A = Add, C = Change, D = Delete) — Amendment Number 2

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: GUATEMALA

3. PROJECT NUMBER: 520-0332

4. BUREAU/OFFICE: LAC — 05

5. PROJECT TITLE (maximum 40 characters): Farm-to-Market Access Roads

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 91

7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)
A. Initial FY 87 B. Quarter 2 C. Final FY 89

8. COSTS ($000 OR EQUIVALENT $1 = 2.50)

A. FUNDING SOURCE	FIRST FY 85 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	2,558	2,324	4,872	13,563	16,437	30,000
(Grant)	(55)	(290)	(335)	(355)	(1,745)	(2,100)
(Loan)	(2,503)	(2,034)	(4,537)	(13,208)	(14,692)	(27,900)
Other U.S. 1.	–	–	–	–	–	–
Other U.S. 2.	–	–	–	–	–	–
Host Country	–	1,824	1,824	–	22,632	22,632
Other Donor(s)	–	–	–	–	–	–
TOTALS	2,558	4,148	6,696	13,563	39,069	52,632

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) FN	200	061	061	1,100	10,366	–	12,034	1,100	22,400
(2) ES87	200	061		–	–	1,000	5,500	1,000	5,500
(3)									
(4)									
TOTALS				1,100	10,366	1,000	17,534	2,100	27,900

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 245 | 251 | 011 | 012 | 019

11. SECONDARY PURPOSE CODE: 264

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	BR	BL	BS				
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

1) To expand the network of all-weather farm-to-market and tertiary roads in the target area to provide a better transportation system 2) To institutionalize the national program to construct and maintain low-cost labor intensive rural farm-to-market roads.

14. SCHEDULED EVALUATIONS
Interim MM 10 YY 88 | MM YY | Final MM 07 YY 91

15. SOURCE/ORIGIN OF GOODS AND SERVICES
Grant: [X] 000 — Loan: [X] 941 — Grant/Loan: [X] Local — [ ] Other (Specify)

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)
This amendment adds $17.5 million in loan funding and $1.0 million in grant funding to expand the network of all-weather farm-to-market roads, institutionalize the national construction and maintenance program started in the original project and initiate a pilot tertiary roads component.
I have reviewed the methods of implementation and financing of this project and certify that they are in agreement with Payment Verification Policy Implementation Guidance provided in AA/M R.S. Rollis memorandum of December 30, 1983.

17. APPROVED BY
Signature: Anthony J. Cauterucci — Joe Hill Jr. Controller
Title: Anthony J. Cauterucci, Director, USAID/Guatemala
Date Signed: MM DD YY

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (8-79)

Authorization Amendment Number Two

Name of Country: Guatemala

Name of Project: Farm-to-Market Access Roads

Number of the Project: 520-0332

Number of Loan: 520-T-040

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, the Farm-to-Market Access Roads project for Guatemala was authorized on March 20, 1985. That authorization is hereby amended as follows:

   Section 1 shall read:

   Pursuant to Section 103 and Section 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Farm-to-Market Roads Project Amendment for Guatemala involving planned obligations of not to exceed TWENTY SEVEN MILLION NINE HUNDRED THOUSAND UNITED STATES DOLLARS ($27,900,000) IN LOAN FUNDS ("Loan") and TWO MILLION ONE HUNDRED THOUSAND UNITED STATES DOLLARS ($2,100,000) IN GRANT FUNDS ("Grant") over a one year period from date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB allotment process, to help in financing foreign exchange and local currency costs for the Project. The planned life of the Farm-to-Market Roads Project is six and one half years from the date of initial obligation.

   Section 2 shall read:

   The Project ("project") consists of assistance to expand the network of all weather Farm-to-Market Roads in the Guatemalan Highlands and in the Departments of Chiquimula and Santa Rosa, to institutionalize a national program to construct and maintain these roads using low-cost, labor-intensive methods and to initiate a pilot tertiary roads component to provide a dependable, all-weather link between farm-to-market roads and secondary roads for the purpose of improving small farmer access to services, markets and inputs to increase agricultural production and

rural income. The Project will achieve this purpose by financing the construction of about 1705 kilometers of access roads and the upgrading of 240 kms. of tertiary roads benefiting about 682,000 highland and eastern inhabitants.

2. The Project Amendment, which may be negotiated and executed by the officer to whom such authority is delegated in accordance with A.I.D. 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 A.I.D. may deem appropriate.

a. PACD

The PACD will be extended 21 months to September 30, 1991.

b. Conditions Precedent to Disbursement (Loan)

1. Prior to the first disbursement under the Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Borrower will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D. the following:

(a) an opinion of the Ministerio Público acceptable to A.I.D. that this Agreement has been duly authorized or ratified by, and executed on behalf of, the Borrower, and that it constitutes a valid and legally binding obligation of the Borrower in accordance with all of this terms;

(b) evidence that the Borrower has assigned financial resources in the Dirección General de Caminos (DGC) budget for contracting the necessary personnel to initiate the access roads activities in Regions VIII and IX in the Departments of Sta. Rosa and Chiquimula respectively, as well as for contracting the necessary personnel to initiate the pilot component for tertiary roads upgrading. Additionally, DGC should present evidence that the procedure for obtaining the authorization of positions by the Borrower for contracting the required personnel has been initiated.

3'

c. Covenant

Additional Administrative and Operations Personnel for Direccion General de Caminos

The Borrower agrees to provide during the life of Project, through the contract and payroll contracting system, the required number of positions for the administrative and operation functioning of the new Regional Construction/Maintenance Offices to be created in the Departments of Santa Rosa and Chiquimula respectively as well as for the administrative and operation functioning of the tertiary roads pilot component.

Approved _____
Anthony J. Cauterucci
Director
USAID/Guatemala

Dissapproved _____
Anthony J. Cauterucci
Director
USAID/Guatemala

Date 9/07/87

Clearances

C/PDSO:CHSchoux _____ Date 9/28/87
PRM:TKellerman _____ Date 9/28/87
AC/OPSP:HWing _____ Date 9/28/87
CONT:JHill _____ Date 9/28/87
DDIR:PWhite _____ Date 9/28/87

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I. Summary and Recommendations for Access Roads Amendment

A PID for the Tertiary Roads Project, 520-0352 was reviewed on Monday April 20 by an executive committee comprising:

A.J. Cauterucci, Director, Chairman of committee
Paul White, DD
Richard Burke, RRM
C.H. Schoux, PDSO
Harry Wing, ORD
Mary Ott, OEPA
Joe Hill, Cont
Anne Walsh, Adm.
Felipe Manteiga, OPSP
Robert Van Horn, RCMO
Liliana Ayalde, HRD

The document was not approved. Following is a summary of the guidance derived from that review.

1. Given that there is still a great need for access roads and the fact that their impact is greater than that of tertiary roads, construction of access roads should be the major undertaking of the new activity with a component to address tertiary roads whose deterioration has affected their year round status.

2. During the economic analysis the relative advantages/disadvantages of having the private sector carry out all or part of the project should be investigated. The advantages of the private sector's greater efficiency must be weighed against its greater cost and lesser social impact.

3. A system should be developed and institutionalized to provide for coordination between the Dirección General de Caminos (DGC) and dependencies of the Ministry of Agriculture. This would allow for placing of roads in areas with greatest agricultural potential.

4. To avoid duplication of efforts and maximize the effectiveness of inputs, we should coordinate closely with other donors involved in road construction projects.

5. The instituional analysis must determine what additional personnel will be required by AID and the DGC to efficiently implement this project.

6. The following general points were also agreed upon:

- Working in conjunction with DGC and dependencies of the MOA, we should develop a system of selection and prioritization of roads to be constructed or upgraded. We should identify any TA required to carry out and institutionalize this coordination.

- The social soundness analysis should give a a detailed descripton of Indian and Ladino populations living in the project areas, identifying anticipated positive and negative effects of the roads and a means for maximizing a sense of ownership in the project financed roads.

- The design of the roads maintenance system and how it will continue after AID funding ceases must be described. CDIE should be contacted to obtain designs of other AID-financed road maintenance systems.

1. Executive Summary

During review of the PID for the Tertiary Roads Project it was determined that the need for, and impact of access roads is greater than that for tertiary roads, though there is a need for the latter. A tertiary road in poor condition does not provide the crucial link between access and secondary roads. The absence of an access road however, means no link to the market. As a consequence, it was decided, rather than develop a separate tertiary roads project, to amend the current access roads project and add a small tertiary roads component to address roads that are deteriorated to the extent that they are not passable in the rainy season.

This amendment will provide an additional $17.5 million in loan funding and $1.0 million in grant funding, to be used as follows: $12.5 million in loan funding will be used to expand the network of all-weather farm-to-market roads and to institutionalize the national construction and maintenance program started in the original project. An additional $5.0 million will be provided to initiate a pilot tertiary roads component to facilitate better access to transportation of inputs, outputs and services for small farm families by providing a dependable, all-weather link between farm-to-market roads and secondary roads. The grant funds will finance TA, studies and evaluation required by the project.

The goal of the amended Project is to improve income, sustainable productivity, and the quality of life of Guatemala's small farmers. During the six and one half year Life of the Project, $30.0 million will be spent in the construction or rehabilitation of 1,705 kilometers of farm-to-market roads and upgrading of 240 kms. of tertiary roads in Guatemala. These activities will use significant amounts of unskilled labor provided by the rural communities participating in this program. By the end of the Project more than 682,000 rural inhabitants will enjoy all-weather access to marketing centers.

This project will provide incentives to increase the production of high value crops. There will also be improved access to health, educational, and agricultural extension services which will result in a better standard of living. In addition, the participating rural farm families will earn, under this amendment, more than $9.1 million in direct payment for the approximately 110,000 man-months of skilled-unskilled labor required for the construction or rehabilitation and maintenance of the access roads and about $1.7 million for the upgrading of tertiary roads for another approximately 32,345 man-months of labor. Roads will be constructed and uncontained in an environmentally sound way and resource management actions will be promoted and carried out with local communities to assure that agricultural and other land/resource uses are sound and rural development is sustainable.

The Project purpose is to improve small farmers' access to services, markets and inputs necessary for agricultural production.

To increase this project's impact on agricultural areas, AID will coordinate with dependencies of the Ministry of Agriculture to help assure that access roads are constructed through areas with high agricultural potential or potential for increased farm production. In this manner, the access roads will complement the efforts of the MOA and other AID projects to increase agricultural production, income and productivity of small farmers, justifying a continued Guatemalan commitment to this kind of program.

The financial resources necessary to carry out the Program are given in the Illustrative Budget in Annex 1.

II. Farm-to-Market Roads, Original Project

1. General Background

The original $10.0 million project (9.0 loan, 1.0 grant) was authorized in the Mission on March 20, 1985 and obligated on March 20, 1985. Its goal was to expand the network of all-weather farm-to-market roads in the Guatemalan Highlands and to institutionalize a national program to construct and maintain these roads using low-cost, labor intensive methods.

The pupose was two-fold: 1) the expansion of the network of all-weather, farm-to-market roads in the target area, and 2) institutionalization of a national program to construct and maintain low-cost labor-intensive rural farm-to-market roads.

The target group was the estimated 150,000 people in the area of influence of the access roads constructed in the Highlands. The beneficiaries would not only receive the benefits of improved access to inputs and services, as well as to the market, but they would also have the opportunity to earn income by providing labor during the road construction phase. An estimated $8.6 million (the Quetzal at that time was 1:1) was earned by the beneficiaries during road construction.

construction and maintenance of the selected roads. The villagers are paid on the basis of the work they perform. The committee is responsible for distributing the work equitably among the community members to give all capable persons the chance to earn additional income.

The unskilled labor is provided with tools and construction materials such as cement, culverts and rebars by DGC. The community provides sand, gravel, rock and water.

The DGC provides all administrative and skilled construction personnel. Under this project the DGC will constuct and equip regional centers and workshops to support and institutionalize the access roads construction rehabilitation and maintenance activities.

Grant funds were planned to contract TA to provide supervisory services for the project, including construction, rehabilitation and maintenance.

A $1.466 million project amendment ($1.366 loan, 1.0 grant) to Project 520-0332, was obligated on July 18, 1986. The goal, purpose and modus operandi of the add-on were the same as that for the original project.

The additional funds were used to establish a new access roads construction and maintenance office in Baja Verapaz. An additional 35km per year of road were to be constructed over the add-on's three year LOP. The original project had project targets of 200 kms per year over its four year LOP. With this Amendment, project targets were increased to 235 kms. per year for a total of 905 kms (800 original, 105 add-on)

2. Accomplishments

At its present staff level DGC has been very effective in implementing the Farm-to-Market Access Roads Project (520-0332). DGC, as the implementing unit of this project has also demonstrated its ability to achieve its targets by having constructed 200 Kms. of access roads by the end of CY 1986 and having under maintenance in 1987 900 Kms. of access roads previously constructed as originally planned.

The use of decentralized regional offices has enabled the Rural Roads Program of DGC to manage and implement the previous Small Farmer Development Project 520-0233 and 520-0233A as well as the ongoing projects Farm-to-Market Access Roads 520-0332 and the Roads component within the Highlands Agricultural Development Project 520-0274. Based on the above Dirección General de Caminos is considered by the AID Mission to be a dependable implementing unit for the proposed project amendment.

III. Description of Amendment

A. Perceived Problem

The 1981 census indicated that 64 percent of Guatemala's population lives in rural areas and that 65 percent of Guatemala's work force is engaged in agriculture.

One of the main constraints to improving the income and productivity of this large rural population has been the lack of an adequate transportation system. In most rural areas, especially in the Highlands, small farmers are often unable to obtain agricultural inputs or market their products because transportation is often not available. When available, it is both expensive and unreliable.

Guatemala has invested in the development of a large and complex transportation network, including primary international highways (such as the Pan American Highway, the parallel South Coast Highway, and highways to ports on both the Atlantic and Pacific) and paved secondary roads that connect the main population centers. However, this network is not supported by a sufficient tertiary and farm-to-market feeder road system. As a result, the majority of small Guatemalan farmers still lack reliable year-round access to markets and agricultural inputs.

Although these small farmers have the potential to increase farm yields, they do not have the incentive to do so; they must still rely on human or pack animal transport over poor foot trails to get their products to market. Poor roads also increase vehicle maintenance costs and lengthen transport time for buses and trucks using the roads. These costs also reduce truckers' frequency of service and raise freight prices to the small farmer. The rural inhabitants' perception of their own problems fully coincides with the facts mentioned above.

In order to alleviate this problem, the GOG with the assistance of AID, initiated a low-cost, labor-intensive pilot access roads construction program (Project 520-0233) in 1978 to provide small Highland farmers year-round access to the national transportation network. Since its initiation, the program has built more than 800 kilometers of access roads using manual labor supplied by the rural beneficiaries. AID support was increased through a $3.0 million Project Paper Amendment in 1983. In addition, the GOG, with the support of the Highlands Agricultural Development Project (Project No. 520-0274), initiated a national maintenance program to maintain these access roads utilizing the same labor-intensive process developed during the construction phase.

In spite of these initial efforts, most of Guatemala's rural areas are still not serviced by adequate roads. In 1976, it was estimated that at least 15,000 kilometers of foot paths and seasonable trails or roads needed to be upgraded to all-weather access roads to provide adequate transportation to all of the rural population. If this is compared to the 800

kilometers of access roads built between 1978 and 1984, the need for additional investment is evident. Unless a program for constructing, reconditioning, and maintaining low-cost, labor-intensive rural access roads is institutionalized, most of Guatemala's small farmers will remain outside the country's economic mainstream.

B. Project Goal and Purpose

1. Goal

The goal of the Project is to improve the income, productivity, and quality of life of Guatemala's small farmers.

The Project will contribute to the accomplishment of this goal by providing small farmers with all-weather access to marketing centers, agricultural inputs, and technical services. Quality of life will be upgraded by improved access to health, education, and agricultural extension services. Other effects include increased production of high value crops and improved regional mobility of excess rural labor resources leading to more productive utilization of the farm labor force.

In addition, short-term employment opportunities and cash incomes for rural inhabitants will be increased by the use of labor-intensive methods.

2. Purposes

a. To expand the network of all-weather farm-to-market and tertiary roads in the target area to provide a better transportation system.

b. To institutionalize the national program to construct and maintain low-cost labor intensive rural farm-to-market roads.

In order to achieve these purposes, the DGC's current labor-intensive access roads program will be expanded to guarantee a continued Government of Guatemala level of effort and effective use of resources in the selection, construction, reconditioning, and maintenance of access and tertiary roads.

The proper selection of roads through rural areas that have high agricultural potential or increased farm production through AID-financed agricultural improvements will ensure their economic impact.

C. Relationship to the CDSS and Action Plan

The CDSS maintains three basic problems as the primary obstacles to broad based economic growth with equity in Guatemala: (1) inadequate economic growth levels and highly skewed participation in the benefits of

growth; (2) rapid population growth; (3) financial instability and balance of payments deficits. The strategy to address the inadequate level of economic growth, and spread the benefits of growth, is intended to improve rural incomes and productivity. Improvements in agriculture, the primary source of employment and income, will be the most important means of achieving this objective.

The strategy seeks to improve the existing resource base in rural areas, increase efficiency in the use of available resources, and improve the agribusiness system. Improved rural access roads is a major condition for improvement of agriculture in rural areas. The expansion of the rural roads network will provide small rural farmers with access to the national transportation system, improve their access to markets, agricultural inputs, and technical support services of government agencies.

Under previous and current AID projects, agricultural areas in the Highlands have benefited from small-scale irrigation and soil conservation measures. As a result, small farmers in these areas have been able to double or triple yields. Poor farm-to-market transportation, however, has sometimes hindered the timely marketing of this increased production at favorable prices. Although the Mission has supported the construcion of rural access roads through the Small Farmer Development Project (520-0233) and its amendment (520-0233A), and is financing the maintenance of these roads through the Highlands Agricultural Development Project (520-0274), the problem of providing the small farmer with adequate access to markets has not been solved. Therefore, to improve market linkages for small farmer production, the proposed Project will concentrate on construction, rehabilitation and maintenance of additional rural access roads. Also, a new pilot project component is included for tertiary roads upgrading to facilitate the use of access roads through a better transportation system. These improvements will provide additional transportation capacity needed by the rural poor and facilitate the movement of small farmers into the production of higher value crops.

In addition to direct benefits to small farmers, the Project will support the Mission strategy of improving the agribusiness system. The current agribusiness system is characterized by: (1) fragmented small producer marketing efforts; (2) poor linkages between growers and processors; and (3) high product losses. To overcome these weaknesses, USAID is carrying out programs to support cooperative production efforts, improve market linkages, provide financing for private sector agribusiness investments, and improve related infrastructure such as rural roads. The rural road network, which is in poor condition, is a critical element in providing market access and reducing product losses.

The proposed Project will give priority to those areas already benefiting from AID financed crop diversification, small scale irrigation, soil conservation activities, as well as areas to be developed or improved under the Agribusiness Project (520-0276). The Project also responds to the Mission strategy of increasing rural incomes, since the construction of the

access roads will be labor-intensive, providing much needed employment opportunities in the benefited areas.

D. Other Donor Activities

The Inter-American Development Bank (IDB), after completing a $25 million Earthquake Road Construction Program, is assisting the GOG with $40 million in rehabilitating and improving 135.4 kms. of secondary roads and constructing 265 kms. of access roads using labor-intensive construction methods. This project is scheduled for completion in 1991. In addition, the IDB has loaned Guatemala US$64.0 million to repair and upgrade 161 kms. of the Atlantic Highway; the main corridor that runs to the Atlantic ports.

The International Bank for Reconstruction and Development (IBRD) has recently completed a $17.0 million loan for a major highway maintenance and is currently working with the GOG on a feasibility study for a $47.0 million primary and secondary roads rehabilitation program, focused in the northern highlands.

The proposed project will be closely coordinated with both IDB and IBRD to avoid duplication of efforts.

E. Conformity with Guatemalan Strategy/Programs

The principal objectives of the Government of Guatemala's 1987-1991 National Development Plan are expanded access of the rural population, especially in the Highlands, to the benefits of development, including increased agricultural production, improved productivity and market access, and a reduction in unemployment and underemployment.

In order to achieve these objectives, one of the basic strategies envisioned by the plan is to improve the infrastructure that supports agricultural production. The construction and maintenance of rural feeder roads has a high priority in the plan. For the transportation sector, the plan includes the construction of these rural access roads and improvement of tertiary roads with community participation using labor intensive procedures.

The construction of rural access roads and improvement of tertiary roads is viewed by the Planning Council and the GOG as one of the most important means of increasing rural Guatemalan farmers' access to the national markets, and as an efficient mechanism to provide employment opportunities to economically depressed rural populations as well as the access to the benefits of social and economic development.

The GOG fully supports the use of labor intensive techniques not only to assure construction and maintenance of access roads but to create additional rural employment opportunities and increase the envolvement of local communities and their commitment to the public infrastructure program in rural roads construction and maintenance.

F. Expected Achievements/Accomplishments

The Project purposes will be achieved during the six years and one half of Project life by means of the following outputs:

a. construction or upgrading of 1,555 kilometers of high priority rural access roads,

b. rehabilitation of 150 kilometers of high priority rural access roads,

c. upgrading of 240 kilometers of tertiary roads.

d. institutionalization of the Government of Guatemala's capacity to execute a continuous labor-intensive access roads program in the mountainous areas of the country.

e. institutionalization of a system of regional centers for construction, rehabilitation and maintenance of access roads and tertiary roads.

Achievement of the Project purposes is to be measured by a final evaluation, which besides measuring the completion of construction targets, will review DGC's capability to efficiently continue the access roads program, and determine if the beneficiaries are indeed obtaining the projected economic benefits.

G. Project Outline and How It Will Work

The proposed Project Amendment will construct or improve 800 kilometers of access roads for a total project target of 1,705 kilometers at the end of the project and will upgrade 240 kilometers of tertiary roads at the end of the project. These new and upgraded roads will benefit 682,000 small Guatemalan farmers. The Project will also upgrade the Dirección General de Caminos' capacity to continue this kind of program beyond the life of the Project. To accomplish the above mentioned targets, the Rural Roads Program of DGC will be expanded by establishing new regional offices in the departments of Chiquimula and Sta. Rosa to construct and maintain Farm to Market Access Roads. In addition, the DGC will establish a mobile unit to upgrade tertiary roads under the new pilot Component.

A combination of AID and GOG funds will be used to finance the elements necessary to complete the following roads activities: 1) the purchase, operation, and maintenance of a small pool of heavy equipment, 2) payment of village supplied unskilled local labor, 3) hand tools and construction materials, 4) project administration, and 5) construction of regional facilities.

A large portion of the AID funds will be used to purchase heavy equipment, construct two new regional offices, and to cover a portion of the

costs for rural labor, local construction materials, spare parts, tires, and tubes.

The GOG will assume all administrative and heavy equipment operating costs, as well as a portion of the cost of rural labor, construction materials, spare parts, tires, and tubes.

The 1,705 kilometers of access roads constructed and rehabilitated annually over the 6 year and one half active life of the Project will be included in the AID financed labor-intensive maintenance program of the DGC's Rural Roads Program. Once upgraded, the tertiary roads will be included in the GOG financed program of the DGC's Maintenance Division.

Complementing the project, an additional $1.0 million in grant funds will be used for technical and supervisory assistance, training in environmental concerns, a baseline survey and final evaluation, as well as for in-country and international seminars and travel. The various elements of the Project by Component are more fully described below.

H. Access Roads Construction, Rehabilitation and Maintenance

The processes for labor-intensive access roads construction and labor-intensive access roads rehabilitation are similar, except that because of the partial savings in the work completed with the original investment, the cost per kilometer of reconditioning is approximately one half the cost of new construction. Given that the proposed amendment will open new areas and the original project includes the rehabilitation targets for the project, the present description is only for the additional farm to market access roads construction or improvement and maintenance activities. The technical analysis given in Annex 3 indicates the costs of access roads construction to be $15,600 (Q39,000) per kilometer.

1. Heavy Equipment

Table VI of the technical analysis shows the targets scheduled per year for a total of 1705 Kilometers in six years and one half of project implementation. In order to maintain the rate of construction and maintenance, heavy equipment with a total value of $ 3,678,000 will be purchased during the first year to cover the two new regional offices and maintenance centers. Table 1 below provides a summary of the equipment to be purchased based on the technical analysis given in Annex 3.

TABLE I

HEAVY EQUIPMENT FOR TWO NEW REGIONAL OFFICES AND TWO MAINTENANCE CENTERS

Description	Quantity for two regions and two maintenance Centers	Unit Price $	Estimated Cost ($)
Crawler Tractors	4	$ 170,000	$ 680,000
Motorgraders	4	99,000	198,000
Front End Loaders	2	72,000	144,000
Front End/Loader/Backhoes	2	45,000	90,000
Self Propelled Compactors	4	80,000	320,000
Dump Trucks	24	36,000	864,000
Concrete Mixers (1 bag)	4	3,000	12,000
Compressors	2	30,000	60,000
Electric Welders	2	6,000	12,000
Oxy - Acetylene Welders	2	1,500	3,000
Water Pumps	2	6,000	12,000
Chain Saws	2	1,000	2,000
Concrete Vibrators	2	2,000	4,000
Large Pick-Up Trucks, 1.5 ton	12	17,000	204,000
3-Ton Stack Trucks	2	24,000	48,000
Truck Mounted Lube System	2	35,000	70,000
Water Tank Trucks	2	26,000	52,000
Small Pick up Trucks, 1 ton	15	15,000	225,000
Portable Jaw crushers	6	80,000	480,000
TOTAL			$3,678,000

The GOG will provide $1,474,000 for operation and maintenance of this equipment. Spare parts, tires, and tubes for the equipment will be financed by a mix of loan and GOG funds. (See Table XX, Annex 3.)

2. Rural Community Labor

Roughly 64 percent of the cost of constructing the proposed access roads is related to manual labor, 55 percent is for payment to community workers for their unskilled labor and 9 percent is for skilled labor contracted by the DGC.

The organization of the unskilled labor provided by communities will be similar to previous construction projects. Construction

committees are formed by the benefiting communities providing the required labor force for both construction and maintenance of the selected roads. The villagers receive monetary compensation for the days worked, based on the type of work performed. Table V, Annex 3, provides the labor rates for various construction activities. On the average, however, a daily rate of roughly 5.56 quetzales will be paid to each worker to compensate him for the potential or partial loss of earned income were he to dedicate his time to other economic activities. The wage of Q5.56 is the average amount obtained by a small farmer per work performed per day based on the list of unit prices updated by DGC for 1988. On the average, participating workers have gained about 122 quetzales per month per worker during road construction, a significant addition to their average annual income of about 366 quetzales per year.

The community construction committee is responsible for providing all unskilled labor required by the program and for equitably distributing the workload to members of the communities. Although women and children are not normally part of the paid work force, they play an important active role by providing work crews with food and logistical support.

Approximately 232 man-months of unskilled labor is required to construct one kilometer of access roads, and 123 man-months to rehabilitate a kilometer of road. In total, about 87,709 man-months of community supplied hand labor will be required to construct 800 kms. of roads. About 22,110 man-months will be required to constantly maintain an additional 675 kilometers during the last three years of project. This level of work effort provided by the communities will cost a total of $9,119,000 million of which AID loan funds will finance $4,561,000 million and GOG counterpart funds the remaining $4,558,000 million (See table XX of Annex 3).

3. Hand Tools and Construction Materials

The rural labor force will be supplied with hand tools to complete the required labor-intensive portions of road construction and maintenance. In accordance with Table XX in the Technical Analysis, Annex 3, approximately $1,137,000 of the funds will be used to procure hand tools. These will be purchased locally by the DGC with a mix of GOG counterpart funds and loan funds. They will be purchased annually and stored at the nine regional warehouses of the program.

In addition to hand tools, work crews will be provided with construction materials, such as cement, culverts, reinforcing steel bars, and lumber for a total amount in loan and GOG funds of about $720,000. At the same time, the various communities will supply local construction materials, such as sand, gravel, rock, and water. Construction materials not provided locally will be purchased by the DGC and distributed to construction and maintenance sites as needed.

4. Project Administration

As indicated in the Technical Analysis, Annex 3, approximately 6 percent of the cost per kilometer to construct access roads is related to administrative and supervisory activities. The organization chart given in the Administrative Analysis, Annex 2, indicates that the Rural Roads Program of DGC currently employees about 508 people at the central office and seven regional offices. This includes, administrative, technical and field personnel (see list on Tables 2 and 3 of Administrative Analysis).

The proposed project Amendment will utilize the existing GOG personnel to implement the six years and one half construction and rehabilitation project. The additional personnel anticipated at this time for purpose of this Amendment is indicated in tables 3 and 4 of the Administrative Analysis. The GOG will provide a total of $1.3 million to pay salaries and per diem of these GOG project employees (See table XX of Annex 3).

In the process of institutionalizing this program at a national level, two new regional facilities will be constructed, one for each regional headquarters; the GOG will acquire the necessary land, and $40,000 in loan funds and $12,000 in GOG counterpart resources will be utilized to construct and equip new regional offices, warehouses, and mechanic shops. The regional offices will be built with the same design and specifications considered for the original project. The DGC will construct these centers by force account and expenses made with loan funds will be reimbursed on a Direct Cost Reimbursement basis.

I. Tertiary Roads Upgrading and Maintenance

As described in the Technical Analysis the pilot tertiary roads component under the proposed project will provide the link between the farmers and the markets and services they require to improve their access to agricultural inputs, reduce transportation costs and increase short-term employment opportunities and cash incomes for the rural poor.

a. Heavy Equipment

Table VI of the technical analysis shows the targets scheduled per year for a total of 240 kilometers of tertiary roads included in the proposed project as a pilot component. In order to upgrade and maintain the proposed targets heavy equipment for approximately $1,906,000 million will be purchased for the mobile unit of the Rural Roads Program and the Maintenance Division of DGC. Table below provides a summary of the equipment to be purchased for this purpose.

Heavy Equipment for the
Tertiary Roads Pilot Component

	DESCRIPCION/DESCRIPTION	CANTIDAD/ QUANTITY	PRECIO UNITARIO/ UNIT PRICE	TOTAL/ TOTAL
a.	Tractores de Oruga/ Crawler Tractors, 140 HP	2	$170,00	$ 340,000
b.	Cargadores Frontales/Front End Loaders, 85 HP	2	72,000	144,000
c.	Motoniveladoras/ Motorgraders, 125 HP	2	99,000	198,000
d.	Compactadoras Autopropulsadoras/ Selfpropelled Compactors, 70 HP	2	80,000	160,000
e.	Retroexcavadoras/Front End Loader/Backhoes, 80 HP	1	45,000	45,000
f.	Camiones de Volteo/Dump Trucks, 5 M^3	12	36,000	432,000
g.	Camiones Regadores de Agua/ Water Tank Trucks, 8000 Lts.	2	45,000	90,000
h.	Pickups/Pick-up trucks 4 x 4 - 1 Ton.	3	14,000	42,000
i.	Camion Para Combustibles y Lubricación/Truck Mounted Heavy Duty Lube system, 125 HP	1	45,000	45,000
j.	Camiones de Estaca/Stack Trucks, 6 Ton.	2	35,000	70,000
k.	Cabezal con Plataforma/Road Truck with Low Boy Trailer, 345 HP	1	75,000	75,000
l.	Compresores de Aire/Air Compressors, 300 CFM	1	30,000	30,000
m.	Mezcladores de Concreto/ Concrete Mixers	1	3,000	3,000
n.	Soldadoras Eléctricas/ Electric Welders	1	6,000	6,000
o.	Equipo de Oxi-Acetileno/ Oxi-Acetylene Equipment	1	1,500	1,500
	SUB-TOTAL			$1,681,500

Equipo Pesado Adicional Para Mantenimiento/Additional H.P. for Maintenance

a.	Motoniveladoras/Motorgrader, 125 HP	1	$99,000	99,000
b.	Compactadora/Compactor, 70 HP	1	80,000	80,000
c.	Camión Regador de Agua/ Water Tank Truck	1	45,000	45,000
	SUB TOTAL			$ 224,000
	TOTAL for H. Equipment =		$1,905,500	

b. Rural Community Labor

Unskilled-skilled labor will be provided by the communities for the different upgrading activities where the labor intensive methods can be utilized to the extent possible. 32 percent of the cost of the proposed upgrading tertiary roads is related to manual labor. The communities along each tertiary road will be organized in a similar manner to those in the access roads communities. These upgrading committees will be responsible for providing all unskilled labor and for equitably distributing the workload to members of the communities. Approximately 32,345 man-months are required to upgrade the 240 kms. of tertiary roads. This community effort will cost a total of $1,582,600 in income for the participants.

As soon as the tertiary roads are upgraded they fall in the maintenance work of the Maintenance Division of DGC. To implement these maintenance activities the GOG will provide during the life of the project the required operational and maintenance support for the heavy equipment and wages for administrative and field personnel as follows: Administration $52,000, labor $101,000, handtools $24,000, construction materials $28,000, Fuels and Lubricants $72,000, Spare parts $64,000 and Tires and tubes $40,004. All these GOG resources ($381,000) are part of the regular operational maintenance and personnel budget appropriations of the DGC's Maintenance Division during the last three years of project execution. In addition to support the maintenance of the new heavy equipment for the tertiary roads maintenance activity, the Project will provide $45,000 of loan funds for spare parts.

c. Handtools

Approximately $503,000 will be used to purchase handtools required to complete the labor intensive works for tertiary roads upgrading. See Table XLVII of Annex 3.

d. Construction materials

In addition to handtools, labor work crews will be provided with construction materials, such as cement lime, rebars, tie wire, corrugated metal or concrete pipes, as well as materials for road signs. Local materials will be provided by the communities (sand, gravel, water, rock). Construction materials not provided by the communities will be purchased locally by DGC and distributed to the tertiary roads work fronts as needed. Loan funds and GOG resources will be available in the amount of $838,000 for such purpose. (See table XLVII of Annex 3)

e. Spare parts - Tires and tubes

Spare parts and tires and tubes will be also purchased for this pilot project component in the amounts of $336,000 and $307,000 respectively. These commodities will be financed with a mix of loan funds and GOG counterpart resources (See Table XLVII of Annex 3).

f. Fuels and Lubricants

Resources for Fuels and lubricants required for the operation and maintenance of the heavy equipment and vehicles will be covered with GOG resources ($1,024,000) (See Table XLVII of Annex 3).

g. Additional Personnel

Table 5 of the Administrative analysis shows the additional personnel that DGC will provide (hired, contracted or under payroll) for functioning the mobile unit for the tertiary roads component. The administrative costs ($516,356) required for these personnel have been considered in Table XLVII of Annex 3.

For purpose of both the farm to market access roads component and the tertiary roads component under the proposed amendment 50 percent of AID loan funds and 50 percent of GOG resources will be utilized to finance unskilled labor, skilled labor, handtools, construction materials, spare parts and tires and tubes. Other operational and expenses costs will be GOG counterpart resources financing.

AID loan funds will be used to finance heavy equipment and vehicles, maintenance and repair shop equipment, surveying equipment, and a portion of the regional facilities construction.

J. Program Support or Improvement

The expansion of the farm to market access roads in two new regional access roads areas and the inclusion of the also new tertiary roads component under the proposed amendment requires additional grant funding support for project implementation.

Approximately $400,000 of grant funds is budgeted to provide supervisory services for the complete program, including construction rehabilitation, maintenance and upgrading of roads. Technical assistance related to planning, administering, mapping and promoting a labor intensive access roads construction and maintenance program will be provided under the Highland Agricultural Development Project (520-0274). This technical assistance began working with the DGC in January 1985.

In order to mitigate possible problems in the future, an environmental awareness within the DGC mainly in the Rural Roads Program and within the communities receiving benefits from the new roads will be promoted. Grant funds will be used to contract long term technical assistance to conduct seminars at each regional center for the DGC technical staff providing them with environmental criteria for road selection, construction, and maintenance. In addition, this technical assistance will assist the DGC social workers to update and expand their community roads promotional campaign to include information on potential environmental hazards of the new roads

(i.e. possible deforestation, erosion). To complement the environmental and promotional activities, grant funds will also be used to assist the environmental expert to develop environmental messages for distribution through local newsletters and over the radio

With the expansion of the program, it is anticipated that the technical assistance for this purpose will be required for up to 24 months with annual two-week visits thereafter. A total of $150,000 of additional grant funds is budgeted for the assistance plus the development and distribution of environmental information.

In order to exchange information with other countries about labor-intensive access roads programs, approximately $50,000 in grant funds will be used for in-country seminars and travel to other countries that have similar access roads programs. An additional $100,000 in grant funds will finance the cost of an access roads promotion and information campaign.

Grant funds will also finance a socio-economic baseline survey in the project communities. These communities will be observed throughout the life of the project to establish how improved access changes their life style. $50,000 of grant funds is budgeted for this purpose. Also $50,000 has been budgeted for final evaluation and $50,000 for annual independent audits.

The Grant will also provide $150,000 to increase the financing of a national computerized access roads inventory initiated with the funding originally provided by the Highlands Agricultural Development Project 520-0274. The additional funds will be used to improve the DGC's capacity to further break down road selection criteria based not only on agricultural potential, but also on the proximity to other AID financed rural development activities. This will provide the information base to overlap development projects, thereby creating a higher use efficiency of economic investments.

K. Environmental Soundness

As indicated in the amendment IEE (Annex 2) project activities have the potential for significant environmental impact. Careful evaluation of the specific candidate road projects will lead to the elimination of certain projects and the identification and implementation of mitigative meassures for others. In order to assess and mitigate environmental impacts associated with road construction, upgrading and maintenance, an environmental capability within the DGC's Access Roads Program will be developed, and environmental awarness promoted within the communities recieving benefits from the new access roads to be funded under the project and its amendment. Grant funds will be used to contract long term technical assistance and support necessary environmental management actions including the following:

1. Environmental evaluation of tertiary and access roads projects;

2. Development of environmental guidelines and their incorporation into routine DGC procedures for road selection, construction and maintenance;

3. inter-institutional coordination for impact mitigation;

4. training of DGC and project staff in environmental management;

5. environmental education at the community level to promote and carry out impact mitigation measures;

6. the development and use of environmental management materials for project training and environmental education activities;

7. implementation of the specific project-related mitigation measures for tertiary and access roads.

The environmental planning and management measures required for this project are outlined in the Amendment IEE and reflected in the technical annexes relating to road project elegibility (Exhibit 10), and technical evaluation. More appropriate environmental assessment procedures and guidelines will be developed by the environmental advisor and incorporated into DGC procedures as the project is implemented.

L. Training

The nature of the project activities and the strong administrative structure of DGC have resulted in an efficient management of the Farm to Market Access Roads Project 520-0332. No administrative/management of technical deficiencies that could directly impact on the project have been identified and therefore, no U.S. participant training in those areas has been programmed.

The coordination with the Access Roads Component of the Highlands Agricultural Development Project 520-0274 has enabled the technical assistance contracted under that project to provide on-the-job training to DGC's Rural Roads Program personnel in the area of computerized systems for Planning and administration, so no additional training is expected to be needed under this project.

In accordance with the amendment IEE description and recommendations, Grant funds will be used to contract long term technical assistance and support as detailed in the environmental soundness description.

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M. Cost Summary and Financial Plan

The total budget of the proposed 4-year Project Amendment is $34.855 million of which $17.533 will be AID Loan funds, $1.0 million Grant funds and $16.322 million GOG counterpart contribution. AID total contribution amounts to 53% and GOG counterpart to 47%.

The summarized financial plan including estimated costs and funding source is given in Tables 1 and 2 below.

Table 1
Illustrative Budget
Loan Add-on
($000)

Component	USAID Loan	GOG Counterpart	Total	%
1. Access Roads				
Construction	7,633	6,922	14,555	43
Maintenance	2,947	2,580	5,527	16
2. Tertiary Roads				
Upgrading	3,462	3,326	6,788	20
Maintenance	269	457	726	2
3. Inflation	1,533	905	2,438	7
4. V.A.T.	0	660	660	2
5. Contingencies	1,689	1,472	3,161	10
Total	17,533	16,322	33,855	100%

Table 2
Illustrative Budget
for the Grant Add-on
($000)

Activity	USAID Grant	%
Supervision	400	40
Environmental Training and Information	150	15
Baseline Survey	50	5
Final Evaluation	50	5
Seminars, Travel and Promotion	150	15
Access Roads Inventory	100	10
Audits	50	5
Contingencies	50	5
	1,000	100%

The proposed amendment's activities will cover four years starting in 1988. Table 3 below gives a summarized projection of Loan and counterpart expenditures for the four years, showing the distribution of funds between local currency and foreign exchange. A detailed projection of Loan and Grant expenditures by component for the four years is given in Tables XX, XX-A, XX-B, and XXLVII of Annex 3.

TABLE 3

TOTAL ANNUAL PROJECTION OF EXPENDITURES FOR THE ACCESS AND TERTIARY ROADS COMPONENTS

CONCEPT	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL
	FX $	LC $	TOTAL	$	-	$	FX $	LC $	TOTAL	$	-	$	FX $	LC $	TOTAL	$	-	$	FX $	LC $	TOTAL	$	-	$	FX $	LC $	TOTAL	$	-	$
A. START UP COSTS																														
1. Heavy Equipment and Vehicles	5,584		5,584			5,584																			5,584		5,584			5,584
2. Construction of Two Regional Offices		40	40	31	12	52																				40	40	31	12	52
3. Surveying Equipment	75		75			75																			75		75			75
4. Maintenance and Repair Shop Equipment	70		70			70																			70		70			70
5. Inflation	577		577	14	6	583																			577		577	14	6	583
6. Contingencies	665		665	12	5	670																			665		665	12	5	670
Sub-Total	6,971	40	7,011	57	23	7,034	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6,971	40	7,011	57	23	7,034
B. OPERATING COSTS AND EXPENSES																														
1. Administration				898	323	323				855	342	342				1,493	597	597				1,515	606	606				4,670	1,868	1,868
2. Unskilled Labor		170	470	1,173	469	939		636	636	1,623	649	1,295		1,718	1,718	4,365	1,746	3,446		1,754	1,754	4,493	1,797	3,551		6,578	6,578	11,653	4,661	9,239
3. Skilled Labor		79	79	200	80	157		198	198	299	112	220		298	298	725	290	582		297	297	743	305	602		772	772	1,978	791	1,563
4. Materials		88	88	223	89	177		170	170	435	174	344		278	278	715	286	564		294	294	738	295	583		820	820	2,110	844	1,664
5. Construction Materials		157	157	398	159	315		254	254	648	259	513		445	445	1,125	474	939		472	472	1,248	507	999		1,370	1,370	3,498	1,399	2,769
6. Fuel and Lubricants				805	322	322				1,460	584	584				2,065	826	826				2,075	830	830				6,425	2,570	2,570
7. Spare Parts	112		112	168	67	179	120		120	328	131	251	208		208	573	229	437	209		209	603	241	450	649		649	1,670	668	1,317
8. Tires and Tubes	49		49	123	49	98	75		75	205	82	157	114		114	320	128	242	115		115	343	137	252	353		353	990	396	749
9. Inflation							18	113	131	335	134	265	18	342	385	968	387	747	18	427	445	1,135	454	899	54	982	956	2,438	975	1,921
10 DVR				165	66	66				305	122	122				568	227	227				613	245	245				1,650	660	660
11 Contingencies	57	138	155	725	290	445	22	197	219	925	370	589	27	291	318	978	391	709	27	305	332	1,040	416	748	93	931	1,024	3,668	1,467	2,491
Sub-Total	178	934	1,112	4,785	1,914	3,026	235	1,478	1,713	7,398	2,959	4,672	367	3,402	3,769	13,963	5,585	9,354	349	3,559	3,928	14,603	5,841	9,769	1,149	9,373	10,522	30,748	16,299	21,221
TOTAL	7,149	974	8,123	4,842	1,937	10,060	235	1,478	1,713	7,398	2,959	4,672	367	3,402	3,769	13,963	5,585	9,354	349	3,559	3,928	14,603	5,841	9,769	8,120	9,413	17,533	[illegible]	16,322	[illegible]

For the Quetzal-Dollar conversions in the budget a rate of exchange of Q2.50=U.S.$1.00 was used. A 10% inflation factor was considered for the estimated costs and contingencies were calculated as 5% of the direct costs.

Annex 3, Technical Analysis provides a detailed description and justification of the planned expenditures. Loan funds will mainly be used to purchase heavy equipment (31.8% of loan funds), construction materials (24.5%) and to pay for unskilled labor (26.1%). Most of GOG counterpart funds will be used to pay Operating Costs (15.7% of counterpart funds), unskilled labor (28.5%) and administrative overhead (11.4%). All operating costs and administrative overhead will be paid with counterpart funds.

The project amendment, as the original project, is clearly a labor-intensive effort. Of the total project cost (AID and Counterpart), 31% will be used to pay unskilled and skilled labor, while only 16% will pay for the procurement of heavy equipment.

AID Grant funds will be mainly used to finance project supervision (40% of Grant funds), Technical Assistance in several areas (25%); audits and evaluations (10%).

The accounting and internal control systems used by the General Directorate of Roads for the proposed amendment will be the same as the those described for the Original Project (Annex 5 of Project Paper). These systems were considered adequate in the original Financial Analysis which concluded that "General Directorate of Roads has enough administrative and financial personnel and capability to carry out satisfactorily the purpose of the project".

The additional funding and new activities included in the proposed amendment will not imply a substantial increase in DGC's accounting and control functions and therefore it is considered that the above statement remains valid for the proposed amendment.

1. Methods of Implementation and Financing

The methods of implementation and financing that will be used in the proposed amended project are included in the procurement plan, Table 4. In general terms, these will be the same that have been used for the on-going project.

The construction and maintenance of access and tertiary roads will be carried out by Force Account; most of the skilled and unskilled labor will be provided by the inhabitants of beneficiary communities as described in detail in the Technical Analysis. Contracting of private firms for the construction, rehabilitation and maintenance of access and tertiary roads is not considered to be an adequate alternative due to the labor-intensive methods that are used in these activities. In addition, construction through private firms would not be compatible with the objective

TABLE 4
DGC PROCUREMENT PLAN
FARM TO MARKET ROADS
AMENDMENT No. 2
(ADD-ON ONLY)

Action No.	Description of Goods and Services	Estimated Cost ($000)	Origin = O Source = S	Contracting Mode	Award Basis	Loan Disbursement	% Loan Financed
1.	Heavy Equipment and Vehicles	5,584	O = 941 S = 941 and HC*	RFP	Lowest Price	Direct Payment	100%
2.	Surveying Equipment	75	O=941 S = 941 and HC	RFP	Lowest Price	Direct Payment	100%
3.	Spare Parts for Heavy Equipment Vehicles	1,317	O = 941 S = 941 and HC	RFP	Lowest Price	Direct Payment and GOG Reibursement	49%
4.	Tires and Tubes	749	O = 941 and HC S = 941 and HC	RFP	Lowest Price	Direct Payment and GOG Reimbursement	47%
5.	Construction and Equipment of Two Regional Offices	52	O/S = 941 and HC	Force Account	N.A.	FAR (Modified)	77%
6.	Maintenance and Repair Shop Equipment	70	O = 941 S = 941 and HC	RFP	Lowest Price	GOG Reimbursement	100%
7.	Unskilled Labor	9,239	O/S = HC	-	-	GOG Reimbursement	50%
8.	Skilled labor	1,563	O/S = HC	-	-	GOG Reimbursement	49%
9.	Handtools Procurement	1,664	O = 941 and HC	RFP	Lowest Price	GOG Reimbursement	49%
10.	Construction Materials	2,769	O/S = 941 and HC	RFP	Lowest Price	GOG Reimbursement	49%
11.	DGC Administrative and Other Costs	5,098	O/S = 941 and HC				
12.	Inflation	2,514	O/S = 941				61%
13.	Contingencies	3,161	O/S = 941				53%
	TOTAL	$33,855					

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of promoting community participation and maximizing in the communities a sense of ownership in the project financed roads.

The contracting of supervisor engineers and technical advisors will be done by the Mission with the approval of DGC as in the current project. International technical assistance will also be contracted by the Mission in order to avoid foreign exchange problems.

The financing with loan funds of construction materials provided by DGC will be done reimbursing directly to the GOG the cost of materials based on fiscal report with supporting documentation. A similar procedure will be used for skilled and unskilled labor financed with loan funds.

The procurement procedures that Dirección General de Caminos (DGC) will use, are the uniform GOG procedures regulated by the Guatemalan Procurement Law and Bylaws, (Decree No. 35-80). These procedures are basically compatible with AID regulations and provide guidelines for procurement of commodities and technical or professional services.

The Mission will purchase directly the heavy equipment, vehicles and construction machinery necessary for project implementation, which are basically foreign exchange procurements. The Mission has considerable and successful experience regarding this type of procurements for the on-going access roads and for other projects. In the on-going project it has been demonstrated that Mission direct procurement of these items is faster than GOG procedures.

2. Counterpart Funding

As described before, GOG counterpart funding will finance 47% of the total cost of the proposed amendment. GOG counterpart funds will be used mainly to finance operating costs (15.7% of counterpart), administrative overhead (11.4%) and labor (33.4%). Since all the operating costs and administrative overhead will be financed with GOG counterpart funds, all AID financed activities will be clearly identified. The Value Added Tax (VAT), which all GOG implementing units are required to pay, will be financed entirely with counterpart funds.

The availability of counterpart funds for the proposed amendment in future years will be facilitated by the commitment that the GOG has shown for this project as demonstrated by the increased amounts of counterpart funds that have been budgeted in the past years (Annex 4, Table 1).

In addition to the GOG counterpart contribution, beneficiary communities will also provide, when possible, in-kind contributions of construction materials such as roch, sand and gravel. Due to the variability of these contributions it would be very difficult to budget them and therefore they are not included in the overall project budget.

3. Replicability (Recurrent Cost Analysis)

By the Project PACD, September 30, 1991 the GOG/DGC will have established nine regional offices for construction or improvement of farm to market access roads and six maintenance units for the maintenance of said access roads. Also, DGC will have installed a heavy equipment and vehicles capacity to support the labor intensive use of the project. In addition, the project will have provided sufficient spare parts and technical assistance for heavy equipment and vehicles maintenance which would permit four years more of useful life of the equipment after the September 30, 1987 PACD.

Therefore, after this date the GOG will continue the average pace of 35 kms. construction or improvement of access roads per region per year. The annual increase of 315 kms. of access roads entering maintenance will absorb the AID financed portion of $2,704,000 million (35% of the fourth year) required for the last year of project implementation for labor, handtools, construction materials, spare parts, tires and tubes as included in table XX Total annual projections for the Access Roads Component, of the technical analysis.

Given that the principal GOG objectives in its National Development Plan are the expanded access of the population to the benefits of development (agricultural production, improved productivity and market access, as well as, the reduction of unemployment and underemployment) and considering that no capital investment would be required four years after the PACD it is conservative to say that the GOG/DGC will continue the program at the same pace of work using the heavy equipment, administrative infrastructure and institutional capability to manage this workload. The GOG considers necessary to continue programs like this, because of its past successful experience and the benefits obtained by the inhabitants of the poor rural areas.

4. Audits

The general description of the internal controls used in DGC in the original Project Paper remain valid. DGC has an Internal Audit Department which has a basically preventive function. In addition, DGC is periodically audited by the General Accounting Office of the Government of Guatemala (Contraloría General de Cuentas), especially for cash transactions.

The original Project Paper earmarked $50,000 in Grant funds for audits during the four years of project life. Due to the addition of two new regions and the introduction of the new tertiary roads component, the project amendment is earmarking an additional $50,000 in Grant funds for this purpose. The total amount of $100,000 earmarked for audits in the overall project will allow to carry out the necessary controls directly on the implementation sites thus improving the project control system. The project amendment will provide $10,000 each year for audits during the first three years and $20,000 in the final year for the same purpose. The increased funding in the last year will allow a detailed investigation, which will provide valuable information to improve design of future projects with DGC or other GOG institutions.

The external audits which will be contracted with the funds mentioned above, will be performed in accordance with AID regulations included in the document "Minimum Requirements for AID Audits" and will be supervised by the appropriate AID offices.

In addition to the internal and external audits, the project sites will also be periodically visited by the Mission Financial Analysts to support the voucher reviews of reported expenses.

It is considered that with all the control systems previously described, AID can be reasonably assured that the appropriate financial management of the project.

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ILLUSTRATIVE BUDGET
FINANCIAL INPUTS

(ADD-ON ONLY)

($000)

Activity	USAID Loan	USAID Grant	GOG	Total
Heavy Equipment	5,584	0	0	5,584
Operating Cost	0	0	2,570	2,570
Labor (unskilled community hand)	4,578	0	4,661	9,239
Tools	820	0	844	1,664
Surveying Equipment	75	0	0	75
Shop Equipment	70	0	0	70
Construction Materials	1,370	0	1,399	2,769
Administrative Overhead	0	0	1,868	1,868
Skilled Labor	772	0	791	1,563
Regional Centers	40	0	12	52
Spare Parts	649	0	668	1,317
Tires and Tubes	353	0	396	749
Supervision	0	400	0	400
Environment training and information	0	150	0	150
Baseline Survey	0	50	0	50
Final Evaluation	0	50	0	50
Seminar, Travel and Promotion	0	150	0	150
Access Roads Inventory	0	100	0	100
Audits	50	0	50	
Inflation	0	981	2,514	
I. V. A.	0	660	660	
Contingencies	1,689	50	1,472	3,211
TOTAL	17,533	1,000	16,322	34,855

7890C

32

Farm-to-Market Roads (Loan Portion)
Amendment No. 2 (ADD-ON ONLY)

I T E M	YEAR 1		YEAR 2		YEAR 3		YEAR 4		T O T A L		
	FX	LC	FX	LC	FX	LC	FX	LC	FX	LC	TOTAL
Heavy Equipment & Vehicles	5,584	---	---	---	---	---	---	---	5,584	---	5,584
Surveying Equipment	75	---	---	---	---	---	---	---	75	---	75
Constructing & Equipping Six Regional Offices	---	40	---	---	---	---	---	---	---	40	40
Maintenance and Repair Shop Equipment	70	---	---	---	---	---	---	---	70	---	70
Unskilled Labor	---	470	---	636	---	1,718	---	1,754	---	4,578	4,578
Skilled Labor	---	79	---	108	---	288	---	297	---	772	772
Hand Tools	---	88	---	170	---	278	---	284	---	820	820
Construction Materials	---	159	---	254	---	465	---	492	---	1,370	1,370
Spare Parts	112	---	120	---	208	---	209	---	649	---	649
Tires and Tubes	49	---	75	---	114	---	115	---	353	---	353
Inflation	77	---	18	113	18	362	18	427	631	902	1,533
Contingency	682	138	22	197	27	291	27	305	758	931	1,689
TOTAL LOAN	7,149	979	235	1,478	367	3,402	369	3,559	8,120	9,413	17,533
TOTAL GRANT	85	180	55	180	35	185	55	225	190	810	1,000
TOTAL AID FINANCING	7,234	1,154	290	1,658	402	3,587	424	3,784	8,310	10,223	18,533

4619C

Farm-To-Market Roads - Grant Portion
($000)

Amendment No. 2
ADD-ON ONLY

ITEM	Year 1		Year 2		Year 3		Year 4		TOTAL		
	FX	LC	FX	LC	FX	LC	FX	LC	FX	LC	Total
Supervision	—	100	—	100	—	100	—	100	—	400	400
Environmental Training	25	20	25	20	15	20	15	10	80	70	150
Baseline Survey	—	15	—	15	—	10	—	10	—	50	50
Final Evaluation	—	—	—	—	—	—	—	50	—	50	50
Seminars, Travel, Promotion	10	25	10	25	10	25	20	25	50	100	150
Access Roads, Inventory	30	10	10	10	—	20	—	20	40	60	100
Audits	10	—	10	—	10	—	20	—	50	—	50
Contingencies	10	10	—	10	—	10	—	10	10	40	50
TOTAL	85	180	55	180	35	185	55	225	230	770	1000

4442C

DGC PROCUREMENT PLAN
FARM TO MARKET ROADS
AMENDMENT No. 2
(ADD-ON ONLY)

Action No.	Description of Goods and Services	Estimated Cost ($000)	Origin = O Source = S	Contracting Mode	Award Basis	Loan Disbursement	% Loan Financed
1.	Heavy Equipment and Vehicles	5,584	O = 941 S = 941 and HC*	RFP	Lowest Price	Direct Payment	100%
2.	Surveying Equipment	75	O=941 S = 941 and HC	RFP	Lowest Price	Direct Payment	100%
3.	Spare Parts for Heavy Equipment Vehicles	1,317	O = 941 S = 941 and HC	RFP	Lowest Price	Direct Payment and GOG Reibursement	49%
4.	Tires and Tubes	749	O = 941 and HC S = 941 and HC	RFP	Lowest Price	Direct Payment and GOG Reimbursement	47%
5.	Construction and Equipment of Two Regional Offices	52	O/S = 941 and HC	Force Account	N.A.	FAR (Modified)	77%
6.	Maintenance and Repair Shop Equipment	70	O = 941 S = 941 and HC	RFP	Lowest Price	GOG Reimbursement	100%
7.	Unskilled Labor	9,239	O/S = HC	-	-	GOG Reimbursement	50%
8.	Skilled labor	1,563	O/S = HC	-	-	GOG Reimbursement	49%
9.	Handtools Procurement	1,664	O = 941 and HC	RFP	Lowest Price	GOG Reimbursement	49%
10.	Construction Materials	2,769	O/S = 941 and HC	RFP	Lowest Price	GOG Reimbursement	49%
11.	DGC Administrative and Other Costs	5,098	O/S = 941 and HC				
12.	Inflation	2,514	O/S = 941				61%
13.	Contingencies	3,161	O/S = 941				53%
	TOTAL	$33,855					

4627C

PROCUREMENT PLAN (GRANT PORTION
-TOTAL REVISED PROJECT))
FARM-TO-MARKET MARKET ROADS

ction o.	Description of Goods and Services	Estimated Cost ($000)	Origin - 0 Source - 0	Contracting Mode	Award Basis	Grant Disbursement	Grant Financec
1	Supervision Services	900	O/S - HC	AID Contract	RFP	Direct Payment	100%
2	Environmental T.A and Training	250	0 - 000 S - 941	AID Contract	Gray amend-ment set aside	Direct Payment	100%
3	Baseline Survey	100	O/S - HC	N.A.	---	GOG Disbursement	100%
4	Evaluation	100	0 - 000 S - 941	AID Contract	Gray amend-ment set aside	Direct Payment	100%
5	Seminars, Travel, Promotion	300	O/S - 941,HC	N.A.		GOG Disbursement Direct Payment	100%
6	Access Roads Inventory	250	0 - 941 S - 941, HC	AID Contract Amendment	N.A.	Direct Payment	100%
7	Audits	100	O - 000, HC S - 941	AID Contract	Gray Amendment Set Aside	Direct Payment	100%
8	Contingencies	100	O/S - 941, HC	--	--	----	
	TOTAL	2,100					

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DETAILED TRAINING INFORMATION

No. of Trainees	Project Name, Number Content Area of Training (e.g., Agronomy)	Type of Training Academic (e.g., BA, MS PhD) or Technical (T)	Training Location U.S., Third Country (Specify) In Country	Quarter (1-4), Fiscal Year (FY)	Length of Training (e.g., 5 days, 1 yr.)	Cost/Estimated	Training Provided (1 - S&TIT 2 - Contractor 3 - Dont't Know
	Farm to Markets Access Roads (520-0332)						
	Access Roads and Tertiary Roads Components/DGC						
35	Environmental Management	T	Guatemala	3Q FY 88	2 six months periods	$ 150,000	2

N. FARM TO MARKET ACCESS ROADS PROJECT
Implementation Plan
(Revised)

No.	Activity	Completion Date of Activity
	First Year:	
0.	First group of roads initiated	January 7, 1985
1	Pid completed and approved by the Mission	February 12, 1985
2.	PP preparation completed	March 12, 1985
3.	GOG/AID Agreement signed	April 31, 1985
4.	Baseline initiated, first and second group of roads selected	July 31, 1985
5.	Agreement ratified by GOG	July 31, 1985
6.	DGC's yearly implementation plan completed	August 31, 1985
7.	Initial CPs met by the Ministry of Finance	August 31, 1985
8	DGC's yearly budget requested to MINFIN	September 30, 1985
9.	Secondary CPs met by the Ministry of Public Works	September 30, 1985
10.	First procurement of handtools, spare parts, etc. made by DGC	October 31, 1985
11.	Construction Supervisory Services contracted	November 30, 1985
12.	Baseline completed	December 31, 1985
13.	First group of roads completed	December 31, 1985
14.	IFB for first heavy equipment procurement prepared	December 31, 1985
15.	Regional Offices designs and construction plans completed by DGC	December 31, 1985
16.	Land plots obtained by DGC	December 31, 1985
17.	Second group of roads initiated	January 31, 1986

No.	Activity	Completion Date of Activity
18.	Regional Offices construction plans approved	January 31, 1986
19.	IFB approved by GOG and AID	February 28, 1986
20.	Regional Offices construction works initiated	February 28, 1986
21.	IFB for first heavy equipment procurement issued	March 31, 1986
22.	Environmental technical scope of work preparation initiated	April 30, 1986
23.	Baseline for third group of roads completed	April 30, 1986
24.	Third group of roads selected	April 30, 1986
25.	DGC's yearly implementation plan completed	May 31, 1986
26.	DGC's yearly budget requested to MINFIN	June 30, 1986
27.	First heavy equipment bid openning date	June 30, 1986
28.	First heavy equipment procurement contracts awarded and signed	August 31, 1986
29.	IFB for second heavy equipment procurement prepared	August 31, 1986
30.	Regional Offices funiture procured	August 31, 1986
31.	PP Amendment No. 1 completed	September 25, 1986
32.	GOG/AID Agreement, Amendment No. 1 signed	September 30, 1986
33.	Four Regional Office buildings completed	October 31, 1986
34.	IFB for second heavy equipment procurement approved by DGC and AID	November 30, 1986
35.	Second group of roads completed	December 31, 1986
36.	First heavy equipment procurement to arrive in country	December 31, 1986
37.	IFB for second heavy equipment procurement issued	December 31, 1986

No.	Activity	Completion Date of Activity
38.	Baseline for fourth group of roads completed	December 31, 1986
39.	CPs for Amendment No. 1 met MINFIN	January 27, 1987
40.	Third group of roads initiated	January 31, 1987
41.	Second procurement of handtools spare parts, etc. made by DGC	January 31, 1987
42.	First heavy equipment procurement to arrive at Regional Offices	January 31, 1987
43.	Fourth group of roads selected	April 30, 1987
44.	DGC's yearly implementation plan completed	May 31, 1987
45.	Second heavy equipment procurement requested By DGC	May 31, 1987
46.	Six Regional Office buildings completed	May 31, 1987
47.	DGC's yearly budget requested to MINFIN	June 30, 1987
48.	PP Amendment No. 2 preparation completed	September 21, 1987
49.	GOG/AID Agreement, Amendment No. 2 signed	September 30, 1987
50.	Second heavy equipment bid opening date	December 15, 1987
51.	Third group of roads completed	December 31, 1987
52.	Fourth group of roads initiated	January 31, 1988
53.	Third procurement of handtools spare parts, etc. made by DGC	January 31, 1988
54.	Environmental technical assistance, contracted	January 31, 1988
55.	Third Procurement of heavy equipment for two new regional offices and mobile unit awarded	February 31, 1988
56.	Environmental assessment for first year of Amendment No. 2 completed	March 31, 1988
57.	Access and Tertiary roads activities started	April 30, 1988
58.	Procurement of heavy equipment under Amendment No. 2 Awarded	April 30, 1988

No.	Activity	Completion Date of Activity
59.	DGC's yearly budget requested to MINFIN	April 30, 1988
60.	Second heavy equipment procurement to arrive in country (Original project and Amendment No. 1)	May 31, 1988
61.	Second heavy equipment procurement to arrive at Regional Offices	June 30, 1988
62.	Procurement of heavy equipment to arrive in country (Amendment No. 2)	July 31, 1988
63.	Access Roads Seminar completed	July 31, 1988
64.	Middle Project evaluation completed	July 31, 1988
65.	First audit completed	October 31, 1988
66.	Fourth procurement of handtools, spare parts, etc. made by DGC	October 31, 1988
67.	Fifth procurement of handtools and spare parts made by DGC	December 15, 1988
67.A	Baseline for fifth group of roads completed	December 15, 1988
68.	Fourth group of roads completed	December 31, 1988
69.	Baseline for sixth group of roads completed	December 15, 1988
70.	First group of tertiary roads upgraded	December, 1988
71.	Sixth group of roads selected	December 31, 1988
72.	Fifth group of roads initiated	January 31, 1989
73.	Second group of tertiary roads selected and initiated	January 31, 1989
74.	Fourth procurement of hand-tools and spare parts made by DGC	January 31, 1989
75.	DGC's yearly implementation plan completed	May 31, 1989
76.	DGC's yearly budget requested to MINFIN	May 31, 1989
77.	Sixth procurement of hand-tools and spare parts made by DGC	December 31, 1989

No.	Activity	Completion Date of Activity
78.	Fifth group of roads completed	December 31, 1989
79.	Nine regional offices constructed	December 31, 1989
80.	Procurement of hand-tools and spare parts made by DGC	December 31, 1989
81.	Sixth group of roads initiated	January 31, 1990
82.	Third group of tertiary roads selected and initiated	January 31, 1990
83.	DGC's yearly implementation plan completed	April 31, 1990
84.	DGC's yearly budget requested to MINFIN	May 31, 1990
85.	Baseline for seventh group of roads completed	December 15, 1990
86.	Baseline for seventh group of roads completed	December 31, 1990
87.	Seventh group of roads selected	December 31, 1990
88.	Sixth group of roads completed	December 31, 1990
89.	Procurement of hand-tools and spare parts made by DGC	December 31, 1990
90.	Seventh group of roads initiated	January 31, 1991
91.	DGC's yearly implementation plan completed	April 31, 1991
92.	DGC's yearly budget requested to MINFIN	May 31, 1991
93.	Final evaluation completed	July 31, 1991
94.	Procurement of hand-tools and spare parts made by DGC	September 30, 1991
95.	Access roads and tertiary roads completed	September 30, 1991

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ANNEX 1

REVISED LOGICAL FRAMEWORK MATRIX

FARM-TO-MARKET ROAD 520-0332

	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
GOAL: To improve the income, productivity, and quality of life of Guatemala's small farmers.	MEASURE OF GOAL ACHIEVEMENT: 1) Improved access to markets 2) Improved access to farming inputs. 3) Upgraded linkages from farm to markets 4) Improved access to Government health, education, and extension services. 5) Environmental analysis and other impact mitigation.	Baseline studies Evaluations	The AID-financed access road maintenance program will maintain these roads in order to insure that the target population will receive the potential long term benefits derived from improved access.
PURPOSE: 1) To expand the network of all-weather farm-to-market and tertiary roads in the target area to provide a better transportation system. 2) To institutionalize the national program to construct and maintain low-cost labor intensive rural farm-to-market roads.	END OF PROJECT STATUS: 1) Construction or improving of 1,555 Kms. of rural access roads. 2) Rehabilitation of 150 Kms. of rural access roads. tertiary roads. 3) Upgrading of 240 kms. of tertiary roads 4) Institutionalization of the GOG's capacity to execute a continuous labor-intensive access roads program in mountainous areas of the country	Site visits, GOG budgets Evaluations	Upon completion of AID-financed portion of the access roads program this type of activity will still have a high priority within it to continue in the future.
OUTPUTS: 1) 1,555 Kms. of access roads constructed or improved. 2) 150 Kms. of access roads rehabilitated. 3) 240 kms of tertiary roads upgraded. 4) 9 regional offices constructed and functioning	1) Kilometers of roads. 2) Buildings	Site visits	Excessive inflation will not cause a reduction in the number of each type output.
INPUT: 1) Tech. Assistance - Grant $ 900 2) Commodities - Loan 14,565 3) Training - Grant 350 4) Other Costs - Loan 13,335 - Grant 850 TOTAL - Loan 27,900 - Grant 2,100	Disbursement of Loan and Grant funds.	Vouchers, bills	

4399C

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D C 20523

ANNEX 2

LAC-IEE-87-32

ENVIRONMENTAL THRESHOLD DECISION

Project Location	:	Guatemala
Project Title	:	Farm to Market Access Roads Amendment
and Number	:	520-0332
Funding	:	$17,600,000 (L) $1,000,000 (G)
Life of Project	:	Two years
IEE Prepared by	:	Roberto Figueroa USAID/Guatemala
Recommended Threshold Decision	:	Positive Determination
Bureau Threshold Decision	:	Concur with Recommendation
Comments	:	Subject to Condition Precedent that the required EA will be completed and its recommendations incorporated into the amendment prior to expenditure of amendment funds for road activities.
Copy to	:	Anthony J. Cauterucci, Director USAID/Guatemala
Copy to	:	Roberto Figueroa, USAID/Guatemala
Copy to	:	Frank Zadroga, ROCAP/San Jose
Copy to	:	Donald Boyd, LAC/DR/CEN
Copy to	:	IEE File

James S. Hester Date AUG 28 1987

James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

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Initial Environmental Examination

Project Country	:	Guatemala
Project Title and Number	:	Farm to Market Access Roads Project Amendment (520-0332)
Life of Project Amendment	:	2 Years (FY'89-91)
IEE Prepared by	:	Frank Zadroga, REMS/ROCAP
IEE Reviewed by	:	Roberto Figueroa, EO, USAID/G
Funding	:	$18.6 million ($17.6 Loan, $1.0 million Grant)
Date	:	_____
Recommended Threshold Decision	:	Positive Determination and Request for a Deferred Assessment

Concurrence : [signature] FOR 8/21/87
Anthony J. Cauterucci — Date
Mission Director
USAID/G

INITIAL ENVIRONMENTAL EXAMINATION

I. BACKGROUND

On March 20, 1985, USAID/G approved the original $10.0 million Farm-to-Market Access Roads Project (520-0332). Its goal was to expand the network of all-weather farm-to-market roads in the Guatemalan Highlands and to institutionalize a national program to construct and maintain these roads using low-cost, labor intensive methods. The overall USAID/G program of financial and technical assistance to the GOG for rural roads, initiated with AID financing in 1976, with additional add-on funds in 1983, and the initiation of an improved maintenance program for these roads in 1984. The physical outputs of the 1985 Farm-to-Market Access Roads Project were no different than those achieved or anticipated within prior or ongoing AID financed access roads projects in Guatemala.

In April 1983 an environmental analysis of the USAID/G financed roads program was undertaken and is attached to the original Farm-to-Market Access Roads PP. The report included 12 specific recommendations to make more efficient use of scarce resources. Since that time over 206 kilometers of access roads have been constructed or upgraded within the Small Farmer Development Project add-on (520-0233A), and an access roads maintenance program, an access roads inventory, and an inter-agency access roads promotional campaign have been initiated within the Highlands Agricultural Development Project 520-0274.

The proposed project amendment continues to address access road needs in Guatemala but includes three significant changes in the design of the original project as follows:

1. The amendment will fund access roads (selection, construction, upgrading and maintenance) and in addition includes the upgrading, rehabilitation, and maintenance of tertiary roads.

2. Tertiary roads upgrading, rehabilitation and maintenance will be done by DGC through Force Account utilizing heavy road construction equipment for all work that cannot be practically done by hand (i.e., cutting, filling, grading and other forms of mass earth movement).

3. Two new regions of the country will be included in the access roads component of the project design. Road work will be carried out in the previous 9 regions of the Guatemalan Highlands, and will be expanded to include the new regional offices of Chiquimula and Zacapa/Santa Rosa.

II. BRIEF PROJECT DESCRIPTION

The project goal is to improve the income, productivity and quality of life of Guatemala's small farmers. The project purpose is to improve small farmers' access to services, markets and inputs necessary for agricultural production.

In order to achieve this purpose, the DGC's (Dirección General de Caminos) current labor-intensive access roads program will be expanded to continue selection, construction, reconditioning, and maintenance of access and tertiary roads.

Priority will be assigned in the screening process to roads that go through rural areas that have high agricultural potential or increased farm production from AID-financed agricultural improvements.

Project outputs are summarized as follows:

a. construction or upgrading of 1,555 kilometers of rural access roads;

b. rehabilitation of 150 kilometers of rural access roads;

c. upgrading of 240 kilometers of tertiary roads;

d. institutionalization of the Government of Guatemala's capacity to execute a continuous labor-intensive access roads program in the mountainous areas of the country; and

e. institutionalization of a system of regional centers for the maintenance of tertiary roads.

III. POTENTIAL ENVIRONMENTAL IMPACTS/CONSEQUENCES

Previous A.I.D. experience has determined that penetration road building or road improvement projects generally have a significant environmental effect on the environment. For this class of action an environmental assessment or environmental impact statement, as appropriate, will be required.

Furthermore, in September of 1986, the Foreign Assistance Act of 1961 was amended to include legislation for the protection of tropical forests and biological diversity. A new Section 118 was added that, among other things, denies AID assistance for the construction, upgrading or maintenance of roads (including temporary haul roads for logging or other extractive industries), which pass through relatively undegraded forest lands, unless an environmental assessment indicates that the proposed activity will contribute significantly and directly to improving the livehood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development.

Thus, in the case of rural access or tertiary roads, an environmental assessment is specifically required.

IV. CONCLUSIONS AND RECOMMENDATIONS

According to the A.I.D. environmental procedures Section 216.2 (a) environmental analysis/evaluation is required

for all substantive project amendments. Fur[illegible]ore, in the case of rural road activities, an enviro[illegible]ental assessment is required.

Given: 1) that the USAID/G Farm-to-Market Access Roads Project will change significantly in it's design, and 2) that the nature of the new FAA Section 118 legislation is more restrictive, USAID/G intends to carry out a comprehensive environmental assessment for the proposed amendment activities. USAID/Guatemala has agreed to contract an environmental advisor for two year to work closely with the DGC to carry out the environmental planning and impact mitigation measures that become necessary with project implementation.

In accordance with Section 216.3 (a) (7), USAID/G requests deferrment of an environmental review of said environmental assessment based on the following two reasons:

1) Significant aspects of the project, including specific candidate subprojects with their preliminary road designs, will still be unidentified at the time of project authorization; and

2) Previous environmental analysis work done for the original Farm-to-Market Access Roads Project (520-0332) suggests that, with proper selection, design and planning and the implementation of appropriate mitigative measures, farm-to-market roads can be constructed in an environmentally sound way in Guatemala.

USAID/G has covenanted in the project paper that the required environmental assessment will be completed and taken into account prior to implementation of the project amendment for which environmental review is deferred. USAID/G further agrees to modify project amendment implementation plans in accordance with the environmental review if the LAC/DR CEO decides that modifications are necessary.

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ANNEX 3

TECHNICAL ANALYSIS

Introduction

Although a map of the 13,500 Km. road network of Guatemala appears to cover most of its rural areas, the country's mountainous and broken topography in fact denies direct, dependable, farm-to-market access to all but those who farm the corridors immediately adjacent to existing roads. Some progress has been made over the last decade with GOG construction of an estimated 900 Km. of all-weather rural access roads in the Guatemalan Highlands utilizing labor-intensive construction methods. These roads have provided previously isolated rural communities with year-round access to agricultural inputs, technical services and local and regional markets. Currently, the GOG is constructing an additional 800 Kms. of access roads under the AID-financed Farm-to-Market Roads Project (520-0332) at a pace of 200 Kms. a year.

Selection of access roads for construction beginning with the original pilot project (520-0233) and continuing through Projects 520-0274 and 520-0332 have been closely linked to AID's projects in improved agricultural practices. Starting with the Small Farmer Development Project 520-0233 in 1976, the Small Farmer Diversification Project 520-0255 initiated in 1981, and the Highlands Agricultural Development Project 520-0274 in 1983, AID has provided a significant amount of loan and grant funds to undertake soil conservation practices, construct mini-irrigation systems, and develop diversified crops which have resulted in the cultivation of increased farm produce or sale in regional, national or international markets. In the past these three agricultural projects were focused on one portion of Guatemala's Highlands, namely Ministry of Agriculture Regions I and V (see Map 1). In March of 1985 a $3.0 million amendment to the Highlands Agricultural Project 520-0274 was signed with the Government of Guatemala expanding soil terracing and irrigation activities to include Ministry of Agriculture regions II, VI, and VII (see Map 2).

To date the Access roads program has operated out of seven regional offices, building and maintaining roads in mountainous, agricultural productive areas of Guatemala (see Map 3). Portions of the rural farming areas do not have access to the road construction program thereby limiting the success of AID's expanded agricultural programs in these areas.

In order to address this problem the Government of Guatemala wishes to expand the access roads program into other mountainous areas of Guatemala where predominantly small farming activities are being undertaken. This supplement details the requirements to establish two additional construction/maintenance regions in order to address the needs of the small farmer community for better farm to market access.

The goal of the proposed project paper amendment remains, as given in the original paper, to improve the income, productivity and quality of life of

Guatemala's small farmers. One of the purposes of the amendment is to improve small farmers access to services, markets and inputs necessary for agricultural production.

In order to achieve this purpose, the DGC's current labor intensive Rural Roads Program will be expanded in two new regional offices and two maintenance centers in the departments of Chiquimula and Santa Rosa in the Eastern and South regions of the country, respectively (see map 4). This expansion will guarantee an increased Government of Guatemala level of effort and effective use of resources in the selection, construction, and maintenance of access roads. Emphasis will be made on the selection of roads in rural areas that have high potential for agricultural or increased farm production .

The purpose will be further achieved by upgrading the tertiary roads to facilitate the use of access roads through a better transportation system. These improvements will provide additional transportation capacity needed by the rural poor and facilitate the movement of small farmers into the production of higher value crops.

For the purpose of this Amendment, the following definitions are used:

- Farm to Market Access Roads: All those access roads constructed, under construction or being maintained under previous AID financed projects Small Farmer Development 520-0233, 520-0233A, and the on-going Farm-to-Market Roads 520-0332 and Highlands Agricultural Development 520-0274.

- Tertiary Roads: Unpaved roads that link the connection between the farm to market roads with the secondary or primary roads network.

I. FARM TO MARKET ACCESS ROADS COMPONENT

A. Construction:

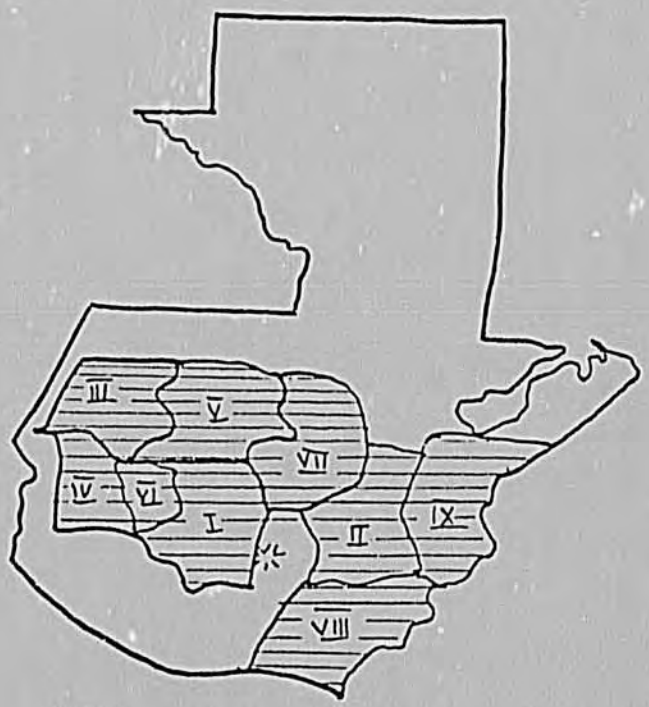
The establishment of two new access roads construction regions and maintenance centers in Chiquimula and Santa Rosa requires: (1) the construction of two new office and operations facilities, (2) the creation of new professional and supporting staff positions, (3) additional heavy equipment to support labor intensive construction activities, and (4) an increased operational budget to finance operation and maintenance costs of the heavy equipment, additional construction materials and handtools, and to pay unskilled community labor as well as some skilled labor. Each of these items is analyzed below.

The access standards call for a 6-8 mts. right of way on which a 4.00 meter one-lane all-weather roadbed will be laid over an improved subgrade. The extra right of way width is required for shoulders, drainage ditches, and switches. Semicircular arch culverts constructed with local materials will be used whenever possible. Bridges will be limited to 5-15 meters in length. Concrete or metal pipes and fords will be constructed to

MAP 1
Ministry of Agricultural Regions and where AID financed agricultural projects 520-0233, 520-0255 and 520-0274 are implemented.

MAP 2
Ministry of Agiruculture regiones where AID financed agricultural projects are implemented including the 1985 expansion agricultural projec 520-0274.

MAP 3
Dirección General de Caminos Access Roads Regions where AID financed road construction and maintenance activities occur within Projects 520-0274 and 520-0332, cinluding the 1986 expansion Farm to Market Roads Project 520-0332.



MAP 4
Proposed expansion of eighth and nineth Dirección General de Caminos Access Roads Regions to incorporate expanded AID financed agricultural activities.

conduct drainage transversely. Box culverts will be used to accommodate projected storm drainage run-off from side ditches. Cuts and fills will be held to a minimum. The final thickness of the road-wearing surface will vary between 15 and 20 cms. depending on the condition of the underlying soils. Longitudinal drainage will be provided by side ditches with frequent ditch turnouts. (See Exhibits 1 and 2 in Annex 3).

1. Building Facilities:

The expanded project will include the construction of permanent office facilities to house the administrative staff for the eighth and ninth construction regions and the fifth and sixth maintenance units. It will also include a workshop for preventive and minor corrective heavy equipment maintenance. These facilities would be constructed on a site to be provided by a local municipality utilizing the same specifications as those used for the six original regional centers financed under the Farm-to-Market Access Roads Project 520-0332. Workshop equipment and furniture will be purchased with loan funds. Detailed construction costs for the new Regional Office are included in Table I below.

TABLE I

Construction Costs for Two New Access Roads Regional Offices

	Item	Average Square Meter	Q/Sq. Mt.	TOTAL Q	= $
1.	Two Office Buildings	390	150	Q 47,700	$ 19,080
2.	Two Workshops and Gas Pump Facilities	420	75	31,500	12,600
3.	Two Control Gates	14	150	2,100	840
4.	Office Equipment and Furniture	-	-	18,000	7,200
5.	Utility Hook-Ups and Landscaping	1740	12	30,880	12,352
6.	Construction Contingencies 10%			12,018	4,807
	Sub Total			Q 142,198	$ 56,879
7.	Inflation 10%			14,220	5,688
	Total			Q 156,418	$ 62,567

Estimated Exchange Rate: Q2.50=$1.00

Loan funds will only be used to pay construction line items 1, 2, 3 and 4 , totalling $ 39,720 (Q99,300) for the two new regional facilities. Other line items will be GOG financed.

2. New Positions:

The new Regional Construction Offices will be staffed by the GOG at the same personnel level as (hired, contracted or under payroll) the already existing regional offices (See Table 3 of the Administrative Analysis).

The administrative costs for these personnel have been considered in the administrative line item of Table V Farm to Market Access Roads Constructions Costs.

The amount of $275,652 (Q689,130) corresponds to the additional administrative expenses for the two new regional offices during the life of the project. The difference of $528,060 (Q1,320,150) is the administrative recurrent cost for the seven regions during the last two years of project implementation.

3. Heavy Equipment

Each new Regional Office will be provided with the same mix and quantity of heavy equipment that currently supports the labor intensive work in the existing regions, as follows:

TABLE II

Heavy Equipment for Two New Regional Offices

Quantity Per Region	Description	Quantity for Two Regions	Unit Price $	Estimated Cost ($)
2	Crawler Tractors	4	$ 170,000	$ 680,000
1	Motorgrader	2	99,000	198,000
1	Front End Loader	2	72,000	144,000
1	Self Propelled Compactor	2	80,000	160,000
6	Dump Trucks	12	36,000	432,000
2	Concrete Mixers (1 bag)	4	3,000	12,000
1	Compressor	2	30,000	60,000
1	Electric Welder	2	6,000	12,000
1	Oxy - Acetylene Welder	2	1,500	3,000
1	Water Pump	2	6,000	12,000
1	Chain Saw	2	1,000	2,000
1	Concrete Vibrator	2	2,000	4,0001
4	4x4 Large Pick-Up Trucks	8	17,000	136,000
1	3-Ton Stack	2	24,000	48,000
1	Truck Mounted Lube System	2	35,000	70,000
1	Water Tank Truck	2	26,000	52,000
1	Small Pick Up Trucks	9*	15,000	135,000
	Sub Total			$ 2,160,000
	Inflation (10%)			216,000
	Total			$ 2,376,000

* Small pick-up trucks have been included for the social workers to perform the promotional campaign and socio-economic surveys for access roads construction

In addition, surveying equipment will be purchased with $75,000 in loan funds for the regional offices and maintenance centers to provide them with the required surveying resource for the access roads and tertiary roads alignments.

4. Operating Costs and Expenses

For the purpose of the proposed Project Amendment the same elements based on the labor intensive use were taken into account as in the original Technical Analysis of Project 520-0332.

Table III below shows a comparative distribution of direct and indirect costs of previous projects and the on-going Farm to Market Roads Project 520-0332 processed by the Rural Road Program.

TABLE III

DIRECT AND INDIRECT COSTS DISTRIBUTION

	Project 520-0233 A.I.D. 520-T-026	Project 520-0233A A.I.D. 520-T-026A	Project 520-0332 A.I.D. * 520-T-040 (on going)
A. INDIRECT COSTS			
Preliminary Works	2.77%	0.62%	1.01%
Administration	4.44%	4.94%	7.76%
SUB-TOTAL:	7.21%	5.56%	8.77%
B. DIRECT COSTS			
-Unskilled labor	53.14%	55.71%	56.74%
-Skilled labor	12.57%	13.26%	9.46%
-Hand tools	1.51%	1.75%	2.86%
-Construction Materials	10.74%	7.51%	5.92%
-Fuels and Lubricants	7.62%	8.91%	9.67%
-Heavy Equipment Deprectiation	3.80%	3.21%	2.73%
-Spare Parts	2.53%	3.21%	2.68%
-Tires and tubes	0.88%	0.88%	1.21%
SUB-TOTAL:	92.79%	94.44%	91.23%
TOTAL:	100.00%	100.00%	100.00%

*Starting, 1987

Based on DGC's experience and a sample of 31 access roads constructed by the Rural Roads Program during the last six years of access roads construction (see Exhibit 3A to this Annex, the average cost per kilometer estimated had been approximately $7,333(Q 22,000). The table below shows the unit cost revised by the Mission engineers in conjuction with the Rural Roads Program engineers for the Farm to Market Access Roads Project implementation starting 1988.

TABLE IV

ACCESS ROADS UPDATED COST

Elemento/ Element	Porcentaje por elemento/Percentage per element ./ (%)	Factor de Inflación/ Inflation factor (%)	Costo revisado por Km./Revised cost per Km. (Q)	Porcentaje por elemento actualizado/Updated percent. per element (%) (1988)
Preliminary work	1.0	30	289	0.74
Administration	7.76	30	2,219	5.70
Unskilled labor	56.74	72	21,470	55.20
Skilled labor	9.46	72	3,580	9.20
Handtools	2.82	300	1,861	4.78
Construction Materials	5.92	300	3,907	10.05
Fuels and lubricants	9.67	10	2,340	6.02
Depreciatión of Equipment	2.73	10	661	1.70
Spare parts	2.68	300	1,769	4.55
Tires and Tubes	1.21	300	798	2.06
			Q 38,894*	100.00%

*Q38,894 = $15,558 at an estimated exchange rate of Q2.50 = $1.00.

./ Source Computer Center of the Rural Roads Project for the Farm to Market Access Roads Project 520-0332.

Table V details the Farm to Market Access Roads Construction Costs based in the number of kilometers of roads addedd per year.

In accordance with the original Farm to Market Access Project (520-0332) signed on March 20, 1985, six regional offices were to construct and rehabilitate 800 kms. of access roads. Amendment No. 1 created a new regional office in Baja Verapaz for an additional 105 kms. of access road construction for a total of 905 kms to be completed by the Project's PACD of December 31, 1989. The proposed Amendment includes an additional 800 kms of access roads to be constructed during the LOP for a total of 1705 kms. of access roads as shown in the Target Schedule below with a new Project PACD of September 30, 1991. During 1990 and 1991 the created DGC's nine regional offices of the Rural Roads Program, will annually complete 325 kms of access roads per year to meet the proposed targets.

The pace of 35 kms of access road constructed per year per region is now closely monitored by DGC. Therefore, it would be anticipated that the present target schedule will be satisfactorily met by the implementation unit.

TABLE V
Construction Costs Table
Cuadro de Costos de Construcción

	Porcentaje actualizado/Updated percentage %	Costo Actualizado por km./Updated Cost per km. Q	No. Kms a construirse en 1988/No. kms. to be constructed in 1988	Costo para 1988/Cost for 1988 Q	Costo para 1988/Cost for 1988 $	No. Kms. a construirse en 1989/No. kms to be constructed in 1989	Costo para 1989/Cost for 1989 Q	Costo para 1989/Cost for 1989 $	No. kms a construirse en 1990/No. kms to be constructed in 1990	Costo para 1990/Cost for 1990 Q	Costo para 1990/Cost for 1990 $	No. kms a construirse en 1991/No. kms to be constructed in 1991	Costo para 1991/Cost for 1991 Q	Costo para 1991/Cost for 1991 $	TOTAL/TOTAL Q	TOTAL/TOTAL $
A. Costos indirectos/Indirect Costos																
1. Trabajos Preliminares/Preliminary Works	0.74	39,000	70	20,202	8,081	80	23,088	9,235	325	93,795	37,518	325	93,795	37,518	230,880	92,352
2. Administración/Administración	5.70	39,000	70	155,610	62,244	80	177,840	71,136	325	722,475	288,890	325	722,475	288,990	1,778,400	711,360
B. Costos Directos/Direct Costs																
1. Mano de Obra no especializada/Unskilled Labor	55.20	39,000	70	1,506,960	602,784	80	1,722,240	688,896	325	6,996,600	2,798,640	325	6,9[illegible],600	2,798,640	17,222,400	6,888,96
2. Mano de Obra especializada/Skilled Labor	9.20	39,000	70	251,160	100,464	80	287,040	114,816	325	1,166,100	466,440	325	1,166,100	466,440	2,870,400	1,148,160
3. Hand tools/Herramientas	4.78	39,000	70	130,494	52,198	80	149,136	59,654	325	605,865	242,346	325	605,865	242,346	1,491,360	596,544

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	Porcentaje actualizado/Updated percentage %	Costo Actualizado por km./Updated Cost per km. Q	No. Kms a construirse en 1988/No. kms. to be constructed in 1988	Costo para 1988/Cost for 1988 Q	Costo para 1988/Cost for 1988 $	No. Kms. a construirse en 1989/No. kms to be constructed in 1989	Costo para 1989/Cost for 1989 Q	Costo para 1989/Cost for 1989 $	No. kms a construirse en 1990/No. kms to be constructed in 1990	Costo para 1990/Cost for 1990 Q	Costo para 1990/Cost for 1990 $	No. kms a construirse en 1991/No. kms to be constructed in 1991	Costo para 1991/Cost for 1991 Q	Costo para 1991/Cost for 1991 $	TOTAL/TOTAL Q	TOTAL/TOTAL $
4. Materiales de Construcción/Construction Materials	10.05	39,000	70	274,365	109,746	80	313,560	125,424	325	1,273,837	509,535	325	1,273,837	509,535	3,135,600	1,254,240
5. Combustibles y lubricantes/Fuels and Lubricants	6.02	39,000	70	164,346	65,738	80	187,824	75,130	325	763,035	305,214	325	763,035	305,214	1,878,240	751,296
6. Depreciación de Equipo Pesado/Heavy Equipment Depreciation	1.70	39,000	70	46,410	18,564	80	53,040	21,216	325	215,475	86,190	325	215,475	86,190	530,400	212,160
7. Repuestos/Spare Parts	4.55	39,000	70	124,215	49,686	80	141,960	56,784	325	576,712	230,685	325	576,713	230,685	1,419,600	567,840
8. Llantas y neumáticos/Tires and Tubes	2.06	39,000	70	56,238	22,495	80	64,272	25,709	325	261,106	104,442	325	261,106	104,442	642,722	257,088
9. Inflación/Inflation 10%							312,000	124,800		1,267,500	507,000		1,267,500	507,000	2,847,000	1,138,800
10. IVA*				46,725	18,690		72,025	30,010		305,658	122,263		305,658	122,263	733,065	293,226
TOTAL	100.00			Q2,776,725	1,110,690		Q3,504,025	$1,402,810		Q14,248,158	5,699,263		Q14,248,160	$5,699,263	Q34,780,067	$13,912,027

* IVA=7% (line items 3,4, 50% (5), 7, 8 and 9)

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The table below includes the target distribution for the Rural Roads Program in this proposed Amendment including the seven existing regions, the two additional regions and the mobile unit for the tertiary roads component.

TABLE VI

Target Schedule During LOP

	1986	1987	1988	1989	1990	1991	Total LOP
	Kilometers of Roads						
1. Farm to Market Access Roads							
1.1 Seven Existing Regions	200	235	235	235	245	245	1395
1.2 Two additional Regions			70	80	80	80	310
	200	235	305	315	325	325	1705
2. Tertiary Roads							
2.1 One Mobile Unit			60	60	60	60	240

5. Level of Community effort

DGC's experience indicates that approximately 400 inhabitants per kilometer of access roads are being benefited by the Project, therefore, with the addition of 800 kms in this proposed Amendment about 48,500 small farmer families (320,000 inhabitants) should be benefited by the proposed project.

Due to their agricultural activities, it has been estimated that each worker will participate approximately three months per year in road construction activities. Using the criteria that each laborer will supply 22 days per months of work, and that DGC's experience has identified man-days per kilometer constructed under the labor intensive use program, the project will provide 87,709 man-months (2412/22 x 800) for construction.

6. Farm to Market Access Roads Selection Criteria

A two-phase process is currently used by the DGC's Rural Roads Program for selecting access roads to be built under this Project: screening

and prioritization. Screening is a preliminary procedure performed by the regional Engineer and Social Worker at each region to eliminate access roads that do not satisfy certain basic criteria. Priorization is a computerized process that gives each access road points based on different factors considered in the socio-economic survey form (See Exhibit No. 4) and the estimated cost of the road segment.

The Access Roads Component of the Highlands Agricultural Development Project 520-0274 provided DGC with a Technical Assistance team to improve the administrative, planning, mapping and promotion activities of the Rural Roads Program. An AID financed Rural Roads Computer Center was established under the access roads component of the Highlands Agricultural Development Project 520-0274 to support the program for the construction rehabilitation and maintenance activities. One of the T.A. team members is providing DGC assistance in the access roads mapping (Computarized Access Roads Inventory) activity. The technical assistance has improved the appropriate mechanisms required to select and implement the construction, rehabilitation and maintenance of the access roads through a sequence of steps as follows:

1. Road's Identification: starts with the community request for road construction.

2. First Level of Selection: is performed by the engineer and the social worker who obtain information related to location, social and economic-agricultural aspects, technical and environmental concerns in the area of influence of the potential road for the screening step.

3. Socio Economic Survey: Once a proposed road passes the screening a Socio-Economic Survey is made in conjunction with the physical data for the cost estimate of the road. The survey's sample is based on the number of heads of families living within the access road's area of influence.

4. Prioritization: The information obtained in the survey and the estimated cost provided by the regional engineer are processed at the Computer Center , which prioritizes each access road. The prioritization considers demography, community organization and public services aspects for a total of 400 points distributed as shown in Exhibit No. 6 of this Annex. Agro-economic, technical, Cost and Community cooperation aspects are considered for a total of 600 points as shown in Exhibit No. 7 of this Annex. Exhibit No. 8 is a summary of the above for a total of 1,000 points for a farm to market access road selected for construction with labor intensive methods.

5. Final Selection: At the Central Level the Coordinator of the Program makes the final selection of those access roads with the highest points at each region and the work capacity of each region (35 kms. per year)].

6. Budget: The Access Roads selected are included in the DGC's annual Program Budget.

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Exhibits Nos. 9 through 13 show the administrative procedure referred to above and the different forms used for that purpose.

Currently the Computer Center contains a data bank with some 147 access roads (954 kms.) in priority order. New roads are entered annually in their priority ranking of the Computer Center. An example of this list is included as Exhibit No. 3.

The DGC's selection procedure has been distributed among the different GOG entities related to the program in annual budget, planning, management, as well as the decision-makers (Ministries). The system has been widely accepted.

Currently the Rural Roads Computer Center controls and follows up on all access roads activities as well as generates reports on work progress.

During a working session held at the AID Mission on May 21, 1987 the Dirección General de Caminos DGC, and the Dirección General de Servicios Agrícolas DIGESA from the Ministry of Agriculture, shared their experiences with prioritizing systems for the Farm to Market Access Roads and Agriculture Infrastructure. As a result of the meeting the following was established:

a. The DGC's priority system includes Agro-economic aspects such as: Land tenure size, production, agricultural inputs, technical and credit assistance, crop diversification, artesanies, type of cropping employment at the community, livestock activities required for road selection in the high potential agricultural areas being worked by DIGESA;

b. DIGESA's priority system does not permit advance identification of specific project targets for budget purposes;

c. Given the availability of a prioritized list of access roads within the data bank of the Rural Roads Program's Computer Center, DGC is capable of identifying Farm to Market Access Roads Project targets two years in advance.

In order to improve coordination between DGC and DIGESA s in areas highly populated by small farmers with a high agricultural potential or significant agricultural production it was agreed by DGC, DIGESA and AID representatives that:

a. DIGESA will plan its yearly Agricultural targets in areas DGC has, or plans to have road construction or upgrading activities.

b. DIGESA will upgrade its prioritizing selection system to coordinate with the advanced project identification system being implemented by DGC.

B. Access Roads Maintenance:

The establishment of two new regional offices for construction in Chiquimula and Santa Rosa requires the establishment of two centers to maintain the new roads and the road construction heavy equipment. Tables VII and VII shows the estimate of labor cost per kilometer for this maintenance activity.

All roads constructed under the Farm to Market Access Roads Project enter into the maintenance activity of this labor intensive Rural Roads Program.

TABLE VII/Cuadro VII
Access Roads Maintenance Component, Estimation of Labor Costs
Componente de Mantenimiento de Caminos de Acceso, Estimación de Costo de la Mano de Obra

Maintenance Activity/ Actividad de Mantenimiento	Execution Criteria/ Criterio de Ejecución	Type Access Roads/ Clase de Caminos Acceso	Work Unit/ Unidad de Trabajo	Efficiency Eficiencia	Total Annual Work/ Cantidad Trabajo Anual	Laborers Require/Trabajadores Requeridos	Crew Days/ Días Cuadrilla	Man Day/ Hombre Día	Cost per Day/ Costo por Día	Labor Cost/ Costo Mano Obra
1. Smoothing/Nivelación con Mano de Obra	Frequency Frecuencia	2 Years 2 años	Km	1 Km/Day/Crew 1 Km/Día/Cuadrilla	400	5 2/	400	2,000	Q5.56 1/	Q11,120
2. Blading and Smoothing Nivelación y Perfilado con Máquina	Frequency Frecuencia	2 Years 2 Años	Km	10 Km/Day 10 Km/Día	400	2	40	80		445
3. Patching:Bacheo	m^3/Km/Year $3m^2$Km/Año	1 Year 1 Año	m^3 m^3	$1.5m^3$m/Crew Day $1.5m^3$h/Cuadrilla Día	4,000	5	2,267	13,335		74,143
4. Resurfacing/Recubrimiento	Frecuency Frecuencia	4 Years 4 Años	m^2 m^2	$350m^3$/Day $350m^3$/Día	128,000	20	366	7,320		40,699
5. Cleaning and Repair of Culverts/Limpieza y Repa-	Frecuency Frecuencia	6 Months 6 Meses	No. Culverts/Alcantarillas	4 ea/m-week 4 uni/h-semana	8,000	2	2,000	4,000		22,240
6. Hand Cleaning Ditches/Limpieza y Perfilado Cunetas	Frecuency Frecuencia	6 Months 6 Meses	metro metro	60mt/m/day 60mg/h/día	160,000	10	2,667	26,670		148,285
7. Vegetation Control/Control de Vegetación	Day-m/km/year Día-h/km/año	1 Year 1 Año	m^2 m^2	$400m^2$m/day $400m^2$m/día	1,200,000	5	3,000	15,000		83,400

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Maintenance Activity/ Actividad de Mantenimiento	Execution Criteria/ Criterio de Ejecución	Type Access Roads Clase de Caminos Acceso	Work Unit/ Unidad de Trabajo	Efficiency Eficiencia	Total Annual Work/ Cantidad Trabajo Anual	Laborers Require/Trabajadores Requeridos	Crew Days/ Días Cuadrilla	Man Day/ Hombre Día	Cost per Day/ Costo por Día	Labor Cost/ Costo Mano Obra
8. Earth Slides/Derrumbes	M^3/Km/Year M^3/Km/Año	1 Year 1 Año	M^3 M^3	$3m^3$/m/day $3m^3$/m/día	2,400	5	800	4,000 72,405		22,240 Q402,572

Unit Cost of Hand Labor per Kilometer/Costo Unitario de Mano de Obra por Kilómetro = $\frac{Q402,572}{800}$ = Q503.22/km.

1/ Q5.56 is the average wage that a laborer will earn per day starting 1988/Q5.56 es el salario promedio que un trabajador ganará por día a partir de 1988.
2/ 5 men is the more effective quantity for a crew/5 hombres es el tamaño de la cuadrilla más efectiva.

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The addition of the fifth and sixth maintenance units within the newly created regional construction offices will provide an additional 486,438 man-work days or 22,110 man-months of community labor during the last three years of access roads maintenance including the additional 800 Kms. of access roads under this project amendment for a total of 197,290 man-work days for the last year of the project. (See Table VIII below). The estimated income (labor payment) generated during the last three years of project amounts $1,081,838 (Q2,704,595). Of this amount it has been estimated that a 15 percent corresponds to skilled labor $162,276 (Q405,690) and $919,562 (Q2,298,905) to unskilled labor.

TABLE VIII

Year	Roads Cons-tructed	Kms. of Roads Maintained Annualy	Required Man-days Year	Estimated income generated per year Q =	$
Prior Years	500	0	0		
1985	200	500	45,000	157,500	63,000
1986	200	700	63,000	220,500	88,200
1987	231	900	81,000	283,500 1/	113,400
1988	305	1135	102,718	571,112	228,445
1989	315	1440	130,320	724,579	289,832
1990	325	1755	158,828	883,084	353,234
1991	325	2180	197,290	1,096,932 2/	438,772

1/ An income of Q3.50 per day was used for the first three years of project.
2/ An income of Q5.56 per day was used for the last four years of project.

Estimated Exchange rate Q2.50 = $1.00.

The level of community effort for the maintenance activity has been reported by DGC as 15 workers per kilometer twice a year for a total of 161,250 (15 persons/km x 5,375 km x 2) workers for the last three years of project.

1. Heavy Equipment

Each of the two new maintenance offices will be equipped with a heavy equipment maintenance unit, as shown in Table IX, to assist the communities in the corrective maintenance of the access roads. In addition six portable jaw-crushers will be purchased to complement the heavy equipment in the access roads program construction and maintenance units.

TABLE IX

HEAVY EQUIPMENT FOR TWO NEW MAINTENANCE CENTERS

Quantity per Center	Description	Quantity for two Centers	Unit Price ($)	Estimated Cost ($)
1	Motorgrader	2	99,000	198,000
1	Front End Loader/Backhoe	2	45,000	90,000
1	Selfpropelled Compactor	2	80,000	160,000
6	Dump trucks	12	36,000	432,000
2	4x4 large pick up trucks	4	17,000	68,000
1	Small pick up truck	6*	15,000	90,000
1	Portable jaw crusher	6**	80,000	480,000
	Cost of heavy equipment			$ 1,518,000
	Spare parts 20% of H.Eq.			$ 304,000
	Subtotal			$1,822,000
	Inflation 10%			182,200
	Total			$ 2,004,200

* Six small pick-up trucks have been included for the additional social work personnel mentioned in B.2.

** The Mission and DGC engineers have considered the jaw crushers necessary to provide appropriate grade of gravel for the road surfacing compacting. This equipment will be moved to the different work fronts of construction or maintenance, as required.

2. Additional Personnel

As included in the original project description the existing staff in the construction regional headquarters will provide payroll and accounting support to the maintenance centers. Therefore, for the maintenance activity in the two newly created maintenance centers two resident maintenance engineers, two assistants to the resident engineer, two warehousemen, two payrollmen, 12 heavy equipment operators and 22 drivers will be hired by DGC. In addition, one social worker per each maintenance center has been considered necessary by DGC for the maintenance promotion within communities. This additional personnel is included in Table X

TABLE X

Additional Personnel Requirements

Quantity	Title of Position	Salary Monthly Q	Salary Annual Q	Christmas Bonus Q	Cost Per Year Q
2	Resident Engineers	1,325	31,800	2,200	34,000
2	Assistant to the Eng.	620	14,880	890	15,770
6	Social Worker	450	32,400	1,650	34,050
2	Warehouseman	510	12,240	670	12,910
2	Payrollman	460	11,040	570	11,610
22	Drivers	331	87,384	3,432	90,816
12	Operators	429	46,332	2,106	48,438
			Q 236,076	Q 11,518	Q 247,594

TABLE XI

Administrative Costs

Year	Cost/Year Q	Average Salary Increase	Update Cost/Year Q	= $
1988	247,594	25%	309,492	123,797*
1989	247,594	-	309,492	123,797
1990	247,594	-	309,492	123,797
1991	247,594	-	309,492	123,797
	TOTAL		Q 1,237,968	$ 495,188

Estimated Exchange Rate: Q 2.50=$1.00.

* Given the need of having the administrative personnel hired by the time the maintenance unit will initiate the maintenance work in 1989, operating funds have been considered to provide the DGC with the necessary resources for hiring said personnel in 1988.

3. Maintenance and Repair Shop Equipment

A set of maintenance and repair shop service tools and equipment will be purchased with $ 35,000 in loan funds for each one of the two new construction/maintenance offices to provide the regional workshops with an equal level of installed equipment maintenance capacity as in the other regional offices to keep the existing and the new heavy equipment in top condition. $70,000 of loan funds will be available for this purpose, plus $7,000 by inflation, for a total of $77,000.

4. Hand Tools:

Experience with the labor intensive maintenance of the rural Roads Program indicates the need to divide maintenance activities among 5 men crews, each assigned to 3-kilometer sections of road. The table below shows the annual number of crews required for the roads entering maintenance. Table XII-A details the handtools costs per year.

TABLE XII

Year	Roads Constructed	Roads Entering Maintenance	Crews Required
1988	305	1,135	—
1989	315	1,440	480
1990	325	1,755	585
1991	325	2,180	727

TABLE XII-A

Maintenance of Access Roads Hand tools Costs

	Quantity per crew	Replacement factor per Year	Quantity per crew per Year	Unit Cost Q	No. of Crews for 1989	Quantity for 1989	Cost for 1989	Inflation 10% 1989	IVA 7%	No. of Crews for 1990	Quantity for 1990	Cost for 1990	Inflation 10% 1990	IVA 7%	No. of Crews for 1991	Quart for 1991	Cost for 1991	Inflation 10% 1991	IVA 7%
Shovels	2	4.0	8	15.00	480	3,840	57,600	5,760	4,435	585	4,680	70,200	7,020	5,405	727	5,816	87,240	8,724	6,717
Picks	3	4.0	12	13.00	480	5,760	74,880	7,488	5,766	585	7,020	91,260	9,126	7,027	727	8,824	113,412	11,341	8,733
Hoes	2	4.0	8	13.00	480	3,840	49,920	4,992	3,844	585	4,680	60,840	6,084	4,685	727	5,816	75,608	7,561	5,822
Wheelborrows	2	2.0	4	90.00	480	1,920	172,800	17,280	13,306	585	2,340	210,600	21,060	16,216	727	2,908	261,720	26,172	20,152
Machetes	2	1.0	2	10.00	480	960	9,600	960	739	585	1,170	11,700	1,170	901	727	1,454	14,540	1,454	1,120
Buckets	4	4.0	4	10.00	480	1,920	19,200	1,920	1,478	585	2,340	23,400	2,340	1,802	727	2,908	29,080	2,908	2,239
							Q384,000= $153,600	Q38,400= $15,360	Q29,568= $11,827			Q468,000= $187,200	Q46,796= $18,718	Q36,036= $14,414			Q494,360= $197,744	Q58,160= $23,264	Q44,783= $17,913

Estimated exchange rate: Q2.50 = $1.00

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5. Construction Materials for Maintenance:

In accordance with DGC's previous experience, a unit cost of Q300/km has been calculated for construction materials, including cement, lime, corrugated metal pipes, etc. See Table XIII, below.

TABLE XIII

Construction Materials Cost for Maintenance

Year	Km/ Year	Cost/ km Q	Cost per Year Q	= $	With Inflation Q	Inflation 10% Q	= $	I V A 7% Q	= $
1988									
1989	1440	300	432,000	172,800	475,200	43,200	17,280	33,264	13,306
1990	1755	300	526,500	210,600	579,150	52,650	21,060	40,540	16,216
1991	2180	300	664,000	265,600	730,400	66,400	26,560	51,128	20,451
TOTAL			Q1,622,500	$649,000		Q162,250	$64,900	Q124,932	$49,973

Estimated Exchange Rate: Q2.50:$1.00

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6. Operation and Maintenance:

TABLE XIV

Operating Expenses - Maintenance - Tires - Fuels & Lubricants

Fuel for Heavy Equipment

	Quantity	Daily Fuel Comsumption	Annual Work Days	Diesel Gallons Per Year	Price Per Gallon	Cost Per Year Q	= $
Motorgraders	2	32 gls.	229	14,656	1.68	24,622	9,849
Backhoe/Front End Loader	2	24 gls.	229	10,992	1.68	18,466	7,386
Compactors	2	56 gls.	229	25,648	1.68	43,089	17,236
Portable Jaw Crushers	6	20 gls.	229	27,480	1.68	46,166	18,466
				T O T A L		Q 132,343	$ 52,937

Year	Cost Per Year Q	= $	With Inflation Q	Inflation Q	= $
1988					
1989	132,343	52,937	145,577	13,234	5,294
1990	132,343	52,937	160,135	27,792	11,117
1991	132,343	52,937	176,148	43,806	17,522
TOTAL	Q 397,029	$ 158,811		Q 84,832	$ 28,277

Estimated Exchange rate: Q2.50 = $1.00.

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TABLE XV

Maintenance Cost for Heavy Equipment

	1	2	3	4	5	6	
	Quantity	Cost Per Unit $	Useful Life	Depreciation After 5 Years	Repairs and Maintenance Factor	Cost* Per Year $	= Q
Motor Grader	1	88,000	5 yrs.	60%	75%	7,920	19,800
Backhoe/Front End Loader	1	40,000	5 yrs.	60%	75%	3,600	9,000
Compactor	4	90,000	5 yrs.	60%	75%	32,400	81,000
Portable Jaw Crushers	6	80,000	5 yrs.	60%	75%	43,200	108,000
Total						$ 87,120	$ 217,800

* 6 = 1 (2-3) x 4 x 5

Year	Cost per Year Q	= $	With Inflation Q	Inflation 10% Q	= $	I V A 7% Q	= $
1988							
1989	217,800	87,120	239,580	21,780	8,712	16,770	6,708
1990	217,800	87,120	263,538	45,738	18,295	18,448	7,379
1991	217,800	87,120	289,892	72,092	28,837	20,292	8,117
Total	Q653,400	$261,360		Q139,610	$55,844	Q55,510	$22,204

Estimated Exchange rate: Q2.50 = $1.00.

TABLE XVI

Tires for Heavy Equipment

	Number of Tires per Year	Unit Cost Per Tire Q	Cost Per Year Q	= $
Graders (1)	6	2,000	12,000	4,800
Backhoe/Front End Loader (1)				
Big tire	2	2,000	4,000	1,600
Small tire	2	600	1,200	480
Compactors (2)	4	800	3,200	1,280
Portable Jaw Crusher (6)	24	400	9,600	3,840
			Q 30,000	$ 12,000

Year	Cost per Year Q	= $	With Inflation Q	Inflation 10% Q	= $	I V A 7% Q	= $
1988							
1989	30,000	12,000	33,000	3,000	1,200	2,310	924
1990	30,000	12,000	36,300	6,300	2,520	2,541	1,016
1991	30,000	12,000	39,930	9,930	3,972	2,975	1,190
Total	Q 90,000	$ 36,000		Q 19,230	$ 7,692	$7,826	$ 3,130

Estimated Exchange rate: Q2.50 = $1.00

TABLE XVII

Fuel for Pick-Ups and Dump Trucks

	Quantity	Diesel Consumption Per Year	Price Per Gallon Q	Cost Per Year Q	= $
Pick up	10	3,333	1.68	55,994	22,398
Dump Truck	12	5,000	1.68	100,800	40,320
Total				Q 156,794	$ 62,718

Year	Cost Per Year Q	= $	With Inflation Q	Inflation Q	= $
1988					
1989	156,794	62,718	172,473	15,679	6,271
1990	156,794	62,718	189,721	32,927	13,171
1991	156,794	62,718	208,693	51,899	24,760
Total	Q 470,382	$ 188,154		Q 100,505	$40,202

Estimated Exchange rate: Q2.50 = $1.00

TABLE XVIII

Maintenance Cost for Pick-Ups and Dump Trucks

	Quantity	Services Per Year	Cost Per Service Q	Cost Per Year Q	= $
Pickups	10	10	300	30,000	12,000
Dump trucks	10	12	450	64,800	25,920
Total				Q 94,800	$ 37,920

Year	Cost per Year Q	= $	With Inflation Q	Inflation 10% Q	= $	I V A 7% Q	= $
1988							
1989	94,800	37,920	104,280	9,480	3,792	7,300	2,920
1990	94,800	37,920	114,708	19,908	7,693	8,030	3,212
1991	94,800	37,920	126,179	31,379	12,552	8,832	3,533
Total	Q 284,400	$ 113,760		Q 60,767	$ 24,307	Q24,162	$9,665

Estimated Exchange rate: Q2.50 = $1.00

TABLE XIX

Tires for Pickups and Dump Trucks

	Quantity of Units	Number of Tires Per Unit	Unit Cost Per Tire Q	Changes Per Year	Cost Per Year Q	= $
Pickups	10	5	150	2	15,000	6,000
Dump Trucks	12	7	450	2	75,600	30,240
Total					Q 90,600	$ 30,200

Year	Cost per Year Q	= $	With Inflation Q	Inflation 10% Q	= $	I V A 7% Q	= $
1988							
1989	90,600	36,240	99,660	9,060	3,624	6,976	2,790
1990	90,600	36,240	109,626	19,026	7,610	7,674	3,070
1991	90,600	36,240	120,589	29,989	11,996	8,441	3,376
	Q 271,800	$ 108,720	Q 420,475	Q 58,075	$ 23,230	Q 23,092	$ 9,236

Estimated Exchange Rate: Q2.50 = $1.00.

TABLE No. II

TOTAL ANNUAL PROJECTION OF EXPENDITURES FOR THE ACCESS ROADS COMPONENT

CONCEPT	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOG COUNTERPART		TOTAL	AID FUNDS			GOG COUNTERPART		TOTAL	AID FUNDS			GOG COUNTERPART		TOTAL	AID FUNDS			GOG COUNTERPART		TOTAL	AID FUNDS			GOG COUNTERPART		TOTAL
	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$
A. START UP COSTS																														
1. Heavy Equipment and Vehicles	3,678		3,678			3,678																			3,678		3,678			3,678
2. Construction of Two Regional Offices		40	40	31	12	52																				40	40	31	12	52
3. Surveying Equipment	75		75			75																			75		75			75
4. Maintenance and Repair Shop Equipment	70		70			70																			70		70			70
5. Inflation	382		382	14	6	385																			382		382	14	6	385
6. Contingencies	420		420	12	5	425																			420		420	12	5	425
Sub-Total	4,625	40	4,665	57	23	4,688	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4,625	40	4,665	57	23	4,688
B. OPERATING COSTS AND EXPENSES																														
1. Administration				485	194	194				510	204	204				1,128	451	451				1,128	451	451				3,250	1,300	1,300
2. Unskilled Labor		302	302	753	301	603		468	468	1,163	467	935		1,350	1,350	3,075	1,350	3,100		1,586	1,586	3,963	1,585	3,171		3,906	3,906	9,728	3,903	7,814
3. Skilled Labor		50	50	125	50	100		79	79	198	79	158		259	259	648	259	518		267	267	668	267	534		655	655	1,638	655	1,311
4. Materials		26	26	65	26	52		107	107	268	107	214		215	215	538	215	430		221	221	550	220	441		569	569	1,420	569	1,137
5. Construction Materials		55	55	138	55	110		149	149	373	149	298		360	360	900	360	720		387	387	970	389	775		951	951	2,380	952	1,903
6. Fuel and Lubricants				165	66	66				790	316	316				1,365	546	546				1,365	546	546				3,415	1,474	1,474
7. Spare Parts	25		25	63	25	50	78		78	195	78	156	166		166	415	166	332	167		167	418	167	334	436		436	1,090	436	872
8. Tires and Tubes	11		11	28	11	22	37		37	93	37	74	76		76	190	76	152	78		78	195	78	156	200		200	505	202	402
9. Inflation							10	83	93	233	93	186	10	294	304	760	304	608	10	319	329	820	328	657	30	696	726	1,813	725	1,451
10. [illegible]				42	17	17				170	68	68				419	167	167				443	177	177				1,074	429	429
11. Contingencies	6	15	19	305	202	321	13	63	76	678	271	347	18	146	164	703	281	445	18	148	166	735	294	469	53	372	425	2,[illegible]	1,049	[illegible]
Sub-Total	40	448	488	2,373	949	1,437	138	949	1,087	4,673	1,869	2,556	270	2,824	3,094	10,938	4,375	7,469	271	2,928	3,199	11,253	4,501	7,700	719	7,189	7,908	19,[illegible]	11,694	[illegible]
TOTAL	$ 4,665	488	5,153	2,430	972	6,125	138	949	1,087	4,673	1,869	2,556	270	2,824	3,094	10,938	4,375	7,469	271	2,928	3,199	11,253	4,501	7,700	5,344	7,189	12,533	29,[illegible]	11,717	[illegible]

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TABLE No. II-4

ANNUAL PROJECTION OF EXPENDITURES FOR ACCESS ROADS CONSTRUCTION ACTIVITY

CONCEPT	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL
	FX $	LC $	TOTAL	B *	$	$	FX $	LC $	TOTAL	B *	$	$	FX $	LC $	TOTAL	B *	$	$	FX $	LC $	TOTAL	B *	$	$	FX $	LC $	TOTAL	B *	$	$
A. PART OF COSTS																														
1. Heavy Equipment and Vehicles	2,160		2,160			2,160																			2,160		2,160			2,160
2. Construction of Two Regional Offices		40	40	31	12	52																				40	40	31	12	52
3. Surveying Equipment	75		75			75																			75		75			75
4. Inflation	223		223	16	6	229																			223		223	16	6	229
5. Contingencies	245		245	12	5	250																			245		245	12	5	250
Sub-Total	2,703	40	2,743	57	23	2,766	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,703	40	2,743	57	23	2,766
B. OPERATING COSTS AND EXPENSES																														
1. Administration				175	70	70				200	80	80				818	327	327				818	327	327				2,010	804	804
2. Unskilled Labor		302	302	753	301	603		345	345	860	344	689		1,399	1,399	3,498	1,399	2,798		1,400	1,400	3,498	1,399	2,799		3,446	3,446	8,608	3,443	6,889
3. Skilled Labor		50	50	125	50	100		57	57	142	57	114		233	233	583	233	466		234	234	585	234	468		574	574	1,435	574	1,148
4. Materials		26	26	65	26	52		30	30	75	30	60		121	121	303	121	242		122	122	303	121	243		299	299	745	298	597
5. Construction Materials		55	55	138	55	110		63	63	158	63	126		255	255	638	255	510		254	254	635	254	508		627	627	1,568	627	1,254
6. Fuel and Lubricants				165	66	66				189	75	75				763	305	305				763	305	305				1,878	751	751
7. Spare Parts	25		25	63	25	50	28		28	70	28	56	115		115	288	115	230	116		116	290	116	232	284		284	713	284	569
8. Tires and Tubes	11		11	28	11	22	13		13	33	13	26	52		52	130	52	104	52		52	133	53	105	128		128	323	129	257
9. Inflation								62	62	155	62	124		254	254	635	254	509		254	254	633	253	507		570	570	1,423	569	1,139
10. Tax				46	19	19				75	30	30				305	122	122				305	122	122				733	293	293
11. Contingencies	4	15	19	473	190	209	5	20	25	475	190	215	10	99	109	475	190	299	10	99	109	478	191	300	29	233	262	1,905	761	1,023
Sub-Total	40	448	488	2,033	813	1,301	46	577	623	2,430	972	1,395	177	2,341	2,518	8,433	3,373	5,911	178	2,343	2,541	8,438	3,375	5,916	441	5,749	6,190	21,333	8,532	14,725
TOTAL $	2,743	492	3,231	2,090	836	4,067	46	577	623	2,430	972	1,395	177	2,341	2,518	8,433	3,373	5,911	178	2,343	2,541	8,438	3,375	5,916	3,144	5,789	8,933	21,333	8,556	17,491

* Estimated exchange rate B 2.50 = $ 1.00

** The total amount of AID Loan Funds for this Access Roads Activity is $ 8,933,556.00

TABLE No. 17-B

ANNUAL PROJECTION OF EXPENDITURES FOR ACCESS ROADS MAINTENANCE ACTIVITY

CONCEPT	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOS COUNTERPART		TOTAL	AID FUNDS			GOS COUNTERPART		TOTAL	AID FUNDS			GOS COUNTERPART		TOTAL	AID FUNDS			GOS COUNTERPART		TOTAL	AID FUNDS			GOS COUNTERPART		TOTAL
	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$
A. COST OF COSTS																														
1. Heavy Equipment and Vehicles	1,518		1,518			1,518																			1,518		1,518			1,518
2. Maintenance and Repair Shop Equipment	70		70			70																			70		70			70
3. Inflation	159		159			159																			159		159			159
4. Contingencies	175		175			175																			175		175			175
Sub-Total	1,922	0	1,922	0	0	1,922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,922	0	1,922	0	0	1,922
B. OPERATING COSTS AND EXPENSES																														
1. Administration				310	124	124				310	124	124				310	124	124				310	124	124				1,240	496	496
2. Unskilled Labor						0		123	123	308	123	246		151	151	378	151	302		186	186	465	186	372		460	460	1,159	460	920
3. Skilled Labor						0		22	22	55	22	44		26	26	65	26	52		33	33	83	33	66		81	81	203	81	162
4. Materials						0		77	77	193	77	154		94	94	235	94	188		99	99	245	99	198		270	270	675	270	540
5. Construction Materials						0		86	86	215	86	172		105	105	263	105	210		133	133	335	134	267		324	324	813	325	649
6. Fuel and Lubricants						0				603	241	241				603	241	241				603	241	241				1,508	723	723
7. Spare Parts						0	50		50	125	50	100	51		51	129	51	102	51		51	129	51	102	152		152	360	152	304
8. Tires and Tubes						0	24		24	60	24	48	24		24	60	24	48	24		24	63	25	49	72		72	183	73	145
9. Inflation						0	10	21	31	78	31	62	19	45	50	125	50	100	19	45	75	188	75	150	38	126	156	390	156	312
10 [illegible]						0				95	38	38				113	45	45				138	55	55				345	138	138
11 Contingencies				38	12	12	8	45	53	202	81	132	8	47	55	229	91	146	8	49	57	258	103	160	24	139	163	718	287	450
Sub-Total	0	0	0	348	136	136	92	372	464	2,243	897	1,361	93	463	556	2,305	1,002	1,556	93	545	638	2,815	1,126	1,784	278	1,400	1,678	7,903	3,161	4,839
TOTAL	1,922	0	1,922	348	136	2,058	92	372	464	2,243	897	1,361	93	463	556	2,305	1,002	1,558	93	545	638	2,815	1,126	1,784	2,200	1,400	3,600	7,903	3,161	4,761

II. TERTIARY ROADS COMPONENT

A. Introduction

One of the main constraints to improving the income and productivity of the Guatemalan rural population has been the lack of an adequate transportation system. While considerable investments have been made by the GOG for transportation infrastructure in the last two decades, most of the funds have been applied to the upgrading and paving of the primary and secondary roads that connects the main population centers. However, they are not supported by a dependable tertiary road system that connects to the farm-to-market road system. Poor roads also increase vehicle maintenance costs and lengthen transport time for buses and trucks using the tertiary roads.

A tertiary roads project was requested by the Ministry of Public Works in May 1986. The request resulted in a series of meetings between representatives of the DGC and the AID project engineer responsible for road construction activities. During these meetings two major needs were identified: 1) upgrading tertiary roads, and; 2) taking steps to assure maximum impact on agricultural production, by coordinating with GOG/Ministry of Agriculture and the AID financed agriculture oriented projects to tie-in road upgrading to actual and potential agricultural activities.

The tertiary roads to be improved under the proposed project amendment will provide the link between the farmers and the markets and services they require to improve the production system and quality of their lives.

This proposed pilot component contemplates the improvement of approximately 240 kms. of tertiary roads in the area of the AID-financed Farm-to-Market Access Roads project 520-0332.

This pilot project has been designed to benefit small farmers living in the area of influence on the farm-to-market access roads as well as those residents living along the tertiary roads.

While the improvement of the rural tertiary road network is not itself sufficient to increase production and net income, it is a necessary element and will contribute towards these objectives in several ways:

1. Improve farmer's access to and the availability of necessary agricultural inputs;

2. Reduce unit transportation costs associated with crop inputs and market-oriented production;

3. Increase short-term employment opportunities and cash incomes for landless and needy rural poor through participation in labor-intensive tertiary road program.

Additionally, living standards of the target group will be enhanced by improving access to health, education and agricultural extension services. Other benefits include increased production of high value crops and improved regional mobility of labor resources leading to more productive utilization of the farm labor force.

B. Design Standards

DGC as the GOG implementing unit in charge of constructing all roads in Guatemala has established simple, acceptable, all weather design standards for the tertiary roads. Specific dimensions and specifications are contained in Exhibit 14 of this Annex.

They provide for an axle load of 10 short tons, the heaviest expected on the road in the foreseeable future.

The standards call for a 25 meter wide right-of-way on which a 6.00 meter two lane all-weather road bed will be laid over an improved subgrade. The extra right of way width is required for the road platform , ditches, and provisions for future improvement to higher standards.

There will be a limited use of bridges. In all other cases streambed crossings are to be provided by masonry culverts. Considering that roads already exist, small bridges in the majority of the cases will be required or improved. These works will be masonry made except the slab, which, when needed, would not exceed 15 mts. long.

The basic alignment of the present roads will be followed. Cuts and fills will be held to a minimum. Final alignment of new realigned segments, when needed, will take into account cost, population served, environmental impact and future improvement requirements.

Drainage will be provided by means of side ditches with frequent ditch-turnouts and transverse drainage by metal or concrete pipe and box culverts as required to accommodate projected storm drainage runoff.

Detailed Tertiary Road Improvement Standards

Right of Way:	25 meters
Roadbed:	6.00 meters
Shoulders:	None, except in the case of new construction, when 0.5 mts shoulders will be provided.
Surface:	15 cms. of compacted granular material or river grave graded to 100%, passing 3" screen.
Side Slopes:	Maximum of 1:1 cut, 1-1/2:1 on fill, with flatter slopes where field soil considerations indicate.
Grades:	Maximum of 14% with 16% allowable along selected short sections.
Crown:	The roadbed and surface along tangents will be crowned and horizontal curves super elevated to a cross slope of 3%.
Alignment:	Follow existing alignment as practicable for minimum earth movement and maintain a minimum radios of horizontal curvature of 40 meters.
Compacting of road:	95% Field Density - modified proctor.
Side Ditches:	Minimum of 0.30 mts. deep, 0.50 wide at top, sloped for drainage on flat road grades.
Culverts:	Corrugated metal or concrete pipes, min. 60 cm. diam, with box and headwalls. Also masonry for large culverts will be used.
Bridges:	As needed, will range from single lane concrete bridges 15 mts. long; cyclopean concrete abutments and concrete beams and slab.

GOG/DGC Highway Design Standards

The following design standards have been developed:

	Tertiary Roads
Vehicles per day	50
Design Velocity - Km/h	
Flat terrain	50
Rolling terrain	40
Mountainous terrain	30
Minimum Radios - Mts.	
Flat terrain	75
Rolling terrain	47
Mountainous terrain	30
Maximum Grades - Mts.	
Flat terrain	10
Rolling terrain	12
Mountainous terrain	14
Sections - Meters	
Right of Way Width	25
Sub Grade Width	9
Roadway Width	6.0

C. Construction Methods

The work will include the upgrading or improving of selected existing dirt routes to all weather standards of the Guatemalan Directorate of Roads. The type of road to be improved corresponds to badly deteriorated gravel-surfaced roads. Approximately 240 kms. of tertiary roads are projected for upgrading or improving by the end of the life of the project. In line with the current GOG policy labor intensive techniques will be emphasized and local construction materials utilized to the maximum extent possible for the following tasks:

Clearing and grubbing
Earthwork of less than 1,000 cub. mts. per km. in soft soils
Shaping of side ditches cut rough by heavy equipment in hard soils
Excavation for transveral drainage
Construction of culverts
Construction of culverts headwalls made of masonry and cyclopen concrete
Building or repair of small bridges

Given the DGC's previous experience on labor intensive use techniques under the Farm to Market Access Roads (Project 520-0332) the Rural Roads Program of DGC will implement this component and will inspect to assure the quality of work. They will also ensure that labor intensive methods are utilized to the extend possible. The Mission will also closely monitor this aspect during field visits. Considering the large area of the Farm-to-Market Access Roads a mobile unit will be established within the Program to carry out the upgrading or improving of 60 km per year activities of the tertiary roads. The regional offices of the Rural Roads Program will provide the mobile unit with space and maintenance workshop support for the time the unit is working in the correspondent area of influence.

Similar to the regional offices of the Rural Roads Program an engineer/administrator (See table 5 of the Administrative Analysis,) with a small technical and administrative staff will be responsible for implementing the mobile unit's activities under the Program's Coordinator Management which will be assisted by an engineering Assistant assigned to the Coordinator for this pilot component. GOG/DGC supervising and engineering staff are generally capable and receptive to new ideas.

Complementing this effort, heavy equipment will perform scarification, grading, compaction along the road segment and major earthmoving in sections where new realignment is required.

Projects will be selected in target areas with high agricultural potential identified by DIGESA, DGC and AID.

In addition, the vast majority of the project's benefits depend upon accessibility to the farmer and therefore priority should be given to providing access to as large a number of farmers as possible.

In accordance with the accessibility and population indexes data gathered at the Planning Office of DGC, an average of 1030 inhabitants are benefited per kilometer of tertiary road. During the life of project 240 kms of roads will be upgraded and about 37,000 small farmers families (247,200 inhabitants) will benefit (6.6 persons per family). Of these approximately 8000 families will receive direct benefit from their participation on road activities . Also, about 90,000 has. are expected to be favored with agricultural infrastructure and product diversification projects. Secondary beneficiaries will be those small farmers living along the access roads converging on any tertiary road segment (400 inhabitants per km of access road).

The GOG fully supports the application of labor intensive techniques not only to assure the regular construction and maintenance of access roads but to create additional rural employment opportunities and increase the involvement of local communities and their commitment to the public infrastructure program in rural road construction or improvement and maintenance.

D. Costs

Construction Materials: corresponds to the cost of those construction materials (cement, lime, steel reinforced bars tie wire, corrugated metal or concrete pipes) needed to build the road infrastructure and drainage. Also materials for road signs have been included. Local materials such as sand, gravel, wood, water will be provided by the communities. Table XXI shows the cost per km as well as the cost per year.

Administration: includes the administrative cost for the work performed by the central and field personnel of DGC/PCR from the time upgrading or improvement starts until the tertiary road is completed and received by the Maintenance Division of DGC for later maintenance work. Table XXII details the Cost per year based on the personnel indicated in the administrative analysis for this component.

Unskilled-skilled labor: unskilled labor includes the cost paid to small farmers within the area of influence of the road based on work performed, in accordance with the tasks as indicated in Section C, Construction Methods. Skilled labor includes the cost paid to skilled personnel (mainly masons) hired or contracted by DGC under payroll or contract to construct road infrastructure such as bridges, culverts and transversal drainage with the support of unskilled labor. See table XXIII.

Handtools: corresponds to the costs of handtools utilized by unskilled and skilled labor based on the 5 man crew system and its useful life as described in Tables XXIV and XXV, handtools requirements.

Spare Parts: corresponds to the costs of the spare parts purchased to provide preventive and corrective maintenance to heavy equipment, dump trucks, pick-up trucks and light equipment. See table XXVI.

Fuels and Lubricants: includes the costs of gasoline, diesel, oil, grease needed for the operation and maintenance of heavy equipment, dump trucks, pick-up trucks and light equipment. See tables XXVII through XXXVI.

Table XXI

Costos de Materiales de Construcción
Construction Materials Costs

Año/ Year	Costo/Km. Cost/Km. Q	Km./Año Km./Year	Costo/Año Cost/Year Q	=	$	Con Inflación/ With Inflation Q	Inflación/Inflation 10% Q	=	$	IVA 7% Q	=	$
1988	8,726	60	523,560		209,424	523,560	-		-	36,649		14,660
1989	8,726	60	523,560		209,424	575,916	52,356		20,942	40,314		16,126
1990	8,726	60	523,560		209,424	633,508	109,948		43,979	44,346		17,738
1991	8,726	60	523,560		209,424	696,858	173,298		69,319	48,780		19,512
TOTAL			Q 2,094,240		$ 837,696-	Q 335,602	$ 134,241		Q 170,089	$ 68,036		

Tasa de Cambio Estimada/Estimated Exchange Rate: Q2.50=US$1.00

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Tires and tubes: corresponds to the costs of tires and tubes for heavy equipment, dump trucks and vehicles. See tables XLI through XLIV.

Even though, a significant portion of the upgrading work must be done by heavy equipment, the extensive use of unskilled labor and equipment will keep the operating costs low. In fact, this labor and equipment mix is clearly feasible given the large concentrated labor existing in the rural areas of Guatemala.

The use of a paid labor force will complement efforts to achieve the project goal as well as benefit the unemployed. 2,965 man-days per kilometer per year are required to perform the different tertiary roads upgrading activities. Using the criteria that each laborer will supply 22 days per month of work the tertiary roads component will provide 32,345 man-months (2965/22 x 240) for upgrading. Due to their agricultural activities it has been estimated that each worker will participate approximately three months per year in road upgrading activities. Taking into account that the average daily earning reported by DGC is 5.56 Quetzales for labor, each worker involved in the program can anticipate annual income of 366 Quetzales (3 month x 22 days x 5.56). This level of effort, provided by the skilled-unskilled labor from the communities will generate a total of Q3,956,496 ($1,582,600) in income for the participants, as shown in Table XXIII.

Hiring unskilled labor will be carefully tied to the road's area of influence and will for the most part be made up of small farmers. Thus, much of the income derived from construction will be channeled back to the small farmers to increase their capital base which in turn will assist them in increasing farm production once the roads are upgraded.

Table XXII

Costos Administrativos
Administrative Costs

Año/ Year	Costo/Año Cost Year	% Incremento Salarial Promedio Average Salary Increase %	Costo/año, actualizado Updated Cost year	
Q			Q =	$
1988	258,178	25%	322,722	129,089
1989	258,178	-	322,722	129,089
1990	258,178	-	322,722	129,089
1991	258,178	-	322,722	129,089
Total			Q1,290,888	$516,356

Estimated exchange rate/Tasa estimada de Cambio: Q2.50=$1.00.

Table XXIII

Costo de Mano de Obra no Especializada - Especializada
Unskilled-Skilled Labor Costs

Año/ Year	Km./Año Km./Year	Hombres/día/Km. Man-day/Km	Costo/Día Cost/day Q	Costo Año/Cost Year Q	= $
1988	60	2,965	5.56	989,124	395,650
1989	60	2,965	5.56	989,124	395,650
1990	60	2,965	5.56	989,124	395,650
1991	60	2,965	5.56	989,124	395,650
Total				Q 3, 956,496	$ 1,582,600

A 15% of the total cost of unskilled-skilled labor corresponds to skilled labor Q593,475 ($237,390).

Estimated exchange rate/Tasa de cambio estimada: Q 2.50=$1.00.

Handtools Requirements

DGC's experience with labor-intensive road construction under the previous AID Small Farmer Development Project No. 520-0233 and the ongoing Farm to Market Access Roads Project No. 520-0332 indicates that the most effective use of unskilled labor is obtained by 5-men crews working in earthmoving sections of 20 mts. each and in stone collection for masonry infrastructure. Handtools per Km. required for each activity where labor will be mainly utilized is detailed in table XXIV and the cost per year in table XXV.

Heavy Equipment

The list of heavy equipment detailed in Table XXVI is the result of an analysis made by the Mission engineers and the Coordinator of the Program based on the tertiary roads of works requirements to comply the target of 60 kms of road per year.

Crawler tractors and front end loaders are considered to perform the cutting and loading work in the bank of selected materials for surfacing the road section and earthmoving in new alignments when needed. Motorgraders and compactors will scarify, grade and compact the road bed using the selected material hauled by dump trucks. Water tanks will provide water to maintain the soil humidity during compacting. The low bed truck will be used to transport the heavy equipment for one work front to the next one. The

mobilization of technical personnel and materials to the work fronts and the supplying of materials from the Coordinator Office justifies the use of stake-body and pick-up trucks. The light equipment (concrete mixers, welders, compressor, chainsaw, vibrators water pumps) will support the specialized labor in carrying out the infraestructure construction activity of the main and secondary drainages.

TABLE XXIV

Requerimientos de Herramienta/
Handtools Requirements - Tertiary Roads

	Tuberias de metal o concreto/Metal or concrete pipes	Puentes/ Bridges	Bóvedas /Large Culverts	Muros /Masonry Walls	Señalización/ Road signalization	Limpia y chapeo/ clearing and Grubbing	Afilado tanudes recubrimiento grama/ Slope finishing and grass Covering	Conformación de cunetas/ shaping of Ditches	Movi-Movimiento de tierras/ Earth-Moving	Cantidad por Km./ Quantity per Km.	Factor renovación cada seis Kms./ Replacement every six Kms.	Cantidad cada seis Kms./ Quantity every six Kms.	No. reemplazos por año/ Times renovation per year	Cantidad por año/ Quantity per year	Precio Unitario/ Unit Price (Q)	Costo por año/ Cost per Year (Q)
Palas/Shovels	76	9	28	4	2	10	20	15	10	174	2.0	348	10	3480	15	52200
Piochas/Mattocks	76	9	28	4	2	10	20	15	10	174	2.0	348	10	3480	13	45240
Azadones/Hoes	76	9	28	4	2	10	20	15	10	174	2.0	348	10	3480	13	45240
Cubetas/Buckets	30	4	12	2	2	2	8	6	4	70	2.0	140	10	1400	10	14000
Machetes/Machetes	30	4	12	2	2	10	20	15	4	99	1.0	99	10	990	10	9900
Carretas/Wheelbarrows	30	4	12	2	2	4	8	6	4	72	2.0	144	10	1440	90	129600
Barretas/Bars	15	4	12	2	2	1	-	-	4	40	1.5	60	10	600	15	9000
Puntas/Wedges	-	4	6	-	-	-	-	15	4	29	2.0	58	10	580	8	4640
Almadanas/Hammers	-	4	6	-	2	-	-	15	4	31	1.5	47	10	470	10	4700
													Total			Q 314,520

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Table XXV

Costo de Herramienta/Handtools Cost

Año/ Year	Costo por año Cost Per Year Q	=	$	Con Inflación/With Inflation Q	Inflación/Inflation 10% Q	=	$	IVA 7% Q	=	$
1988	314,520		125,808	314,520	-			22,016		8,806
1989	314,520		125,808	345,972	31,452		12,580	24,218		9,687
1990	314,520		125,808	380,569	66,049		26,420	26,640		10,656
1991	314,520		125,808	418,626	104,106		41,642	29,304		11,722
	Q 1,258,080		$ 503,232		Q 201,605		$ 80,642	Q 102,178		$ 40,871

Tasa de cambio estimada/Estimated exchange rate: Q 2.50=$1.00.

Table XXVI

Heavy Equipment for the
Tertiary Roads Pilot Component

Componente de Caminos Terciarios/
Tertiary Roads Component

Equipo Pesado Básico/
Heavy Equipment (Basic)

	DESCRIPCION/DESCRIPTION	CANTIDAD/ QUANTITY	PRECIO UNITARIO/ UNIT PRICE	TOTAL/ TOTAL
a.	Tractor de Oruga/ Granter tractor, 140 HP	2	$170,000	$340,000
b.	Cargador Frontal/Front End Loader, 85 HP	2	72,000	144,000
c.	Motoniveladoras/ Motorgraders, 125 HP	2	99,000	198,000
d.	Compactadoras Autopropulsadoras/ Selfpropelled Compactors, 70 HP	2	80,000	160,000
e.	Retroexcavadoras/Front End Loader/Backhoe, 80 HP	1	45,000	45,000
f.	Camiones de Volteo/Dump Trucks, 5 M^3	12	36,000	432,000
g.	Camiones Regadores de Agua/ Water Tank Trucks, 8000 Lts.	2	45,000	90,000
h.	Pickups/Pick-up trucks 4 x 4 - 1 Ton.	3	14,000	42,000
i.	Camion Para Combustibles y Lubricación/Truck Mounted Heavy Duty Lube system, 125 HP	1	45,000	45,000
j.	Camiones de Estaca/Stack Trucks, 6 Ton.	2	35,000	70,000
k.	Cabezal con Plataforma/Road Truck with Low Boy Trailer, 345 HP	1	75,000	75,000

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	DESCRIPCION/DESCRIPTION	CANTIDAD/ QUANTITY	PRECIO UNITARIO/ UNIT PRICE	TOTAL/ TOTAL
l.	Compresores de Aire/Air Compressors, 300 CFM	1	30,000	30,000
m.	Mezcladores de Concreto/ Concrete Mixers	1	3,000	3,000
n.	Soldadoras Eléctricas/ Electric Welders	1	6,000	6,000
o.	Equipo de Oxi-Acetileno/ Oxi-Acetylene Equipment	1	1,500	1,500
	SUB-TOTAL			$1,681,500
	Inflation 10%			168,150
	Spare parts 20% of Heavy Equipment			336,300
	Inflation 10%			33,630

Equipo Pesado Adicional Para Mantenimiento/Additional H.P. for Maintenance

a.	Motoniveladoras/Motorgrader, 125 HP	1	$99,000	99,000
b.	Compactadora/Compactor, 70 HP	1	80,000	80,000
c.	Camión Regador de Agua/ Water Tank Truck	1	45,000	45,000
	SUB TOTAL			$ 224,000
	Inflation 10%			22,400
	Spare parts 20% of Heavy Equipment			44,800
	Inflation 10%			4,480

Additional minimum heavy equipment has been included to provide the División de Mantenimeinto of DGC with the necessary units to provide resource the improved or upgraded tertiary roads segments for the grading maintenance.

E. Tertiary Roads Selection Criteria

Selection Committee

As indicated in the Administrative Analysis the Dirección General de Caminos, DGC, is responsible for the planning, design, construction and maintenance of all national roads and bridges in Guatemala. The Planning Section of DGC will to chair the Selection Committee for the tertiary roads component. The Committee will comprise representatives of DGC (Ministry of Communications Transportation and Public Works) DIGESA and INAFOR (Ministry of Agriculture), AID's Project Engineer and the Agriculture Project Officer. This Committee will be responsible for final review and approval of the potential tertiary roads segments proposed by the Rural Roads program of DGC to be considered for project implementation.

For purpose of this pilot component DGC has proposed tertiary roads segmets for the first year of project implementation as follows:

TERTIARY ROAD SEGMENT	DEPARTMENT	LENGHT
1. San Lorenzo-Comitancillo	San Marcos	12.9 kms.
2. San Marcos-Tejutla	San Marcos	30.3 kms.
3. Momostenango-San Fco. El Alto	Totonicapán	15.5 kms.
4. Totonicapán-Sta. Cruz El Quiché	Totonicapán-Quiché	44.1 kms.
5. Cruce Ruta Nacional 9N (Km. 289.8)-San Martín Cuchumatán	Huehuetenango	36.0 kms.
6. Entronque (Momostenango-San Fco. El Alto)-Sta. María Chiquimula	Totonicapán	17.1 kms.

The Committee will be located at DGC. The Head of the Planning Section and the Coordinator of the Rural Road Program, both of DGC, will serve on the staff level. Other DGC personnel will provide support. The Ministry of Agriculture will designate one representative each (professional agronomist/economist) from the Dirección General de Servicios Agrícolas DIGESA and from the Instituto Nacional Forestal, INAFOR, to participate at the staff level.

The Rural Roads Program will provide information from the Farm-to-Market Roads (location, area of influence, No. of roads connecting to the proposed project, inhabitants per access road, agriculture production area and other derived from the socio-economic survey). DIGESA and INAFOR will identify the agricultural areas of high potential production for the proposed roads segments.

The staff will be responsible for reviewing road proposals against selection criteria, overseeing the road surveys, and making recommendations to the Selection Committee.

The Planning Section of DGC will assist the tertiary roads mobile unit of the Rural Roads Program to carry out the surveys by providing, on and as needed basis, an engineer and agronomist who are familiar with the area where the proposed road is located.

After a road is approved, it is placed on a prioritized list according to its benefit-cost ratio. The roads selected will form the upgrading plan for the year and must be approved by AID. Any changes in the list must also be approved by AID.

The Mission believes that with the above arrangements, all aspects of the selection process can be carried-out. Environmental technical assistance and training will be provided by AID to assist in developing and upgrading methods that mitigate negative environmental impacts. Taking into account the past and present experience of DGC with AID financed projects, the Mission also feels that DGC has the personnel and capacity to play an effective role in this program component.

The tertiary roads will be selected from eligible projects according to the priorities described below.

a. Relatively High Population Areas: the highest agricultural production areas with the highest small farmers population density will be given higher priority.

b. Strength of Community Organization: Since the tertiary roads upgrading will be performed with a mix of labor and heavy equipment, the organization of the communities along the road segments is one of the most important stages before upgrading starts. The communities considered by the engineer and social worker to be most organized and largest organizations, will be given higher consideration for roads.

c. Linkage to Market Centers: Higher priority will be given to road sections necessary to establish links from other communities, by the Farm-to-Market Access Roads which would be otherwise able to participate in the project.

d. Land Tenure

High priority will be given to land tenure in the area of influence favorable to the highest small farmer population.

e. Gross Income

A minimum level of farm production on a gross basis of at least Q700.00 per year per hectare valued at farm-gate prices, will be

considered necessary to ensure that the tertiary roads are being used to a significant extent and that potential exists for increasing farm productivity and diversification cropping patterns where additional income or efficiencies can be gained or increased. High priority will be given to this aspect.

f. Cost per kilometer

A lower cost per kilometer of upgrading road segment will be favored. This helps to spread the benefits of the project broadly and provides incentive to communities to contribute labor and materials voluntary as well as to improve the priority ranking of their project.

g. Benefit-Cost Analysis

Cost benefit analysis will be developed by DGC and utilized as a factor in the tertiary roads prioritization. In project purposes the tertiary roads must have a Benefit-Cost ratio greater than 1.0.

Table XXVII

Costos de Operación/Operational Costs

Combustibles para Equipo Pesado/Fuel for Heavy Equipment

Tractor de Oruga/Crawler Tractor

Cantidad/Quantity = 2 unidades/2 units

Rendimiento Diario = 350 M^3/tractor
/Efficiency

Volumen/año/Volume/Year = 2x990 M^3/km x 60 km/año = 118,800 m^3

Tiempo/time = $\frac{118,800}{350 \times 2}$ = 170 días/days

Consumo diario/Daily Consume = 7 gls. diesel/h x 8h = 56 gls.

Consumo/año/Consume/year = 170 x 56 x 2 = 19,000 gls./año/2 tractores/gls./Year/2 tractors

Costo/año/Cost/year = 19,000 gls. x Q1.68/gl. = Q31,920

Factor de inflación/año/Inflation factor/year = 10%

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	1.68	19,000	31,920	31,920	--	--
1989	1.68	19,000	31,920	35,112	3,192	1,276
1990	1.68	19,000	31,920	38,623	6,703	2,681
1991	1.68	19,000	31,920	42,485	10,565	4,226
Total			Q 127,680	Q 148,140	Q 20,460	$ 8,184

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50= $1.00

Table XXVIII

Cargador Frontal/Front End Loader

Cantidad/Quantity = 2 unidad/unit

Rendimiento diario/Daily Efficiency = 350 M^3/día/day

Volumen/año = 59,000 M^3

Tiempo = 170 días/máquina (día = 6 horas máq. efectivo)/days/unit (day=6 hours, effective)

Consumo diario/Daily consume = 2 gls. diesel/h x 8h/día/day = 16 gls./día/gls./day

Consumo por año/consume per year = 170 x 16 x 2 = 5,440 gls./año/gls./year

Factor de inflación/año/Inflation factor/yr = 10%

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	1.68	5,440	9,139	9,139	-	-
1989	1.68	5,440	9,139	10,053	914	366
1990	1.68	5,440	9,139	11,058	1,919	768
1991	1.68	5,440	9,139	12,164	3,025	1,210
Total			Q 36,556		Q 5,858	$2,344

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50= $1.00

Table XXIX

Motoniveladora/Motorgrader

Cantidad/Quantity = 2 unidades/2 units

Rendimiento/Efficiency = 350 M^3/día/day

Volumen/año/Volume/year = 118,800 M^3

Tiempo/time = 186 días máquina/days/unit (1 día/day = 6 h maq. efectivo/6h/unit, effective)

Consumo diario/daily consume = 5 gls. diesel/h x 8 h/día/day = 40 gls./día/day

Consumo/año/consume/year = 170 x 40 x 2 = 13,600 gls./año/gls./year

Factor de inflación/año/Inflation factor/year = 10%

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	1.68	13,600	22,848	22,848	--	--
1989	1.68	13,600	22,848	25,132	2,284	914
1990	1.68	13,600	22,848	27,646	4,798	1,909
1991	1.68	13,600	22,848	30,411	7,563	3,025
Total			Q 91,392	Q 106,037	Q 14,645	$ 5,858

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50 = $1.00

Table XXX

Compactadoras/Compactors

Cantidad/Quantity = 2

Velocidad/Speed = 4 km/h

Tiempo efectivo/Effective time = (3 h maq./día efectivo) 93 días máq./days unit

Consumo diario/Daily consume = 30 gls. diesel/día/day

Consumo/año/Consume/year = 93 x 30 x 2 = 5,580 gls./año/year

Factor de Inflación/Inflation Factor = 10%/año/year

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	1.68	5,580	9,374	9,374	--	--
1989	1.68	5,580	9,374	10,311	937	375
1990	1.68	5,580	9,374	11,343	1,969	788
1991	1.68	5,580	9,374	12,477	3,103	1,241
Total			Q 37,496	Q 43,505	Q 6,009	$ 2,404

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50 = $1.00

Table XXXI

Retroexcavadoras/Front End loader/Backhoe

Cantidad/Quantity = 1

Consumo diario de diesel/Diesel Daily Consume = 24 gls.

Consumo anual/Consume/year = 170 x 24 x 1 = 4,030 gls./año/year

Factor de Inflación/Inflation factor - 10%

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	1.68	4,080	6,720	6,720	--	--
1989	1.68	4,080	6,720	7,392	672	269
1990	1.68	4,080	6,720	8,131	1,411	564
1991	1.68	4,080	6,720	8,944	2,224	890
Total			Q 26,880	Q 31,187	Q 4,307	$ 1,723

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50= $1.00

Table XXXII

Costos de Operación del Equipo Adicional
Para Mantenimiento/
Operational Costs for the Additional Equipment
For Maintenance

Combustible/Fuel

Motoniveladora/Motorgrader

Cantidad/Quantity = 1 unidad/unit

Rendimiento/Efficiency = 350 M^3/día/day

Volumen/año/Volume/year = 195,000 M^3

Tiempo/Time = 186 días máquina/days/unit (1 día= 6 h. máquina efectivas/h/unit, effective)

Consumo diario/Daily consume = 40 gls/día/day

Consumo por año/Consume/year = 186x40x1= 7,440 gls/año/year

Factor de Inflación/Inflation Factor = 10%

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	-	-	-	-	-	-
1989	1.68	7,440	12,499	13,749	1,250	500
1990	1.68	7,440	12,499	15,124	2,625	1,050
1991	1.68	7,440	12,499	16,636	4,137	1,655
Total			Q 37,497	Q 45,509	Q 8,012	$ 3,205

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50 = US$1.00

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Table XXXIII

Compactadoras/Compactors

Cantidad/Quantity = 1

Velocidad/Speed = 4 Km/h

Tiempo efectivo/Effective time = (3h maq/día efec) 93 días maq/Days unit

Consumo diario/Daily consume = 30 gls diesel/día/day

Consumo/año/Consume/Year = 93x30x1= 2790 gls/año/year

Factor de inflación/Inflation factor = 10%

Año/ Year	Precio Unitario Unit Price Q/gl.	gls/año gls/year	Costo/ Q/año/ Cost/year	Costo con Inflación/Cost with Inflation	Inflación/ Inflation Q	= $
1988	-	-	-	-	-	-
1989	1.68	2,790	4,687	5.156	469	188
1990	1.68	2,790	4,687	5,671	984	394
1991	1.68	2,790	4,687	6,238	1,551	620
Total			Q 14,061	Q 17,065	Q 3,004	$ 1,201

Tasa de Cambio Estimada/Estimated Exchange Rate: Q 2.50 = US$1.00

TABLE XXXIV

Resumen: Costo de Combustible/Summary: Cost of Fuel

Equipo Pesado Esencial/Basic Heavy Equipment

Año/ Year	Tractor de Oruga/Crau-ler Tractor Q	Cargador Fron tal/Front End Loader Q	Motonivela dora/Motor Grader Q	Compactadoras/ Compactors Q	Retroexcavado ras/Front End Loader Backhoe Q	Total/ Total Q =	$	Inflación/ Inflation Q =	$
1988	31,920	9,139	22,848	9,374	6,720	80,000	32,000	—	—
1989	31,920	9,139	22,848	9,374	6,720	80,000	32,000	8,000	3,200
1990	31,920	9,139	22,848	9,374	6,720	80,000	32,000	16,800	7,720
1991	31,920	9,139	22,848	9,374	6,720	80,000	32,000	26,480	10,592
Total	Q 127,680	Q 36,556	Q 91,392	Q 37,496	Q 26,880	Q 320,000	$ 128,000	Q 51,280	$ 20,512

Tasa de Cambio Estimada/Estimated Exchange Rate Q.2.50 = $1.00

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Table XXXV

Combustible Diesel para Camiones, Vehículos y Equipo Liviano
Fuel (diesel) for Trucks, Vehicles and Light Equipment

	Recorrido Anual/Annaul Mileage Kms.	Consumo/ Consume Km/gl	Unidades/ Units	Consumo Anual/Annual/Consume Gls	Precio Unitario/Unit Price Q/gl	Costo Total Anual/Total Annual Cost Q
Esencial/Basic						
Camiones de Volteo/Dump Trucks	60,000	12	12	60,000	1.68	100,800
Camiones Regadores de Agua/ Water Tank Trucks	40,000	12	2	6,666	1.68	11,199
Camiones de Estaca/Stack Trucks	40,000	12	2	6,666	1.68	11,199
Camiones Comb. y Lubricantes/ Trucks mounted H.D. Lube System	30,000	12	1	2,500	1.68	4,200
Pick-Up/Pick-Up Truck	50,000	15	3	9,999	1.68	16,798
Cabezal/Road Truck w/L.B. Trailer	40,000	12	1	3,333	1.68	5,599
Equipo liviano/(compresores, mezcladoras de concreto, soldadoras y eléctricas); se ha estimado un consumo equivalente en gls. de diesel por año/Light Equipment (compresors, concrete mixed electric welders) An equivalent consume of diesel in gls. per year have been estimated	-	-	-	1,500	1.68	2,520
Total						Q 152,315

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Table XXXVI

Resumen: Combustibles para Camiones, Vehículos y Equipo Liviano
Summary: Fuel for Trucks, Vehicles and Light Equipment

Año/ Year	Camiones de Volteo/Dump Trucks Q	Regadores de Agua/Water Tank Trucks Q	Camión de Estaca/ Stack Truck Q	Camión Comb. y Lubric. Mounted Truck with H.D. Lube System Q	Pick-Up/ Pick-Up Truck Q	Cabezal/Road Truck w/L.B. Trailer Q	Equipo Liviano/Light Equipment Q	Costo Total por Año/Total Cost per Year Q	= $	Inflación 10%/ Inflation 10% Q	= $
Esencial/Basic											
1988	100,800	11,199	11,199	4,200	16,798	5,599	2,520	152,315	60,926	-	-
1989	100,800	11,199	11,199	4,200	16,798	5,599	2,520	152,315	60,926	15,231	6,092
1990	100,800	11,199	11,199	4,200	16,798	5,599	2,520	152,315	60,926	31,986	12,794
1991	100,800	11,199	11,199	4,200	16,798	5,599	2,520	152,315	60,926	50,416	20,166
Total								Q 609,260	$ 243,704	Q 97,633	$ 39,052

Tasa de Cambio Estimada/Estimated Exchange Rate: Q2.50 = $1.00.

8033C

Table XXXVII
Mantenimiento de Equipo Pesado/
Heavy Equipment Maintenance

Mantenimiento/Maintenance: Se considera como mantenimiento preventivo incluyendo lubricantes/Considered as preventive maintenance including lubricants

Equipo Pesado Esencial/Basic Heavy Equipment

Para el equipo pesado se considera como costo del mantenimiento por año igual al 75% de la depreciación anual del equipo/For heavy equipment, a 75% of the annual depreciation, is considered as the annual cost for maintenance

Depreciación anual/Annual Depreciation = 60% $\frac{\text{Valor del equipo/Cost of Equipment}}{\text{vida útil/Useful life}}$

La vida útil del equipo se ha considerado igual 5 años/The useful life of the equipment has been considered to be 5 years

Factor de Inflación/año/Inflation Factor/Year = 10%

Equipo/ Equipment	Costo del Equipo/Cost of Equipment $	Vida Util/ Useful Life	Depreciación/ Depreciation $	Costo Mantenimiento por Año/Maintenance Cost Per Year $	= Q
Tractores de Oruga/Crawler Trucks	340,000	5 años	68,000	51,000	127,500
Cargador Frontal/Front End Loader	144,000	5 años	17,280	12,960	32,400
Motoniveladora/Motor Grader	198,000	5 años	39,600	29,700	74,250
Compactadoras/Compactors	160,000	5 años	32,000	24,000	60,000
Retroexcavadoras/Front End Loaders/Backhoe	45,000	5 años	9,000	6,750	16,875
			$ 165,800	$ 124,410	Q 310,625

Tasa de Cambio Estimada/Estimated Exchange Rate=Q2.50=US$1.00
Costo Mantenimiento por año/Maintenance Cost per Year = Q305,625

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Año/Year	Costo Año/ Cost/Year Q		Con Inflación/ With Inflation 10% Q	Inflación/ Inflation 10% Q	$	IVA (7%) Q	$
1988	310,625	124,410	310,625	-	-	21,743	8,697
1989	310,625	124,410	341,687	31,062	12,425	23,918	9,567
1990	310,625	124,410	375,856	65,231	26,092	26,310	10,524
1991	310,625	124,410	413,442	102,817	41,127	28,940	11,576
Total	Q 1,242,500	$ 497,640		Q 199,110	$ 79,644	Q 100,911	$ 40,364

Tasa de Cambio Estimada/Estimated Exchange Rate=Q2.50=US$1.00

8034C

Table XXXVIII

Mantenimiento de Camiones, Vehículos y Equipo Liviano
Maintenance for Trucks, Vehicles and Light Equipment

Se estima que los camiones y vehículos recibirán servicio de mantenimiento cada 5,000 kms. de recorrido y el equipo liviano cada mes y medio/It is estimated that trucks and vehicles will receive maintenance every 5,000 kms. each and that light equipment every 1-1/2 months.

	Recorrido Anual/ Annual Mileage (Kms)	No. de Servicios/ No. of Services	Costo Unitario/Unit Cost (Q)	No. de Unidades/ No. of Units	Costo Anual/ Annual Cost (Q)
Esencial/Basic					
Camión de volteo/Dump trucks	60,000	12	450	12	64,800
Regadores de Agua/Water Tank Trucks	40,000	8	450	2	7,200
Camiones de Estaca/Stack Trucks	40,000	8	450	2	7,200
Pick-up/Pick-Up Truck	50,000	10	150	3	4,500
Camion de Combustible y Lubricantes/ Truck Mounted w/H.D. Tube System	30,000	6	450	1	2,700
Cabezal/Road Truck	40,000	8	600	1	4,800
Equipo Liviano/Light Equipment		8	150	4	4,800
Total					Q 96,400

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Table XXXIX

Costo de Mantenimiento de Camiones y Vehículos
Proyección Anual
Maintenance Cost of Trucks and Vehicles
Annual Projection

Año/Year	Costo por Año/ Cost per year Q	= $	Con Inflación/ With Inflation (10%)	Inflación/Inflation Q	= $	I V A Q	= $
Esencial/ Basic							
1988	96,400	38,560	96,400	—	—	6,748	2,699
1989	96,400	38,560	106,040	9,640	3,856	7,423	2,969
1990	96,400	38,560	116,644	20,244	8,098	8,165	3,266
1991	96,400	38,560	128,308	31,908	12,763	8,982	3,593
Total	Q 385,600	$154,240		Q 61,792	$ 24,717	Q 31,318	$ 12,527

Tasa de Cambio Estimada/Estimated Exchange Rate=Q2.50=US$1.00

8034C

Table XL

Costo de Llantas para Equipo Pesado y Equipo Liviano
Cost of Tires for Heavy and Light Equipment

	No. de Unidades/ No. of Units	No. de Llantas por Unidad/No. of tires per Unit	No. Total de Llantas/ Total No. of Tires	Costo por Llanta/Cost per Tire Q	Costo Anual/ Annual Cost Q
Equipo Esencial/Basic Equipment					
Cargador Frontal/Front End Loader	2	4	8	1,900	15,200
Motoniveladora/Motor grader	2	6	12	1,900	22,800
Compactadora/Compactor	2	2	4	1,900	7,600
Retroexcavadora/Front End Loader Backhoe	1	2	2	1,900	3,800
		2	2	400	800
Equipo Liviano/Light Equipment	4	2	8	400	3,200
TOTAL					Q 53,400

Se estima que el equipo pesado y liviano requerirá sólo de un cambio de llantas por año/It is estimated that the heavy and light equipment will require tires replacement only once a year.

8034C

Table XLI

Resumen de Costo Anual - Llantas para Equipo

Summary of Annual Cost - Tires for Equipment

Año/Year	Costo por Año/ Cost per year Q	=	$	Con Inflación/ With Inflation (10%)	Inflación/Inflation Q	=	$	I V A Q	$
Equipo Esencial/ Basic Equipment									
1988	53,400		21,360	53,400	-		-	3,738	1,495
1989	53,400		21,360	58,740	5,340		2,136	4,112	1,645
1990	53,400		21,360	64,614	11,214		4,486	4,523	1,809
1991	53,400		21,360	71,075	17,675		7,070	4,975	1,990
TOTAL	Q 213,600		$ 85,440		Q 34,229		$ 13,692	Q 17,348	$ 6,939

Tasa de Cambio Estimada/Estimated Exchange Rate=Q2.50=US$1.00

8034C

Table XLII

Costo de Llantas para Camiones y Vehículos
Cost of Tires for Trucks and Vehicles

	No. de Unidades/ No. of Units	No. de Llantas por Unidad/No. of Tires per Unit	No. Total de Llantas Total No. of Tires	Costo por Llanta/Cost Per Tire Q	Recorrido/Mileage Kms.	Reemplazo de Llantas/ Replacement of Tires Kms.	Factor de Reemplazo Año/ Annual Replacement Factor	Costo por Año/Cost per Year Q
Equipo Esencial/ Basic Equipment								
Camiones de Volteo/Dump Trucks	12	7	42	450	60,000	25,000	2.4	90,720
Camiones Regadores de Agua/ Water Tank Trucks	2	7	14	450	40,000	25,000	1.6	10,080
Pick-ups/Pick-up Trucks	3	5	15	300	50,000	30,000	1.7	7,650
Camión de Combustible y Lubricación/Truck Mounted with H.D. Tube System	1	7	7	450	30,000	75,000	1.2	3,780
Camiones de Estaca/Stack Trucks	2	7	7	450	40,000	25,000	1.6	10,080
Cabezal/Road Truck with Low Boy Trailer	1	22	22	450	40,000	25,000	1.6	15,840
TOTAL								Q 138,150

8034C

Table XLIII

Resumen: Costo Anual de Llantas para Camiones y Vehículos
Summary: Annual Cost of Tires for Trucks and Vehicles

Año/Year	Costo por Año / Cost per Year		Costo con Inflación Cost with Inflation	Inflación/ Inflation (10%)		I V A (7%)	
	Q =	$	Q	Q =	$	Q =	$
Equipo Esencial							
1988	138,150	55,500	138,150	-	-	9,670	3,868
1989	138,150	55,500	151,965	13,815	5,526	10,638	4,255
1990	138,150	55,500	167,162	29,011	11,604	11,701	4,680
1991	138,150	55,500	183,878	45,728	18,291	12,871	5,148
TOTAL	Q 552,600	$ 222,000		Q 88,554	$ 35,422	Q 44,880	$ 17,952

Tasa de Cambio Estimada/Estimated Exchange Rate=Q2.50=US$1.00

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Maintenance of Tertiary Roads

The Rural Roads Program of DGC provides maintenance to those access roads constructed within the area of influence the Farm-to-Market Roads Project. However, even though these access roads permit smooth transportation of farm to market products the connecting tertiary dirt roads within the Project lack continous maintenance due to the scarcity of heavy equipment at the GOG Roads Maintenance Division at DGC.

To solve this problem and considering the need to expedite the transportation of agricultural inputs and the marketing of small farmer products, the proposed Project Amendment will provide Heavy Equipment (See Table XXVI) required for the tertiary roads maintenance for the amount of $224,000 and spare parts for the amount of $44,800. The tertiary roads upgraded or improved by the Program under this proposed project will immediately pass into the Maintenance Division's annual work plan and budget. The maintenance work will be performed by the Maintenance Districts of the Maintenance Division at least twice a year under the administration and supervision of the "Zonas Viales" of DGC as detailed below.

Zona vial	Location/ Ubicación	District/ Distrito	location/ Ubication	Rural Roads Program/ Programa Caminos Rurales Region
No. 1	Guatemala	No. 1	Chimaltenango	I
No. 2	Jutiapa	No. 1	Mataquescuintla, Jalpa	II
No. 2	Jutiapa	No. 6	Aldea Las Cabezas, Oratorio, Santa Rosa	VIII
No. 2	Jutiapa	No. 8	Aldea El Cerinal, Barberena Santa Rosa	VIII
No. 2	Jutiapa	No. 9	Nueva Santa Rosa, Santa Rosa	VIII
No. 5	Quezaltenango	No. 1	San Marcos, San Marcos	IV
No. 5	Quezaltenango	No. 4	Tejutla, San Marcos	IV
No. 5	Quezaltenango	No. 5	Olintepeque, Quezaltenango	IV
No. 5	Quezaltenango	No. 7	Momostenango, Totonicapán	VI
No. 6	Huehuetenango	No. 1	San Juan Ixcoy, Huehuetenango	III
No. 6	Huehuetenango	No. 3	Nebaj - Uspantán, El Quiché	V
No. 6	Huehuetenango	No. 4	Sacapulas, El Quiché	V
No. 6	Huehuetenango	No. 5	Chichicastenango, El Quiché	V
No. 7	Santa Cruz Verapáz	No. 4	Salamá, Baja Verapáz	VII
No. 7	Santa Cruz Verapáz	No. 5	El Chol, Baja Verapaz	VII
No. 8	Chiquimula	No. 1	Quetzaltepeque, Chiquimula	IX
No. 8	Chiquimula	No. 2	Vado Hondo, Chiquimula	IX
No. 8	Chiquimula	No. 3	Ipala Chiquimula	IX
No. 8	Chiquimula	No. 4	Zacapa, Zacapa	IX
No. 8	Chiquimula	No. 5	Cabañas, Zacapa	IX
No. 8	Chiquimula	No. 9	Mayuelas, Gualán, Zacapa	IX

The above mentioned Maintenance Districts will implement routine corrective maintenance activities such as resurfacing, grading, compacting patching, cleaning and reshaping of side ditches, cleaning of culverts, repairing of headwalls and inlet boxes for transversal drainages, clearing grubbing of slopes and right of way. All these activities will be performed by heavy equipment supported by GOG permanent local crews (4 to 5 crews per district) consisting of 1 foreman and 10 helpers each. Since the unskilled labor required to maintain the 240 kms. of road is generally hired from nearby countryside or local villages, the local crews would undoubtedly fall within the target group category. Given the increased need to maintain tertiary roads built under this program, the total labor requirement will result in increased employment opportunities. The eight "Zonas Viales" and their maintenance responsabilities are as follows:

"Zona Vial"	Headquarters	1987 Kilometers Maintained (not paved)	kms not maintained (not paved)	Total Kilometers
1.	Guatemala*	1,226.0		1,226.0
2.	Jutiapa *	1,263.0	249	1,502.0
3.	Escuintla	795.0		705.0
4.	Retalhuleu	956.0	176	1,132.0
5.	Quetzaltenango*	980.0	50	1,030.0
6.	Huehuetenango*	972.0	45	1,017.0
7.	Santa Cruz Verapaz*	1,384.0	33	1,417.0
8.	Chiquimula*	725.0	163	888.0
	T O T A L :	8,291.0	716	9,007.0

*"Zonas Viales" affected by the Rural Roads Program.

The above chart shows that the Maintenance Division has not been able to maintain some of the roads presently in the system. The main constraint has been the obsolete equipment existing at the "Zonas viales" to carry out the work. The Project Amendment will provide the Maintenance Division with one motorgrader, one selfpropelled compactor and one water tank truck to help assure the grading, and corrective maintenance of the improved tertiary roads.

A summary of yearly assigned budgets from 1978 through 1987, kilometers maintained and estimated cost per kilometer maintained is given in Table XLV below.

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TABLE XLIV

YEAR	ALLOCATED Q	Km. Maintained	Cost/Km.
1978	11,322,207	8,784	1,288.96
1979	11,322,587	9,024	1,254.72
1980	13,866,846	9,105	1,522.99
1981	12,882,492	9,299	1,385.36
1982	13,481,692	9,281	1,452.61
1983	11,042,185	9,335	1,182.88
1984	11,058,200	9,506	1,163.30
1985	9,341,443	10,645	877.54
1986	12,131,394	11,390	1,065.09
1987	31,645,207	11,390 *	2,778.33

* Includes 2383 kms of paved roads.

Costs

Based on the experience of the Maintenance Division of DGC, the unit cost breakdown per kilometer of tertiary road maintained is estimated as follows: administration 13%, labor 25%, fuels and lubricants 18%, handtools 6%, construction materials 7%, spare parts 16%, Heavy Equipment Depreciation 5%, Tires and tubes 10%.

The Maintenance Costs per year are detailed in Table XLVI.

Considering that the basic Maintenance Division structure is currently in place, no additional personnel is expected (professional, administrative and field personnel) is expected to implement this portion of the proposed pilot component.

The total amount of Q1,100,088 ($440,035) are GOG resources of the existing recurrent costs for project financing.

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Table XLV

Tertiary Roads Maintenance Costs

	Unit Cost Percentage %	Unit Cost Per Km. Q	No. Kms. to be mantained in 1989	Cost for 1989 Q	Cost for 1989 = $	No. Kms. to maintain in 1990	Cost for 1990 Q	Cost for 1990 = $	No. Kms. to maintain in 1991	Cost for 1991 Q	Cost for 1991 = $	Total Q	Total = $
A. Indirect Costs													
1. Administration	13.0	2,778	60	21,668	8,667	120	43,337	17,335	180	65,005	26,002	130,010	52,004
B. Direct Costs													
1. Labor	25.0	2,778	60	41,670	16,668	120	83,340	33,336	180	125,010	50,004	250,020	100,008
2. Handtools	6.0	2,778	60	10,001	4,000	120	20,002	8,001	180	30,002	12,000	60,005	24,003
3. Construction Materials	7.0	2,778	60	11,668	4,667	120	23,335	9,334	180	35,003	14,001	70,006	28,002
4. Fuels and Lubricants	18.0	2,778	60	30,002	12,001	120	60,005	24,002	180	90,007	36,003	180,014	72,006
5. Heavy Equipment Depreciation	5.0	2,778	60	8,334	3,334	120	16,668	6,667	180	24,002	10,001	50,004	20,002
6. Spare Parts	16.0	2,778	60	26,669	10,668	120	53,338	21,335	180	80,006	32,002	160,013	64,005
7. Tires and tubes	10.0	2,778	60	16,668	6,667	120	33,336	13,335	180	50,004	20,002	100,008	40,004
8. Inflation (10%)				8,000	3,200		16,000	6,400		24,000	9,600	48,000	19,200
9. IVA*				6,745	2,698		12,320	4,928		18,480	7,392	40,112	16,045
Total				Q181,425	$72,570		Q361,681	$144,673		Q542,519	$217,007	Q1,088,192	$435,276

* IVA = 7% (line items No.s 2, 3, 50% (4), 6, 7 and 8)
Lubricants have been considered as a 50% of line item No. 4.
Estimated Exchange Rate: Q2.50 = $1.00.
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TABLE No. XI-VI

TOTAL ANNUAL PROJECTION OF EXPENDITURES FOR TERTIARY ROADS COMPONENT

COST	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL	AID FUNDS			GOB COUNTERPART		TOTAL
	FX $	LC $	TOTAL	B	*	$	FX $	LC $	TOTAL	B	*	$	FX $	LC $	TOTAL	B	*	$	FX $	LC $	TOTAL	B	*	$	FX $	LC $	TOTAL	B	*	$
A. START UP COSTS																														
1. Heavy Equipment and Vehicles	1,906		1,906			1,906																			1,906		1,906			1,906
2. Installation	195		195			195																			195		195			195
3. Contingencies	245		245			245																			245		245			245
Sub-Total	2,346	0	2,346	0	0	2,346	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,346	0	2,346	0	0	2,346
B. OPERATING COSTS AND EXPENSES																														
1. Administration				525	129	129				345	130	130				345	146	146				300	153	153				1,420	560	560
2. Unskilled Labor		168	168	420	168	336		168	168	455	182	350		168	168	490	196	364		168	168	530	212	380		672	672	1,895	758	1,450
3. Skilled Labor		29	29	75	30	59		29	29	83	33	62		29	29	88	35	64		30	30	95	38	68		117	117	340	136	223
4. Materials		42	42	150	63	125		63	63	168	67	130		63	63	178	71	134		63	63	188	75	138		251	251	690	276	527
5. Construction Materials		104	104	250	104	208		105	105	275	110	215		105	105	285	114	219		105	105	298	119	224		419	419	1,118	447	834
6. Fuel and Lubricants				640	256	256				670	268	268				700	290	290				730	292	292				2,740	1,096	1,096
7. Spare Parts	87		87	105	42	129	42		42	133	53	95	42		42	150	63	105	42		42	195	74	116	213		213	580	232	445
8. Tires and Tubes	38		38	95	38	76	38		38	113	45	83	38		38	130	52	90	39		39	118	59	98	153		153	485	194	347
9. Inflation							8	38	38	103	41	79	8	68	76	208	83	159	8	108	116	315	126	242	24	296	230	625	250	855
10 Ins				110	47	47				133	54	54				150	60	60				170	68	68				573	229	229
11 Contingencies	13	123	136	220	88	224	9	134	143	248	99	242	9	145	154	275	110	264	9	157	166	305	122	298	40	559	599	1,043	419	1,018
Sub-Total	138	436	624	2,415	965	1,589	97	529	626	2,725	1,090	1,716	97	578	675	3,025	1,210	1,885	98	631	729	3,350	1,340	2,069	430	2,224	2,654	11,513	4,605	7,229
TOTAL	0 2,484	436	2,970	2,415	965	3,935	97	529	626	2,725	1,090	1,716	97	578	675	3,025	1,210	1,885	98	631	729	3,350	1,340	2,069	430	2,224	2,654	11,513	4,605	7,229
																									2,776	2,224	5,000	11,513	4,605	9,175

TABLE No. XLVII

ANNUAL PROJECTION OF EXPENDITURES FOR TERTIARY ROADS UPGRADING ACTIVITY

CONCEPT	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL	AID FUNDS			GOE COUNTERPART		TOTAL
	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$	FX $	LC $	TOTAL	$	*	$
A. START UP COSTS																														
1. Heavy Equipment and Vehicles	1,482		1,482			1,482																			1,482		1,482			1,482
2. Inflation	148		148			148																			148		148			148
3. Contingencies	200		200			200																			200		200			200
Sub-Total	2,050	0	2,050	0	0	2,050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,050	0	2,050	0	0	2,050
B. OPERATING COSTS AND EXPENSES																														
1. Administration				323	129	129				323	129	129				323	129	129				323	129	129				1,290	516	516
2. Unskilled Labor		168	168	420	168	336		168	168	420	168	336		168	168	420	168	336		168	168	423	169	337		672	672	1,683	673	1,345
3. Skilled Labor		29	29	75	30	59		29	29	75	30	59		29	29	75	30	59		30	30	75	30	60		117	117	300	120	237
4. Purchasing		63	63	158	63	126		63	63	158	63	126		63	63	158	63	126		63	63	158	63	126		251	251	630	252	503
5. Construction Materials		104	104	263	105	209		105	105	263	105	210		105	105	263	105	210		105	105	263	105	210		419	419	1,048	419	838
6. Fuel and Lubricants				640	256	256				640	256	256				640	256	256				640	256	256				2,560	1,024	1,024
7. Spare Parts	42		42	105	42	84	42		42	105	42	84	42		42	105	42	84	42		42	105	42	84	168		168	420	168	336
8. Tires and Tubes	38		38	95	38	76	38		38	95	38	76	38		38	95	38	76	39		39	98	39	78	153		153	383	154	307
9. Inflation							8	30	38	95	38	76	8	68	76	193	77	153	8	108	116	290	116	232	24	296	320	578	231	461
10 TPR				118	47	47				128	51	51				138	55	55				153	61	61				535	214	214
11 Contingencies	8	123	131	220	88	219	9	134	143	230	92	235	9	145	154	240	96	250	9	157	166	253	101	267	35	559	594	943	377	971
Sub-Total	88	486	574	2,413	965	1,537	97	529	626	2,530	1,012	1,638	97	578	675	2,650	1,060	1,735	98	631	729	2,778	1,111	1,810	380	2,224	2,604	10,370	4,148	6,752
TOTAL	2,138	486	2,624	2,413	965	3,587	97	529	626	2,530	1,012	1,638	97	578	675	2,650	1,060	1,735	98	631	729	2,778	1,111	1,810	2,430	2,224	4,654	10,370	4,148	8,802

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TABLE No. XLVIII

ANNUAL PROJECTION OF EXPENDITURES FOR TERTIARY ROADS MAINTENANCE ACTIVITY

CONCEPT	FIRST YEAR						SECOND YEAR						THIRD YEAR						FOURTH YEAR						TOTALS					
	AID FUNDS			GOB COUNTERPART			AID FUNDS			GOB COUNTERPART			AID FUNDS			GOB COUNTERPART			AID FUNDS			GOB COUNTERPART			AID FUNDS			GOB COUNTERPART		
	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$	FX $	LC $	TOTAL	$	$	$
A. START UP COSTS																														
1. Heavy Equipment and Vehicles	224		224			224																			224		224			224
2. Inflation	27		27			27																			27		27			27
3. Contingencies	45		45			45																			45		45			45
Sub-Total	296	0	296		0	296	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	296	0	296	0	0	296
B. OPERATING COSTS AND EXPENSES																														
1. Administration										23	9	9				43	17	17				65	26	26				130	52	52
2. Unskilled Labor										35	14	14				70	28	28				108	43	43				213	85	85
3. Skilled Labor										8	3	3				13	5	5				20	8	8				41	16	16
4. Materials										10	4	4				20	8	8				30	12	12				60	24	24
5. Construction Materials										13	5	5				23	9	9				35	14	14				70	28	28
6. Fuel and Lubricants										30	12	12				60	24	24				90	36	36				180	72	72
7. Spare Parts	45		45			45				28	11	11				53	21	21				80	32	32	45		45	160	64	109
8. Tires and Tubes										18	7	7				33	13	13				50	20	20				100	40	40
9. Inflation										8	3	3				15	6	6				25	10	10				48	19	19
10 Risk										8	3	3				13	5	5				18	7	7				38	15	15
11 Contingencies	5		5			5				19	7	7				35	14	14				53	21	21	5		5	105	42	47
Sub-Total	50	0	50	0	0	50	0	0	0	195	78	78	0	0	0	375	150	150	0	0	0	573	229	229	50	0	50	1,143	457	507
TOTAL	346	0	346	0	0	346	0	0	0	195	78	78	0	0	0	375	150	150	0	0	0	573	229	229	346	0	346	1,143	457	803

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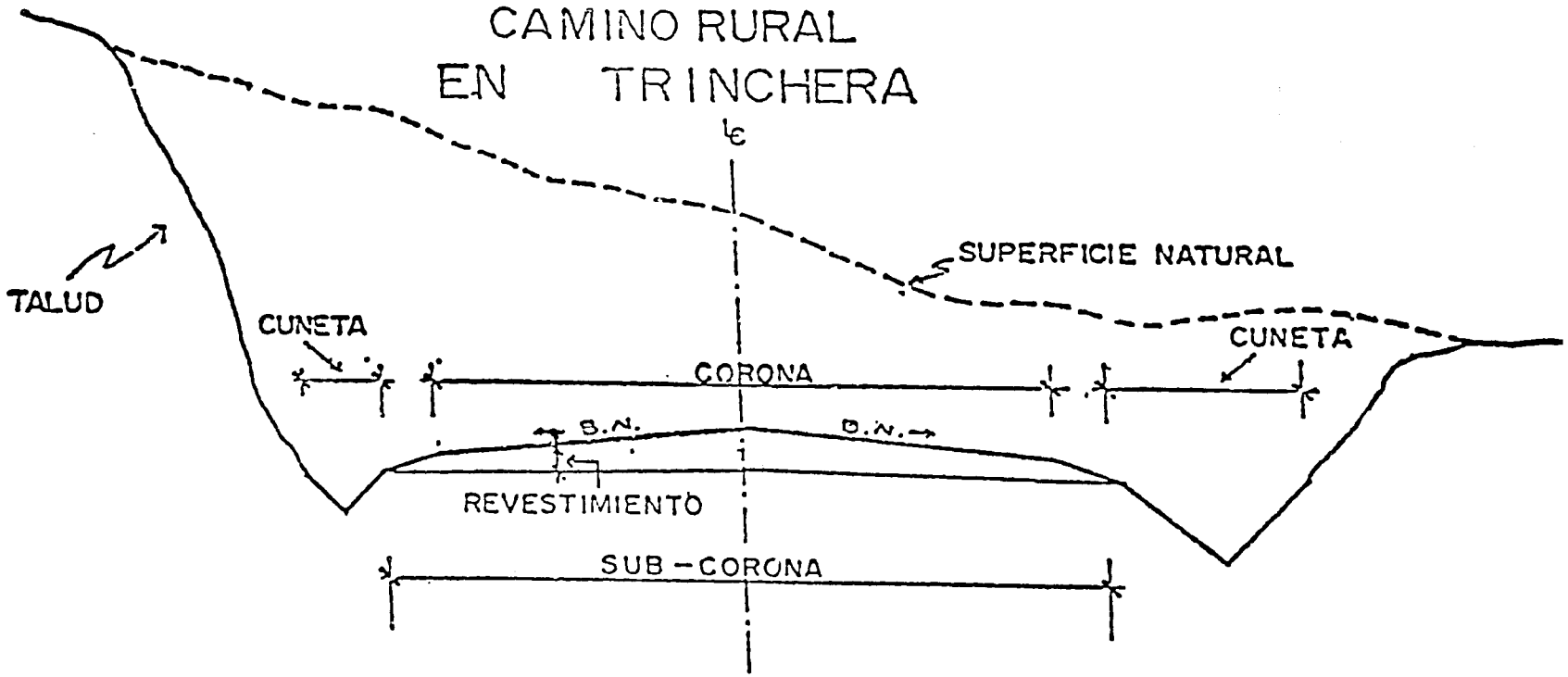
ANNEX 3

EXHIBIT 1

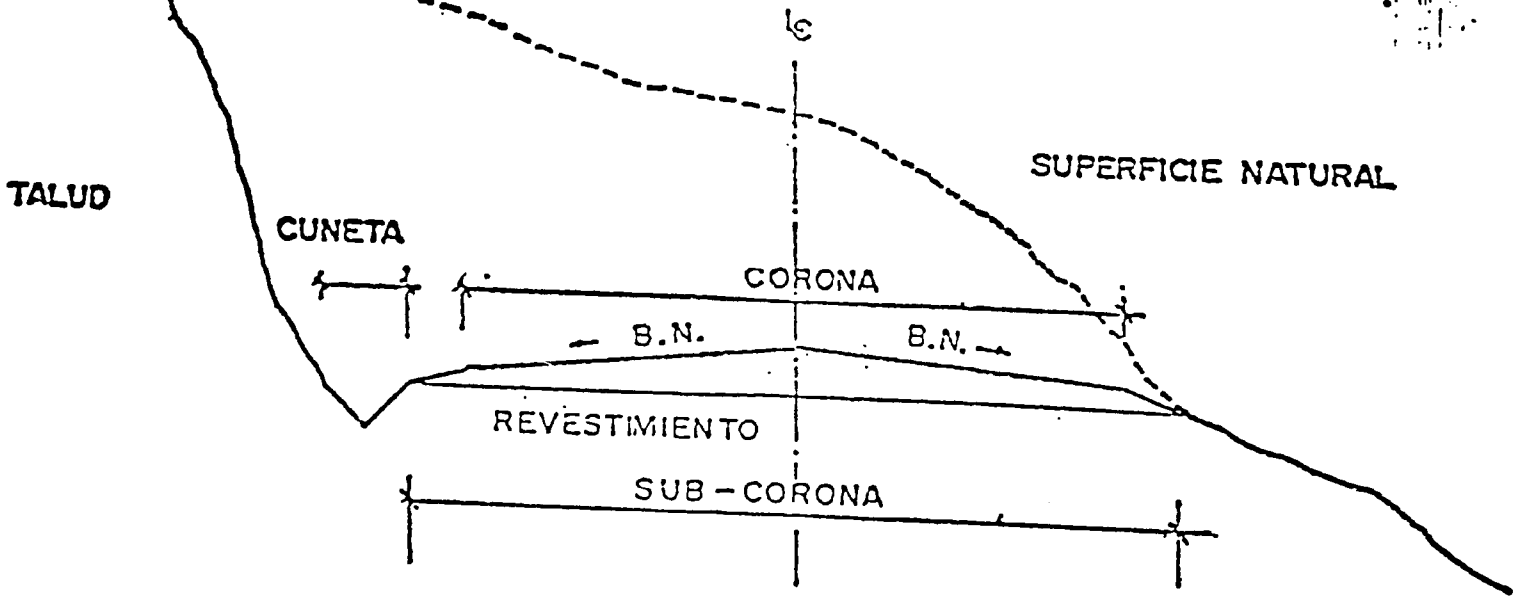
SECCION TIPICA DE CAMINO RURAL EN TRINCHERA



ANCHO DE CORONA:	4.00 m.
SUB-CORONA:	4.60 m.
CUNETAS:	0.80 m. promedio
BOMBEO NORMAL:	3% mínimo 5% máximo
REVESTIMIENTO:	de 15 a 20 cm. de espesor

EXHIBIT 2

SECCION TIPICA DE CAMINO RURAL EN LADERA



ANCHO DE CORONA	4.00 m
SUB-CORONA:	4.60 m
CUNETAS :	0.80 m. promedio
BOMBEO NORMAL:	3 % mínimo
	5 % máximo
REVESTIMIENTO:	de 15 a 20 cm. de espesor

SECCION TIPICA DE CAMINO RURAL.

EXHIBIT 3 Annex3

DIRECCION GENERAL DE CAMINOS - PROGRAMA DE CAMINOS RURALES - PRIORIZACION GENERAL DE PROYECTOS - MARZO, 1987

ITEM	CODIGO	TRAMO	MUNICIPIO	DEPARTAMENTO	PUNTEO	FECHA	LONGITUD	KMS. ACUM.	COSTO ESTIMADO	COSTO/Km.	COSTO ACUM.	POBLACION
1	04-01-291	CA-1 Chivarreto - San Antonio Buenabaj	Momostenango	Totonicapán	818.34	02-Dec-86	3.5 Kms.	3.5	100,299.44	28,656.98	100,299.44	2,767
2	04-01-576	Santa Teresa - El Porvenir	Comitancillo	San Marcos.	778.00	10-Dec-86	3.0 Kms.	6.5	88,905.64	29,635.21	189,205.08	985
3	07-01-709	El Monjón - El Mango	Salamá	Baja Verapáz	758.00	24-Feb-87	10.0 Kms.	16.5	267,074.76	26,707.48	456,279.84	29,279
4	04-01-571	Cabricán - Los Corrales	Cabricán	Quetzaltenango	742.34	14-Jan-87	2.0 Kms.	18.5	46,615.19	23,307.60	502,895.03	2,100
5	02-01-561	Los Magueyes - Los Lavaderos	Mataquescuintla	Jalapa	734.00	03-Dec-86	4.0 Kms.	22.5	118,898.84	29,724.71	621,793.87	5,223
6	03-01-596	Llano de Las Tejas - Piacha	Malacatancito	Huehuetenango	724.34	13-Dec-86	5.3 Kms.	27.8	140,474.07	26,504.54	762,267.94	2,028
7	06-01-550	Santa Clara La Laguna - Pasajquim	San Juan La Laguna	Sololá	710.34	09-Dec-86	12.0 Kms.	39.8	272,097.47	22,674.79	1,034,365.41	2,931
8	06-01-281	Rancho de Teja - Cecales	Totonicapán	Totonicapán	710.00	03-Dec-86	3.5 Kms.	43.3	103,349.19	29,528.34	1,137,714.60	1,029
9	04-01-575	El Horizonte - Armenia	Tejutla	San Marcos	699.34	07-Jan-87	6.2 Kms.	49.5	129,440.99	20,877.58	1,267,155.59	1,062
10	04-01-568	Tejutla - Tuizacaja	Tejutla	San Marcos	691.34	10-Jan-87	9.0 Kms.	58.5	317,189.18	35,243.24	1,584,344.77	2,204
11	04-01-603	RN-1 - Tirate	San Juan Ostuncalco	Quetzaltenango	688.34	17-Dec-86	4.0 Kms.	62.5	116,981.41	29,245.35	1,701,326.18	1,604
12	04-01-577	Tuichilupe - Piedra de Fuego	Comitancillo	San Marcos	687.34	10-Jan-87	3.3 Kms.	65.8	105,443.65	31,952.62	1,806,769.83	1,752
13	03-01-542	CA-1 - Pueblo Viejo	San Sebastián	Huehuetenango	684.00	15-Dec-86	1.6 Kms.	67.4	65,362.17	41,440.86	1,873,152.00	3,802
14	01-01-231	Los Magueyes - Cañajal	San Martín Jilotepeque	Chimaltenango	683.00	19-Dec-86	10.0 Kms.	77.4	279,215.41	27,921.54	2,152,367.41	1,230
15	06-01-583	Pacoxlaj - Chejonactuz	Momostenango	Totonicapán	680.34	03-Dec-86	5.5 Kms.	82.9	109,543.02	19,916.91	2,261,910.43	1,961
16	03-01-557	CA-1 - La Cumbre	Malacatancito	Huehuetenango	667.00	12-Dec-86	2.1 Kms.	85.0	52,712.26	24,864.27	2,314,622.69	851
17	08-01-642	San Juan Chamelco - Paapá	Paapa	Alta Verapaz	665.00	04-Oct-86	7.0 Kms.	92.0	218,296.53	31,185.22	2,532,919.22	3,081
18	06-01-552	Tzantzete - Patzalá	Santa María Chiquimula	Totonicapán	663.34	08-Dec-86	2.2 Kms.	94.2	47,425.34	21,556.97	2,580,344.56	482
19	04-01-569	Piedra Grande - Esquipulas Seque	San Carlos Sija	Quetzaltenango	656.34	12-Dec-86	2.5 Kms.	96.7	53,678.52	21,471.41	2,634,023.08	1,200
20	04-01-610	Santa Irene - San Lorenzo	San Lorenzo	San Marcos	652.34	16-Jan-87	12.5 Kms.	109.2	246,436.50	19,714.92	2,880,459.58	1,525
21	02-01-262	Morazán - Piedras de Fuego	Monjas	Jalapa	645.00	12-Mar-86	4.5 Kms.	113.7	60,861.94	13,524.88	2,941,321.52	576
22	06-03-204	San Jose - Chuihoxtan	Momostenango	Totonicapán	644.34	21-Apr-86	4.2 Kms.	117.9	77,588.76	18,473.51	3,018,910.28	1,107
23	04-01-602	Chual - Poj	Sipacapa	San Marcos	644.00	13-Feb-87	2.5 Kms.	120.4	83,350.89	33,340.36	3,102,261.17	1,200
24	04-01-579	Barrial - Xacana	Cabricán	Quetzaltenango	639.67	15-Dec-86	7.5 Kms.	127.9	180,216.55	24,028.87	3,282,477.72	726
25	01-03-225	Xeabaj - Chuacacay	Santa Apolonia	Chimaltenango	639.34	02-Dec-86	3.0 Kms.	130.9	92,942.29	30,980.76	3,375,420.01	405
26	07-01-715	El Chol - Los Amates	El Chol	Baja Verapáz	638.34	25-Feb-87	7.0 Kms.	137.9	286,839.38	40,977.05	3,662,259.39	3,047
27	02-01-530	Jalapa - La Ventura	Jalapa	Jalapa	638.34	01-Dec-86	8.9 Kms.	146.8	346,554.48	38,938.71	4,008,813.87	1,667
28	02-03-261	San Juan Cano - Piedras Blancas	Monjas	Jalapa	637.00	18-Apr-86	2.0 Kms.	148.8	24,617.10	12,308.55	4,033,430.97	352
29	04-01-574	Los Arcos - La Democracia	Tejutla	San Marcos	635.34	07-Jan-87	4.2 Kms.	153.0	141,350.98	33,655.00	4,174,781.95	1,123
30	02-01-264	Estancia - Achiotillos	Monjas	Jalapa	634.00	16-Apr-86	6.5 Kms.	159.5	90,032.42	13,851.14	4,264,814.37	2,099
31	05-01-549	Aldea Pericón - Las Flores Pajales	Cunén	El Quiché	631.00	20-Nov-86	5.0 Kms.	164.5	133,967.55	26,793.51	4,398,781.92	1,211
32	02-01-403	Cushapa - Granada	San Luis Jilotepeque	Jalapa	630.00	29-Nov-86	2.0 Kms.	166.5	66,574.15	33,287.08	4,465,356.07	1,003
33	08-01-627	Setzul - Chinahá	San Pedro Carchá	Alta Verapaz	630.00	03-Oct-86	2.0 Kms.	168.5	67,261.85	33,630.93	4,532,617.92	593
34	02-03-256	Mojarritas - San Joancito	Monjas	Jalapa	629.34	16-Apr-86	4.5 Kms.	173.0	59,963.85	13,325.30	4,592,581.77	1,850
35	01-01-345	Patajbey - Panatzan	Santa Apolonia	Chimaltenango	628.00	19-Mar-86	5.6 Kms.	178.6	149,065.64	26,618.86	4,741,647.41	
36	05-01-244	Las Cruces - Xeraju	Godinez	Sololá	625.34	02-Dec-86	3.0 Kms.	181.6	95,800.56	31,933.52	4,837,447.97	1,200
37	03-01-344	Caserío Esquipulas - Los Planes	Chiantla	Huehuetenango	622.34	08-Dec-86	3.4 Kms.	185.0	134,867.77	40,259.04	4,972,315.74	1,651
38	08-01-635	Cecilia - Secampamac - Secumb	San Pedro Carchá	Alta Verapaz	622.00	04-Oct-86	6.0 Kms.	191.0	162,025.78	27,004.29	5,134,341.50	860
39	06-01-441	Santa María Chiquimula - Chuiaj	Santa María Chiquimula	Totonicapán	619.34	02-Dec-86	5.5 Kms.	196.5	144,547.35	[illegible]	[illegible]	2,716
40	01-01-238	Los Magueyes - San José Las Canoas	San Martín Jilotepeque	Chimaltenango	617.34	02-Dec-86	7.1 Kms.	203.6	243,326.49	34,271.34	[illegible]	694
41	01-01-534	Parajbey - Xepanil	Santa Apolonia	Chimaltenango	616.34	02-Dec-86	3.0 Kms.	206.6	100,973.92	[illegible]	[illegible]	482
42	01-03-219	Patzacam - Xesuj	Tecpán	Chimaltenango	616.00	16-Apr-86	7.7 Kms.	214.3	147,111.30	[illegible]	[illegible]	
43	02-01-592	Las Flores - Las Brisas	Mataquescuintla	Jalapa	615.34	04-Dec-86	8.0 Kms.	222.3	354,145.17	[illegible]	[illegible]	4,717
44	07-01-718	Rabinal - [illegible]	Rabinal	Baja Verapáz	614.34	02-Mar-87	6.0 Kms.	228.3	[illegible]	[illegible]	[illegible]	819
45	08-01-591	Chuitzoabaj - Pachón	Santa María Chiquimula	Totonicapán	613.34	08-Dec-86	8.5 Kms.	236.8	226,116.23	[illegible]	[illegible]	1,155
46	08-01-437	[illegible] - Panca	Momostenango	Totonicapán	611.34	04-Dec-86	14.0 Kms.	250.8	391,189.76	[illegible]	6,873,534.09	[illegible]
47	05-01-245	Xelbaquiej - Mactzul I - Mactzul VI	Chichicastenango	El Quiché	611.00	11-Apr-86	12.0 Kms.	262.8	264,389.50	[illegible]	[illegible]	[illegible]
48	02-01-607	El Guayabito - Potrero Grande	Jutiapa	Jutiapa	610.00	28-Nov-86	10.1 Kms.	272.9	297,492.27	29,454.68	7,435,415.86	[illegible]
49	02-03-254	Encino Gacho - Posas de Agua	El Progreso	Jutiapa	608.00	12-Apr-86	3.5 Kms.	276.4	67,501.25	19,286.07	7,502,917.11	681
50	03-01-559	Río Ocho - Agua Blanca	San Pedro Necta	Huehuetenango	604.84	03-Dec-86	4.2 Kms.	280.6	284,516.05	67,420.86	7,787,433.16	1,676
51	03-01-560	Malacatancito - Chocal	Malacatancito	Huehuetenango	603.00	20-Dec-86	5.3 Kms.	285.9	168,517.01	31,795.66	7,955,950.17	3,547
52	01-01-537	El Paraíso - Secabastel	Palencia	Guatemala	602.34	02-Dec-86	4.0 Kms.	289.9	136,714.52	34,178.63	8,092,664.69	979
53	02-01-543	Plan de La Cruz - El Pinal	Jutiapa	Jutiapa	601.34	02-Dec-86	10.0 Kms.	299.9	423,429.85	42,342.99	8,516,094.54	2,511
54	05-01-247	CA-1 Km 123 - Panajil	Sololá	Sololá	601.34	02-Dec-86	2.0 Kms.	301.9	61,323.91	30,661.96	8,577,418.45	294
55	01-01-348	Los Tuneyes - Estancia de San Martín	San Martín Jilotepeque	Chimaltenango	600.34	22-Dec-86	11.0 Kms.	312.9	354,739.49	32,249.04	8,932,157.94	2,485
56	02-03-449	Río de Paz - San Fernando	Quezada	Jutiapa	598.00	04-Apr-86	2.5 Kms.	315.4	45,321.40	18,128.56	8,977,479.34	785
57	06-01-462	Santa Lucía La Reforma - Ichomchaj	Santa Lucía La Reforma	Totonicapán	597.34	04-Dec-86	5.0 Kms.	320.4	167,085.16	33,417.03	9,144,564.50	1,828
58	02-01-263	Encino Gacho - Río Morán	Progreso	Jutiapa	595.00	19-Apr-86	4.5 Kms.	324.9	88,525.25	19,672.28	9,233,089.75	1,871
59	08-01-634	Sanispena - Xaltenamit	San Pedro Carchá	Alta Verapaz	595.67	03-Oct-86	4.5 Kms.	329.4	145,744.96	32,387.77	9,378,834.71	419
60	08-01-632	Kacoatzul - Rubelcoj	San Pedro Carchá	Alta Verapaz	595.34	04-Oct-86	7.0 Kms.	336.4	271,508.46	38,786.92	9,650,343.17	1,019
61	02-01-258	Laguna Mojada - Estrella	San Pedro Pinula	Jalapa	595.00	09-Apr-86	6.5 Kms.	342.9	53,332.67	8,205.03	9,703,675.84	2,732
62	03-01-385	El Rancho - Caserío El Rosario	Aguacatán	Huehuetenango	593.00	09-Dec-86	3.0 Kms.	345.9	102,568.31	34,189.44	9,806,244.15	1,789
63	03-01-247	Todos Santos - Mash	Todos Santos Cuchumatán	Huehuetenango	589.34	02-Mar-87	4.6 Kms.	350.5	203,546.73	44,249.29	10,009,790.88	2,028
64	01-01-229	Saquitacaj - Xequechelaj	San José Poaquil	Chimaltenango	589.34	02-Dec-86	3.0 Kms.	353.5	87,982.82	29,327.61	10,097,773.70	641
65	03-01-342	Rincón - Tajumuco	Chiantla	Huehuetenango	588.50	10-Apr-86	14.0 Kms.	367.5	491,922.10	35,137.29	10,589,695.80	
66	06-01-582	Pasanyib - Patzan - Chiaj	Santa María Chiquimula	Totonicapán	588.34	04-Dec-86	14.0 Kms.	381.5	393,165.16	28,083.23	10,982,860.96	4,478
67	03-01-396	Santiago Chimaltenango - Bella Vista	Santiago Chimaltenango	Huehuetenango	588.00	10-Dec-86	4.0 Kms.	385.5	180,690.29	45,172.57	11,163,551.25	1,525
68	01-01-227	Chichavac - Xesajcap	Santa Apolonia	Chimaltenango	587.00	02-Dec-86	5.0 Kms.	390.5	160,992.34	32,198.47	11,324,543.59	410
69	03-01-558	CA-1 - Chiaqué	Malacatancito	Huehuetenango	587.00	11-Dec-86	6.1 Kms.	396.6	224,857.90	36,861.93	11,549,401.39	981
70	05-01-434	San Bartolomé - Los Cimientos	San Bartolomé	El Quiché	581.34	04-Dec-86	10.0 Kms.	406.6	312,623.64	31,262.36	11,862,025.03	5,403

PROYECTO A.I.D. 520-0274 - CENTRO DE COMPUTO - 08/04/87

Exhibit 3A

CODIGO:	NOMBRE.CAMINO	FECHA.TERMIN:	LONGITUD:	% MANO OBRA:	% EQUIPO:	RENDIMIENTO:	COSTO.TOTAL:.Q.	COSTO/KM:.Q	NO.JORNALES:	%.M.O DESTAJO	HABIT BENEF:
01-02-001	San Martín Jilotepeque - Estancia de La Virgen	03-31-86	10.0	70.0	30.0	.37	215446.99	21544.69	34320	22.45	3000
01-02-028	Parramos - Parrojas	01-09-80	3.8	.0	.0	.54	83826.08	22059.49	14416	47.55	500
01-02-030	San Andres Itzapa - Xeparquiy	06-01-81	5.0	70.0	30.0	.23	119083.81	23817.76	25190	56.00	500
01-02-032	San José Poaquil - Patio Bolas	04-01-81	8.7	70.0	30.0	.58	102243.15	21157.00	32448	45.73	4000
01-02-037	El Sitio - La Trompeta	06-30-83	2.6	90.0	10.0	.51	56367.31	21679.73	5835	20.48	600
01-02-056	Chumanzana - CR-1	03-01-80	3.5	31.0	69.0	.29	94542.20	27012.06	19760	57.04	1175
01-02-058	Saquiyá - Xelbaquiej	03-01-80	4.0	31.0	69.0	.80	83581.19	20895.30	12722	39.08	5000
01-02-062	Entronque (Xabiuaguach-Chuchipaca) - Lacamá	05-01-81	3.5	20.0	80.0	.22	73316.84	20947.67	11160	33.08	1400
01-02-064	San Marcos - Santa cruz	03-01-82	3.0	50.0	50.0	.16	72476.00	24158.67	10937	38.74	650
02-02-040	Panimatzalán - Calias	07-01-84	5.0	70.0	30.0	.75	125067.75	20977.96	18765	44.53	1000
02-02-070	La Lagunetá - El Durazmito	02-01-81	3.0	65.0	35.0	.37	80332.37	20110.79	0	11.79	1028
02-02-082	San Francisco - Poza Verde	07-01-83	2.5	60.0	40.0	.62	52415.32	20966.12	0	44.72	1200
02-02-085	Llano Grande - Los Tablones	05-01-85	5.5	70.0	30.0	.37	131626.56	23923.10	0	46.35	300
02-06-072	Los Izotes - San Jose Carrizal	05-01-80	2.6	78.0	22.0	.19	56292.03	21650.78	0	58.58	2677
02-06-076	Sexhico - Sansurutate	05-01-80	6.9	42.0	58.0	.46	159824.26	23171.63	0	21.37	1743
03-01-348	Caserio Climentor - El Suj	12-15-86	2.4	76.8	23.2	.61	55208.06	22659.04	604	46.60	5610
03-02-100	San Pedro Necta - Santiago Chimaltenango	11-01-82	15.4	60.0	40.0	.49	323400.00	21000.00	1492	60.00	4000
03-02-101	Ocobila - Toixcox	12-01-82	10.0	60.0	40.0	.88	210000.00	21000.00	1079	45.00	850
03-02-102	San Lorenzo - Chiquiliabaj	10-27-82	7.0	72.0	28.0	.77	140000.00	20000.00	1043	55.89	2500
03-02-107	Santiago Chimaltenango - La Florida	10-05-83	5.7	66.7	33.3	.71	119724.00	21004.21	779	45.10	1000
03-02-109	Bojuup - Lupina	07-31-85	4.0	61.8	38.2	.28	89838.08	22459.77	15323	35.31	2500
03-02-171	San Martín Cuchumantán - Cantinil	12-18-84	17.5	67.3	32.7	1.12	372349.32	21277.10	2815	49.77	7278
04-02-115	Buena Vista - Los Gonzalez	12-12-83	5.4	66.0	34.0	.56	125417.49	23225.50	25275	65.60	1000
04-02-119	Cabrición - La Grandeza	12-14-82	5.7	80.0	20.0	.57	112264.36	19626.64	27540	62.90	1500
04-02-124	San Antonio Sac. - San Isidro Ixcolochil	11-17-82	3.3	90.0	10.0	.40	59436.15	17974.67	11730	64.32	1000
04-02-131	Sibilia - El Barrial	12-10-82	6.6	70.0	30.0	.47	137927.19	20898.06	23430	51.71	5000
04-02-135	La Grandeza - Chorjale	03-15-83	1.8	80.0	20.0	.92	41353.41	22474.66	9060	68.98	800
05-01-200	Saquiyá II - Patulup	12-09-86	4.0	87.0	13.0	.39	85768.65	21282.54	21492	62.30	2500
01-02-055	Chuchipaca - Chumanzana	03-04-80	4.7	70.0	30.0	.39	109247.12	23031.30	19760	49.87	1225
01-02-060	Xelbaquiej - Tzanixnem	09-01-81	10.0	60.0	40.0	.42	211423.24	21147.32	30400	53.86	2430
06-02-149	Chicaxtun - Rancho de Teja 1ª	07-12-84	12.0	80.0	20.0	.71	255528.69	21294.06	70110	27.70	3000

	LONGITUD:	% MANO.OBRA:	% EQUIPO:	RENDIMIENTO:	COSTO.TOTAL:.Q.	COSTO/KM:.Q.	NO.JORNALES:	%.M.O.DESTAJO	HABIT.BENEF:
Total	186.1	1964.6	1035.4	16.14	4015333.59	674422.64	448545	1438.95	66966
Minimum	1.8	.0	.0	.16	41353.41	17974.67	0	11.79	300
Maximum	17.5	90.0	80.0	1.12	372349.32	27012.06	70110	68.98	7278
Average	6.0	63.3	33.4	.52	129526.89	21755.56	14469	46.41	2160
Record Count = 31		Record Count = 31	Record Count = 31		Record Count = 31				

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ASISTENCIA TECNICA
PROYECTO AID 520-0274

Form. BS-2-85

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

BOLETA DE INVESTIGACION SOCIOECONOMICA

I. IDENTIFICACION

1. No. de Boleta: _____ 2. Fecha de Encuesta: _____
3. Lugar de Encuesta: _____ 4. Localización: _____
5. Nombre del Proyecto: _____
6. Código: _____ 7. Porcentaje de muestreo: _____

II. ASPECTOS SOCIALES

II.1 Demografía

8. ¿De cuántos miembros está integrada su familia?

	Hombres	Mujeres	Total
1. De 18 años o más	_____	_____	_____
2. De 14 a 18 años	_____	_____	_____
3. De 7 a 14 años	_____	_____	_____
4. Menores de 7 años	_____	_____	_____
TOTAL:	_____	_____	_____

9. ¿Qué dialectos o lenguas habla usted y su familia? _____

10. Habitualmente ¿Qué clase de trabajo realiza usted? _____

11. ¿Lo ayuda su familia en su trabajo?

1. SI ☐
2. NO ☐

¿Quiénes lo ayudan?

3. Su papá ☐
4. Su mamá ☐
5. Su esposa ☐
6. Sus hijos ☐
7. Otros ☐ Especifique: _____
8. Ninguno ☐

Exhibit 4

12. ¿A qué actividades u ocupaciones se dedica su esposa, aparte de las de su hogar?

_____

(indique si son actividades artesanales, pequeñas industrias u otras)

¿Cuántos miembros de su familia tienen trabajo permanente? _____

II.2 Organización

13. ¿Cuántos tipos de organizaciones existen en su aldea?

TIPO		NUMERO
1. Religiosa	☐	_____
2. Comunal	☐	_____
3. Sindical	☐	_____
4. Municipal	☐	_____
5. Ninguna	☐	_____
6. Otras	☐	_____

Especifique: _____

14. ¿Pertenece usted a algún comité organizado?

1. SI ☐ 2. NO ☐

¿Cuál de éstos?

3. Pro-mejoramiento de aldea ☐
4. Coordinadora Local ☐
5. Pro-construcción camino ☐
6. Pro-construcción Puesto o Centro de Salud ☐
7. Pro-construcción Escuela ☐
8. Introducción Agua Potable ☐
9. Otros ☐

Especifique: _____

II.3 Servicios Públicos

II.3.1 Educación

15. ¿Sabe leer y escribir? 1. SI ☐ 2. NO ☐

¿Qué educación tiene?

3. Pre-Primaria Bilingüe	☐	7. Castellanización	☐
4. Primaria	☐	8. Secundaria	☐
5. Técnico/Vocacional	☐	9. Universitaria	☐
6. Ninguna	☐	10. Otras	☐

Especifique: _____

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16. ¿Hasta qué grado cursó? _____

17. ¿Estudian sus hijos? 1. SI ☐ 2. NO ☐

¿En escuela pública? ☐ ¿En escuela privada? ☐

		GRADO	TIPO DE TRANSPORTE	HORAS DE VIAJE
3. Preprimaria	☐			
4. Bilingüe	☐			
5. Castellanización	☐			
6. Primaria	☐			
7. Secundaria	☐			
8. Técnico/Vocacional	☐			
9. Universitaria	☐			
10. Ninguna	☐			
11. Otras	☐			

Especifique: _____

18. ¿Dónde vive el(la) maestro(a)?

1. En la escuela: ☐ 2. En la aldea: ☐

3. Fuera de la aldea: ☐ 4. Otro: ☐

Especifique: _____

5. ¿Cuántos días da clase durante la semana? _____

¿Qué medios de transporte utiliza?

6. A pie ☐ 7. Bestias ☐

8. Moto ☐ 9. Carro ☐

10. Camión ☐ 11. Camioneta ☐

12. Otros ☐ Especifique: _____

II.3.2 Vivienda

19. ¿En qué calidad está su casa?

1. Propia ☐ 2. Alquilada ☐ 3. Usufructo ☐

4. ¿Cuánto paga por su casa o el alquiler? Q _____

20. ¿Qué servicios tiene su vivienda?

1. Energía Eléctrica: 2. SI ☐ ¿Cuánto paga? Q _____

3. NO ☐ ¿Por qué? _____

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4. ¿Qué uso le da?: 5. Iluminación ☐ 6. Industrial ☐ 7. Agrícola ☐ 8. Comercial ☐

9. Agua potable: 10. SI ☐ ¿Cuánto paga? Q _____ 11. NO ☐ ¿Por qué? _____

12. ¿Qué uso le da?: 13. Consumo hogar ☐ 14. Riego ☐ 15. Otros ☐

Especifique: _____

16. El agua que consume ¿de dónde la trae? _____

17. ¿A qué distancia? _____

18. ¿La trae usted? ☐ 19. ¿Paga por que se la traigan? ☐ 20. ¿Cuánto paga? Q _____

		SI	NO	¿Por qué?
21.	Drenajes			
22.	Aguas negras	23. ☐	24. ☐	_____
25.	Aguas de lluvia	26. ☐	27. ☐	_____
28.	Combinado	29. ☐	30. ☐	_____
31.	¿Tiene letrina?	32. ☐	33. ☐	_____

34. Ninguno ☐

II.3.3 Salud

21. Cuando en su familia hay enfermos ¿a qué servicios médicos acude?

1. Puesto de Salud ☐ 2. Centro de Salud ☐
3. Médico ☐ 4. Promotor de Salud ☐
5. Hospital ☐ 6. Otros ☐

Especifique: _____

7. ¿En qué comunidad se localiza? _____

8. ¿A qué distancia se encuentra? _____

9. ¿Qué medio de transporte utiliza para llegar al servicio médico? _____

10. ¿Cuánto paga? Q _____

22. ¿En dónde atienden a su esposa en el nacimiento de sus niños?

1. Hospital regional ☐ 2. Centro de Salud ☐
3. Médico particular ☐ 4. Comadrona ☐
5. Otros ☐

Especifique: _____

_____

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Exhibit 4

6. ¿Dónde queda el servicio en el cual ha sido atendida su esposa?

¿Lugar? _____
(caserío, aldea, municipio, departamento)

¿Distancia? _____

¿Dónde compra las medicinas? _____

¿Lugar? _____
(caserío, aldea, municipio, departamento)

¿Distancia? _____

II.3.4 Recreación

23. ¿Cuál es el medio de recreación que usted utiliza en su comunidad?

1. Canchas Deportivas ☐
2. Balnearios ☐
3. Salones Sociales o Comunales ☐
4. Cines ☐
5. Otros ☐

   Especifique: _____

6. Ninguna ☐

III. ECONOMIA

III.1 Propiedad y Tenencia de la Tierra

24. ¿Tiene usted terrenos? 1. SI ☐ 2. NO ☐

25. El(los) terreno(s) que posee es o son:

1. Propio(s) ☐ 2. En usufructo ☐ 3. Municipal ☐
4. Arrendado(s) ☐ 5. Comunal(es) ☐ 6. Otro ☐

Especifique: _____

26. ¿Cuántos terrenos tiene? _____

27. ¿De cuántas cuerdas?

1. 0 — 10 ☐
2. 11 — 20 ☐
3. 21 — 30 ☐
4. 31 — 40 ☐
5. 41 — 50 ☐
6. 51 — 60 ☐
7. 61 — 70 ☐
8. 71 — 80 ☐
9. 81 — 90 ☐
10. 90 o más ☐

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Exhibit 4

28. ¿Tamaño de la cuerda? De _____ x _____
(metros o varas) (metros o varas)

29. Si su(s) terreno(s) es(son) arrendado(s) ¿Cuánto paga en arrendamiento? Q_____
Costo/cuerda

III.2 Producción

30. Cuerdas cultivadas principales cultivos.

1	2	3	4	5	6	7	8	9	10	11
Cultivo	Cuerdas cultivadas	Cosechas al año	Producción total qq	Auto consumo qq	Venta qq	Costo producción Q/qq	Precio de venta Q/qq	No. de personas	Tiempo	Costo/ jornal

31. ¿Dónde vende sus productos?

1	2	3
Cultivo	Nombre del mercado	Distancia del mercado al punto medio del camino

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Exhibit 4

32. ¿Cuánto le cuesta el transporte de sus productos y el de su persona al mercado?

1	2	3	4	5	6	7
Clase de transporte	De	A	Distancia en kilómetros	Costo/qq	Costo/ Persona	Tiempo de viaje
En hombros						
Animal						
Camión						
Bus						
Pick-Up						
Otros:						
Especifique: _____ _____ _____						

III.3 Insumos

33. ¿Utiliza abono en sus cultivos?

1. NO ☐ ¿Por qué? _____

2. SI ☐ ¿Cómo lo transporta? _____

¿Cuáles utiliza?

1	2	3	4	5	6	7
Nombre del insumo	Nombre del cultivo	Cantidad utilizada por año (qq)	COSTO POR QUINTAL			Costo Total Q
			Insumo	Transporte	Total	
					TOTAL	

Exhibit 4

III.4 Asesoría Técnica y Asistencia Crediticia

34. ¿Ha recibido usted asesoría técnica para el mejoramiento de sus cultivos?

1. SI ☐ 2. NO ☐

¿Por qué? _____

3. ¿Qué tipo de asesoría? 4. ¿De qué institución?

_____ _____

_____ _____

_____ _____

35. ¿Ha recibido usted asistencia crediticia para el incremento y/o mejoramiento de sus cultivos?

1. SI ☐ 2. NO ☐

¿Por qué? _____

(Si la respuesta es afirmativa)

1	2	3	4	5	6	7
Nombre del cultivo	Area en cuerdas	Tipo de crédito	Duración	Monto aproximado	Intereses a pagar	Institución

36. ¿Tendría usted interés en participar en programas agrícolas con asistencia técnica y/o crediticia?

1. SI ☐ 2. NO ☐

¿Por qué? _____

_____

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III.5 Otras Actividades Productivas

37. Aparte de la agricultura ¿a qué otra actividad se dedica usted?

1. **Ganadería**

1	2	3	4	5	6	7	8	9	10	11
Especie	Cantidad	Costo producción Q	Valor de venta Q	Mercado	Forma de transportarlo		Area de su terreno que dedica a la crianza (m^2)	No. de personas	Tiempo	Costo/ jornal
					Tipo de transporte	Distancia				

2. **Aves de Corral**

1	2	3	4	5	6	7	8	9	10	11
Especie	Cantidad	Costo producción Q	Valor de venta Q	Mercado	Forma de transportarlo		Area de su terreno que dedica a la crianza (m^2)	No. de personas	Tiempo	Costo/ jornal
					Tipo de transporte	Distancia				

Exhibit 4

3. **Artesanías**

1	2	3	4	5	6	7	8	9	10	11
Tipo	Cantidad	Costo producción Q	Valor de venta Q	Mercado	Forma de transportarlo		Area de su terreno (m^2)	No. de personas	Tiempo	Costo/ jornal
					Tipo de transporte	Distancia				

4. **Textiles**

1	2	3	4	5	6	7	8	9	10	11
Tipo	Cantidad	Costo producción Q	Valor de venta Q	Mercado	Forma de transportarlo		Area de su terreno	No. de personas	Tiempo	Costo/ jornal
					Tipo de transporte	Distancia				

Exhibit 4

5 **Otras Actividades**

1	2	3	4	5	6	7	8	9	10	11
Actividad	Cantidad	Costo producción Q	Valor de venta Q	Mercado	Forma de transportarlo		Area de su terreno (m^2)	No. de personas	Tiempo	Costo/ jornal
					Tipo de transporte	Distancia				

III.6 Incremento o diversificación de producción.

38. Si en su comunidad se construyera un camino rural, transitable en toda época, ¿incrementaría usted su producción?

1. SI ☐ 2. NO ☐

¿Por qué? _____

39. ¿Se dedicaría a trabajar en otros productos diferentes a los existentes en la región?

SI ☐ ¿Cuáles? _____

¿Por qué? _____

NO ☐ ¿Por qué? _____

40. ¿Cómo incrementaría su producción?

1. Ampliándose en su terreno ☐ 2. Utilizando abonos ☐ 3. Ambos ☐

1	2	3	4	5	6	7
Tipo de producción	INCREMENTO DE PRODUCCION EN QUINTALES				Costo unitario producción (Q/qq)	Valor de venta (Q/qq)
	Ampliación áreas	Utilizando abonos	Ambos	Producción total		

Exhibit 4

41. Con este incremento ¿necesitaría el mismo número de personas que ha utilizado siempre?

1. NO ☐ 2 SI ☐

¿Por qué? _____

3. (Si la respuesta es negativa). ¿Cuántas personas utilizaría?

_____

4. ¿Cuanto tiempo durante el año? _____
(días/año, horas por día/año, jornales/año)

III.7 Empleo en su Comunidad

III.7.1 Propietarios de terrenos que contratan trabajadores

42. Contrata a otras personas para que le ayuden a cultivar la tierra?

1. SI ☐ 2. NO ☐

¿Por qué? _____

43. ¿Durante qué meses?

CULTIVOS

		1	2	3	4	5	6	7	8	9	10
1	Siembra										
2	Cuido										
3	Cosecha										
4	Otros										

Especifique: _____

44. ¿Las personas que usted contrata son de la comunidad?

1. SI ☐ 2. NO ☐

¿Por qué? _____

(Si la respuesta es afirmativa)

3. ☐ Existe en exceso personas en la comunidad sin trabajo para contratar.

4. ☐ Existe el número justo de personas sin trabajo para contratar.

5. ☐ Contrata en la comunidad a personas sin trabajo porque es barato.

6. Cuánto paga por jornal contratado:
(sin comida)

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CULTIVOS

		1	2	3	4	5	6	7	8	9	10
7	Siembra Q										
8	Cuido Q										
9	Cosecha Q										
10	Otros Q										

Especifique: _____

MESES

1	2	3	4	5	6	7	8	9	10

45. ¿Las personas que usted contrata son de otros lugares?

1. SI ☐ 2. NO ☐

(Si la respuesta es afirmativa)

3. ☐ No existen personas sin trabajo en la comunidad.
4. ☐ En la comunidad es más cara la mano de obra.
5. ¿Cuánto paga por jornal contratado? (sin comida)

CULTIVOS

		1	2	3	4	5	6	7	8	9	10
6	Siembra Q										
7	Cuido Q										
8	Cosecha Q										
9	Otros Q										

Especifique: _____

MESES

1	2	3	4	5	6	7	8	9	10

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Exhibit 4

46. ¿De qué lugares vienen las personas que usted contrata?

_____

¿A qué distancia se localizan? _____

47 ¿Qué tipo de transporte utilizan para llegar al trabajo?

_____

48. ¿Cuántos meses y cuáles se mantienen sin actividad agrícola en su comunidad?

MESES	NOMBRES
1. ☐ 0—2	_____
2. ☐ 2—4	_____
3. ☐ 4—6	_____
4. ☐ 6—8	_____
5. ☐ 8 o más	_____

III.7.2 Trabajadores Contratados

49. ¿Trabaja usted para otras personas de la comunidad?

1. SI ☐ 2. NO ☐

50. ¿En qué actividades trabaja?

1. Siembra ☐ Meses: _____
2. Cuido ☐ Meses: _____
3. Cosecha ☐ Meses: _____
4. Otros ☐ Meses: _____

Especifique: _____

51. ¿Cuánto le pagan por jornal? Q. _____
(sin comida)

52. ¿Consigue con facilidad trabajo en la comunidad?

1. SI ☐ Meses: _____
2. NO ☐

¿Por qué?

3. ☐ No existe trabajo
4. ☐ Existe pero es escaso

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Exhibit 4

53. ¿Ha trabajado usted en obras realizadas por el gobierno, en su comunidad?

1. SI ☐ 2. NO ☐

54. ¿Cuánto le pagan o le han pagado? Q _____

55. ¿Acostumbra trabajar fuera de la comunidad?

1. SI ☐ 2. NO ☐

3. ACTIVIDAD	4. MESES	5. LUGARES
_____	_____	_____
_____	_____	_____
_____	_____	_____

56. ¿Cuánto le pagan en esos lugares? Q _____
(sin comida)

IV. GRADO DE COOPERACION CON LA COMUNIDAD EN LA CONSTRUCCION Y O MANTENIMIENTO DEL CAMINO

57. ¿Estaria usted y/o sus hijos dispuestos a participar en Comités Pro-contrucción y/o Mantenimiento de Caminos Rurales?

1. SI ☐ 2. NO ☐

¿Por qué? _____

58. ¿Estaría usted y/o sus hijos dispuestos a trabajar en la construcción y/o mantenimiento del camino?

1. SI ☐ 2. NO ☐

¿Por qué? _____

59. Si el camino pasara por sus tierras ¿permitiría usted el paso en forma gratuita?

1. SI ☐ 2. NO ☐

¿Por qué? _____

60 Si dentro de su propiedad se localizaran recursos naturales aprovechables para la construcción del camino (bancos de préstamo, árena, piedra, madera, agua, etc. ¿permitiría usted su extracción y uso para el proyecto en forma gratuita?

1. SI ☐ 2. NO ☐

¿Por qué? _____

Exhibit 4

V. IMPACTO

V.I Impacto Ambiental

61. Para cocinar en su hogar ¿qué energía utiliza?

1. Leña ☐ 2. Carbón ☐ 5. Otra ☐
3. Gas ☐ 4. Eléctrica ☐ Especifique: _____

62. ¿Acostumbra cortar árboles?

1. SI ☐ 2. NO ☐ ¿Por qué? _____

(Si la respuesta es NO pase al numeral 14)

(Si la respuesta es afirmativa, continúe).

¿Los utiliza para hacer leña? ☐ ¿Los vende a aserraderos? ☐

3. ¿Dónde los corta?		Area (en cuerdas)	Cuántas tareas por cuerda
4. Terreno propio	☐	_____	_____
5. Comunal	☐	_____	_____
6. Municipal	☐	_____	_____
7. Nacional (bosque)	☐	_____	_____

8. ¿Para qué la utiliza?		Cantidad (tareas/año)	Cantidad de leños/tarea
9. Para consumo	☐	_____	_____
10. Hacer carbón	☐	_____	_____
11. Para vender	☐	_____	_____
12. Otros	☐	_____	_____

Especifique: _____

13. ¿En cuánto vende la tarea? Q _____

14. ¿Dónde compra la leña? _____

15. ¿Distancia? _____ 16. ¿Cuánto paga/tarea? Q _____

17. ¿Para qué la usa?		Cantidad (tareas/año)
18. Consumo propio del hogar	☐	_____
19. Hacer carbón	☐	_____
20. Revender	☐	_____
21. Caleras	☐	_____
22. Hacer pan	☐	_____

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Exhibit 4

23. Tortillerías ☐ _____

24. Otros ☐ _____

Especifique: _____

25. ¿Cómo la transporta o se la traen?

26. En hombros ☐ 29. En bestia ☐

27. Carreta ☐ 30. Pick-up ☐

28. Camión ☐ 31. Camioneta ☐

32. Otros ☐ Especifique: _____

33. ¿Cuánto paga por el transporte de su leña? Q _____
(quetzales / tarea)

63. Cuando usted corta árboles ¿siembra otros para reponer los cortados?

1. SI ☐ 2. NO ☐

¿Por qué? _____

3. ¿Cuántos árboles siembra por cada uno cortado? _____

4. ¿Dónde los siembra? ☐

5. Terreno propio ☐ 7. Municipal ☐

6. Comunal ☐ 8. Nacional (bosques) ☐

64. ¿Hay en la comunidad programas de reforestación?

1. SI ☐ 2. NO ☐

¿Por qué? _____

(si la respuesta anterior es afirmativa)

3. ¿Qué instituciones los ayudan para reforestar?

4. INAFOR ☐ Otras ☐ Especifique: _____

5. Municipal ☐ Ninguna ☐ Por qué: _____

65. ¿Participa usted en la reforestación?

1. SI ☐ 2. NO ☐

¿Por qué? _____

66. Si se llevara a cabo un Programa de Reforestación en esta comunidad

¿le gustaria participar? 1. SI ☐ 2. NO ☐

¿Por qué?: _____

Exhibit 4

V.II Impacto Socio-económico

67. Si se construyera el camino, ¿cree usted incrementar su producción?

1. Agrícola ☐
2. Ganadera ☐
3. Textil ☐
4. Artesanal ☐
5. Avícola ☐
6. Otras ☐

Especifique: _____

68. Al estar terminado el camino ¿qué otros servicios considera usted serían más importantes construir o introducir?

1. Centro de Salud ☐
2. Escuela ☐
3. Iglesia ☐
4. Canchas deportivas ☐
5. Agua potable ☐
6. Electricidad ☐
7. Otros ☐

Especifique: _____

VI. OBSERVACIONES.

_____

_____

_____

_____

_____

_____

_____

_____

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DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

P (1)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION RECION: Exhibit 5 Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO (Q)
001	Limpia, Chapeo y Destronque	Ha.	0.0052	1,069.24
003	Excavación en Corte y Tallado de Taludes			
	1. Material Suave	M^3	4.81	1.15
	2. Material Intermedio	M^3	3.09	1.80
	3. Material Duro	M^3	2.30	2.41
	4. Roca	M^3	0.65	8.55
072	Préstamos Laterales y de Banco			
	1. Material Suave	M^3	4.81	1.15
	2. Material Intermedio	M^3	3.09	1.80
	3. Material Duro	M^3	2.30	2.41
	4. Roca	M^3	0.65	8.55
070	Terraplenes (Rellenos)			
	1. Formación y Compactación	M^3	2.11	2.63
006	Excavación en Zanjas			
	1. Material Suave	M^3	3.0	1.85
	2. Material Intermedio	M^3	2.62	2.13
	3. Material Duro	M^3	1.19	4.67
	4. Roca	M^3	0.65	8.55

DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

P(2)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION REGION: Exhibit 5 Anex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO (Q)
011	Remoción de Derrumbes	M^3	7.52	0.74
043	Relleno Estructural	M^3	6.54	0.84
073	Acarreo de Materiales			
	1. De 0 - 20 m.	M^3	3.36	1.66
	2. De 0 - 40 m.	M^3	2.00	2.78
090	Protección de Taludes			
	1. (Siembra de Vegetación)	M^3	7.5	0.74
053	Muros Secos (Construcción)	M^3	1.87	2.97
004	Excavaciones Estructurales			
	EN SECO:			
	1. Material Suave	M^3	1.99	2.79
	2. Material Intermedio	M^3	1.40	3.98
	3. Material Duro	M^3	1.06	5.25
	4. Roca	M^3	0.65	8.55
	CON ACUA:			
	5. Material Suave	M^3	1.85	3.00
	6. Material Intermedio	M^3	1.5	3.71
	7. Material Duro	M^3	1.4	3.98

DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

p. (3)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION REGION: Exhibit 5 Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO $
	8. Roca	M^3	0.72	7.72
018	Construcción y Reconstrucción de Cunetas y Contracunetas (Excavación)			
	1. Material Suave	m.l.	14.17	0.40
	2. Material Intermedio	m.l.	12.08	0.46
	3. Material Duro	m.l.	10.00	0.56
	4. Roca	m.l.	8.00	0.69
	5. Tallado de Cunetas	m.l.	15.00	0.37
056	Construcción de Badenes (Excavación)			
	1. Material Suave	M^3	1.99	2.79
	2. Material Intermedio	M^3	1.40	3.98
	3. Material Duro	M^3	1.06	5.25
075	Zampeado con Mortero	M^2	2.0	2.78
076	Zampeado sin Mortero	M^2	3.54	1.57
160	Elementos Verticales (Formaletas)	M^2	1.70	3.27
049	Mampostería			
	1. Levantado de Piedra con Formaleta	M^3	0.302	18.41
	2. Levantado de Piedra con Hilos	M^3	0.84	6.62
	3. Cajas y Tragantes	M^3	0.3745	14 .79

DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

p. (4)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION REGION: Exhibit 5 Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO ($)
	4. Bóvedas	m^3	0.24	23.17
026	Drenajes de Mampostería o Alcantarillas construídas en Sitio			
	1. Con Formaleta	m^3	0.302	18.41
	2. Con Hilos	m^3	0.84	6.62
063	Superficie de Piedra	m^2	2.0	2.78
062	Balasto (Tendido y Afinado)	m^3	9.88	0.56
060	Extracción, carga y acarreo de Materiales/Balasto en banco			
	1. Extracción y carga			
	1.1 Material Suave	m^3	3.37	1.66
	1.2 Material Intermedio	m^3	2.16	2.57
	1.3 Material Duro	m^3	1.61	3.46
099	Tubería de metal de 24"			
	1. Armado y Colocado	m.l.	12.0	0.46
101	Tubería de metal de 30"			
	1. Armado y Colocado	m.l.	12.0	0.46
103	Tubería de metal de 36"			
	1. Armado y Colocado	m.l.	12.0	0.46
194	Tubería de metal de 42"			

DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

p. (5)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION REGION: Exhibit 5 Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO (Q)
	1. Armado y Colocado	m.l.	10.0	0.56
105	Tubería de metal de 48"			
	1. Armado y Colocado	m.l.	10.0	0.56
107	Tubería de metal de 60"			
	1. Armado y Colocado	m.l.	6.0	0.93
100	Tubería de Concreto de 24"			
	1. Colocación	m.l.	2.0	2.78
102	Tubería de Concreto de 30"			
	1. Colocación	m.l.	1.0	5.56
104	Tubería de Concreto de 36"			
	1. Colocación	m.l.	0.5	11.12
106	Tubería de Concreto de 48"			
	1. Colocación	m.l.	0.5	11.12
108	Tubería de Concreto de 60"			
	1. Colocación	m.l.	0.25	22.24
161	Emparrillado y Fundición de Losa			
	1. Emparrillado	m^2	0.752	7.39
	2. Fundición de Losa	m^3	0.125	44.36

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DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

P.(6)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION REGION: Exhibit 5 Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO (G)
014	Cunetas Revestidas	M^2	2.0	2.78
24700	OTRAS ACTIVIDADES			
	01. Vivandera	Día		5.18
	02. Guardían	Día		5.18
	03. Mensajero	Día		5.18
	04. Conserje	Día		5.18
	05. Ayudante de Mecánico	Día		5.55
	06. Ayudante de Canoral	Día		5.18
	07. Ayudante de Trabajador Social	Día		5.18
	08. Auxiliar de Guardalmacén	Día		5.55
	09. Auxiliar de Distribuidor de Combustible	Día		5.18
	10. Calero	Día		6.65
	11. Ayudante de Calero	Día		4.44
	12. Aserrador	Día		5.18
	13. Carpintero	Día		5.91
	14. Ayudante de Carpintero	Día		4.44
	15. Cantero	Día		6.65
	16. Peón de Topografía	Día		5.18

DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

p. (7)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: CONSTRUCCION RECION: Exhibit 5 Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/PIA	PRECIO DE CAMPO (Q)
	17. Herrero	Día		5.91

DIRECCION GENERAL DE CAMINOS
PROGRAMA DE CAMINOS RURALES CON USO
INTENSIVO DE MANO DE OBRA

P(1)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: MANTENIMIENTO REGION: Exhibit 5A Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO H/DIA	INDICE UNITARIO (%)
001	Limpia y Chapeo	M^2	92.49	0.06
144	Limpia de Cunetas y Contracunetas	m.l.	58.54	0.19
018	Construcción y Reconstrucción de Cunetas y Contracunetas			
	1. Material Suave	m.l.	25.0	0.22
	2. Material Intermedio	m.l.	21.12	0.27
	3. Material Duro	m.l.	10.77	0.52
	4. Roca	m.l.	9.38	0.59
050	Protección de Taludes (Siembra de Vegetación)	M^2	6.04	0.92
053	Construcción de Muros Secos	M^3	1.56	3.56
030	Bacheo	M^3	4.33	1.29
241	Reacondicionamiento de la Subrasante (Ondulaciones de 15 cm.)	M^3	8.10	0.68
012	Remoción de Derrumbes o Deslizamientos	M^3	4.87	1.14
082	Limpieza de Tuberías	m.l.	1.37	4.05
310	Rellenos	M^3	4.45	1.24
075	Zampeado con Mortero	M^2	2.0	2.78
076	Zampeado sin Mortero	M^2	3.54	1.57
049	Construcción de Lavaderos, gavachas, etc. a base de Mampostería	M^3	0.69	8.06
313	Reparación de Elementos Estructurales (Cabezales y muros)	M^3	1.0	5.56

FUENTE: [illegible] Proyecto AID-520-0271

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

(2)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURAL

ACTIVIDAD: MANTENIMIENTO REGION: Exhibit 5A Annex 2

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	PRECIO UNITARIO (Q)
040	Reparación de Losas y Bóvedas	M^3	0.24	23.67
060	Extracción, carga y acarreo de materiales/Balasto en Banco			
	1. Extracción y carga			
	1.1 Material Suave	M^3	3.37	1.66
	1.2 Material Intermedio	M^3	2.16	2.57
	1.3 Material Duro	M^3	1.61	3.46
052	Tendido y afinado de Balasto	M^3	9.88	0.56
057	Reparación de Badenes	M^2	6.0	0.93
073	Acarreo de Materiales			
	1. De 0 - 20 m.	M^3	3.36	1.66
	2. De 0 - 40 m.	M^2	2.00	2.78
099	Tubería de metal de 24"			
	1. Armado y Colocado	m.l.	12.0	0.46
101	Tubería de metal de 30"			
	1. Armado y Colocado	m.l.	12.0	0.46
103	Tubería de metal de 36"			
	1. Armado y Colocado	m.l.	12.0	0.46
104	Tubería de metal de 42"			

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

p.(3)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURAL

ACTIVIDAD: MANTENIMIENTO RECION: Exhibit 5A Annex 3

CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO U/DIA	MANO DE OBRA (O)
	1. Armado y Colocado	m.l.	10.0	0.56
105	Tubería de metal de 48"			
	1. Armado y Colocado	m.l.	10.0	0.56
107	Tubería de metal de 60"			
	1. Armado y Colocado	m.l.	6.0	0.93
100	Tubería de concreto de 24"			
	1. Colocación	m.l.	2.0	2.78
102	Tubería de concreto de 30"			
	1. Colocación	m.l.	1.0	5.56
134	Tubería de Concreto de 36"			
	1. Colocación	m.l.	0.5	11.12
106	Tubería de Concreto de 48"			
	1. Colocación	m.l.	0.5	11.12
108	Tubería de Concreto de 60"			
	1. Colocación	m.l.	0.25	22.24
014	Cunetas Revestidas	M^2	2.0	2.78
24700	OTRAS ACTIVIDADES			
	01. Vivandera	Día		5.18

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

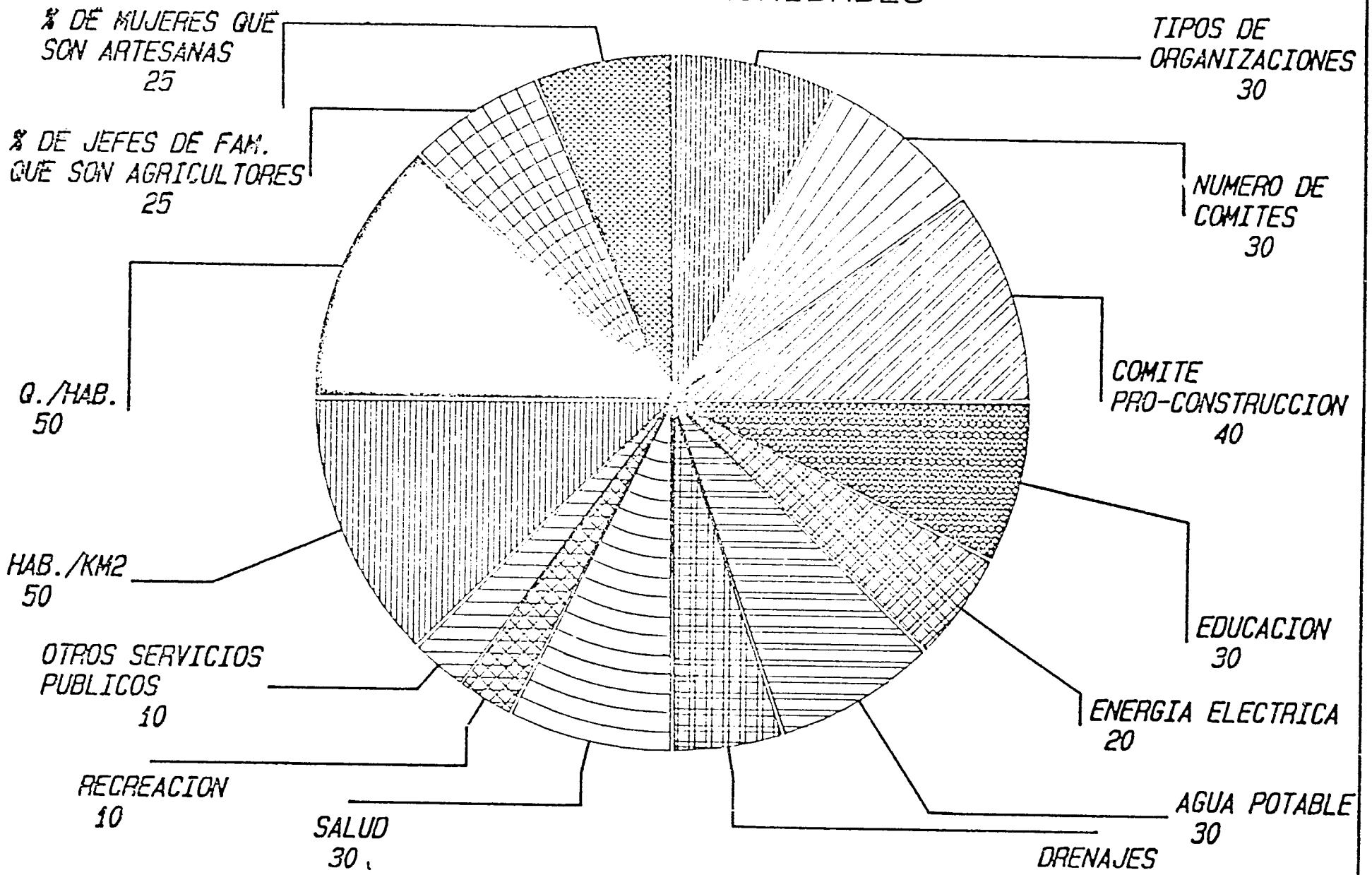
P.(4)

RENDIMIENTO DE LA MANO DE OBRA EN LAS DIFERENTES ACTIVIDADES DE CAMINOS RURALES

ACTIVIDAD: MANTENIMIENTO REGION: Exhibit 5A Annex 3

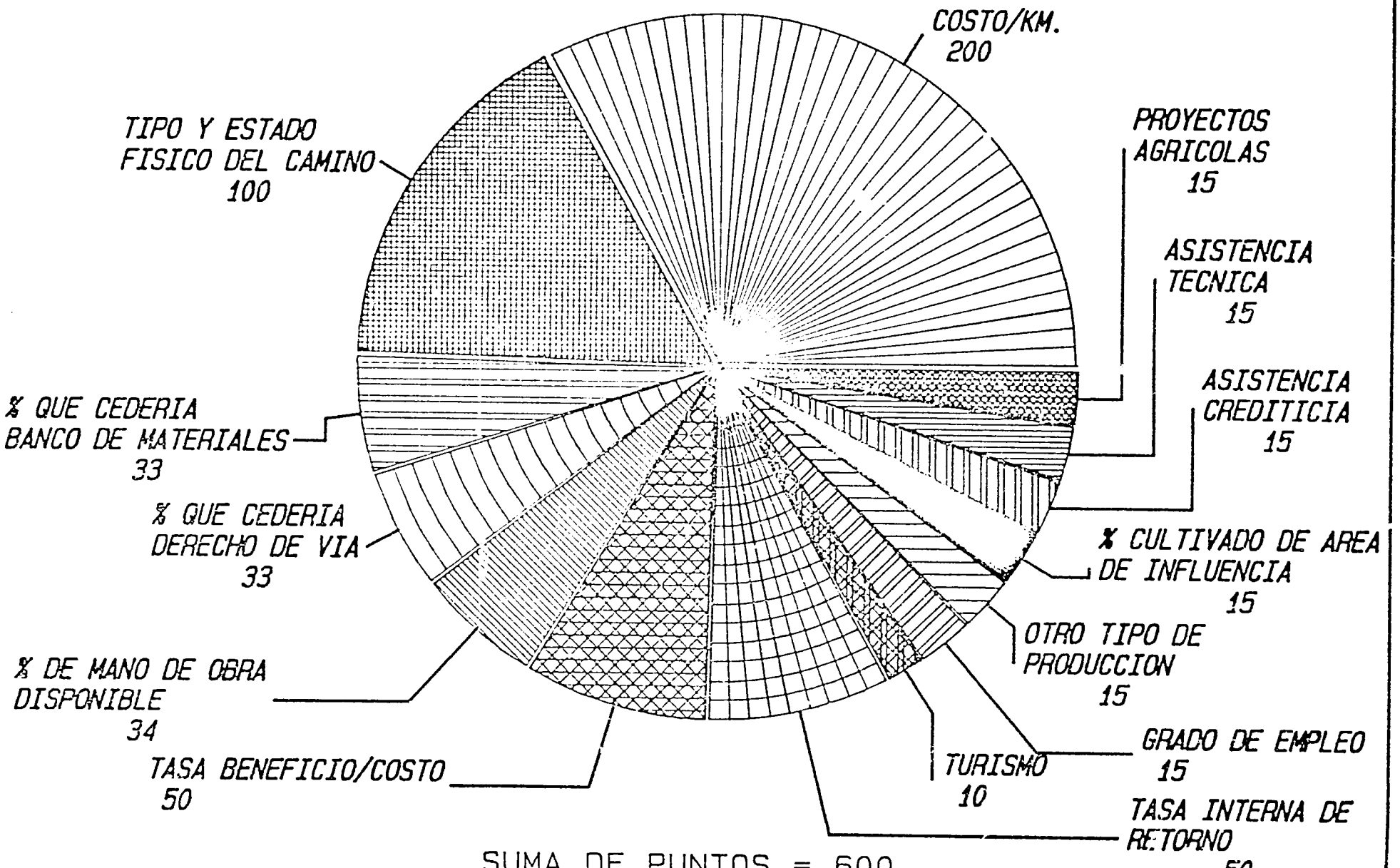
CODIGO	CONCEPTO	UNIDAD	RENDIMIENTO D/HA	PRECIO UNITARIO (Q)
	02. Guardian	Día		5.18
	03. Mensajero	Día		5.18
	04. Conserje	Día		5.18
	05. Ayudante de Mecánico	Día		5.55
	06. Ayudante de Caporal	Día		5.18
	07. Auxiliar de Trabajador Social	Día		5.18
	08. Auxiliar de Guardalmacén	Día		5.55
	09. Auxiliar de Distribuidor de Combustible	Día		5.18
	10. Calero	Día		6.65
	11. Ayudante de Calero	Día		4.44
	12. Aserrador	Día		5.18
	13. Carpintero	Día		5.91
	14. Ayudante de Carpintero	Día		4.44
	15. Cantero	Día		5.91
	16. Peón de Topografía	Día		5.18
	17. Herrero	Día		5.91

CONSIDERACIONES DEMOGRAFICAS, ORGANIZATIVAS Y DE SERVICIOS PUBLICOS EN LAS COMUNIDADES



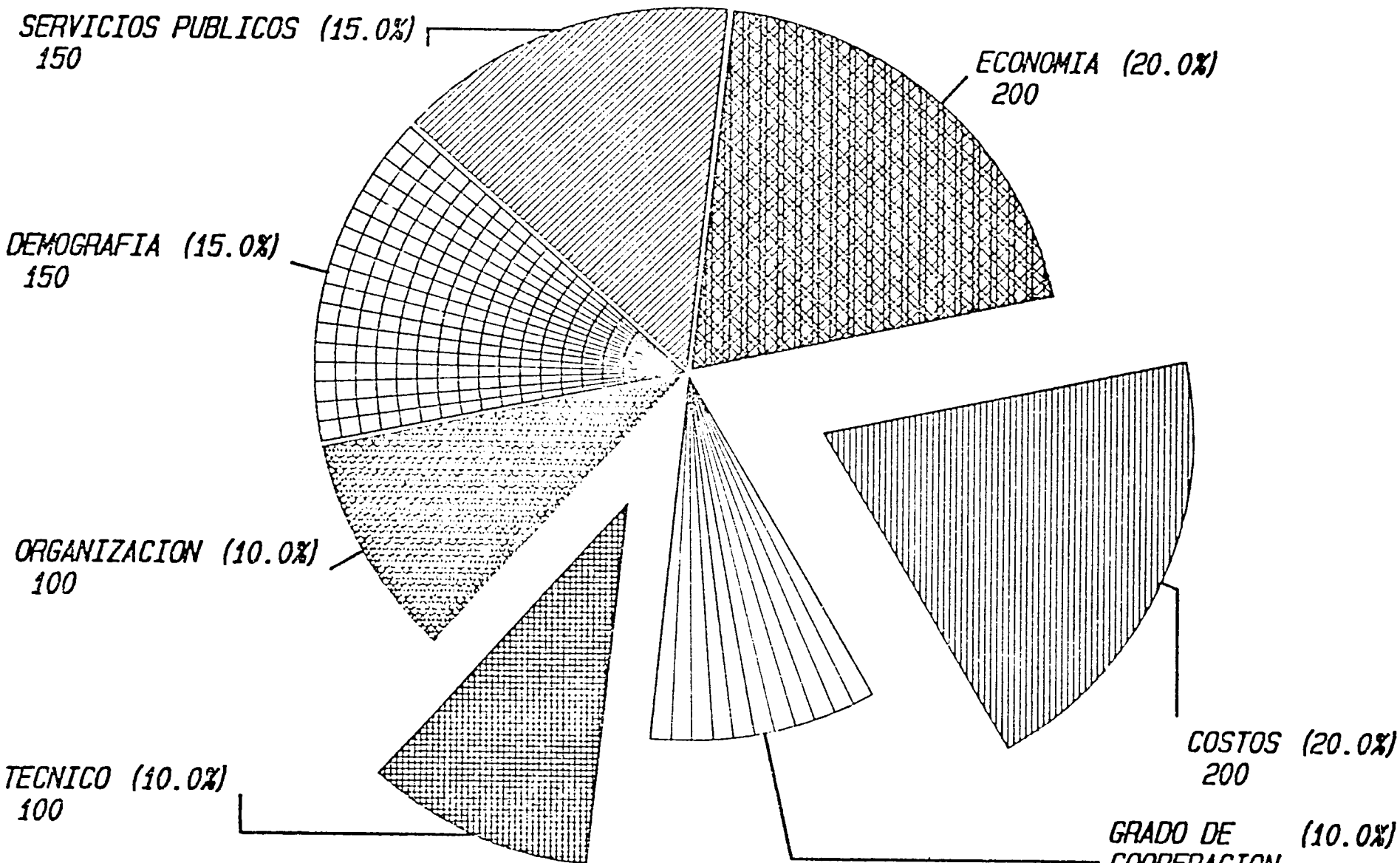
SUMA DE PUNTOS = 400

CONSIDERACIONES ECONOMICAS, TECNICAS, DE COSTO Y COOPERACION EN LAS COMUNIDADES



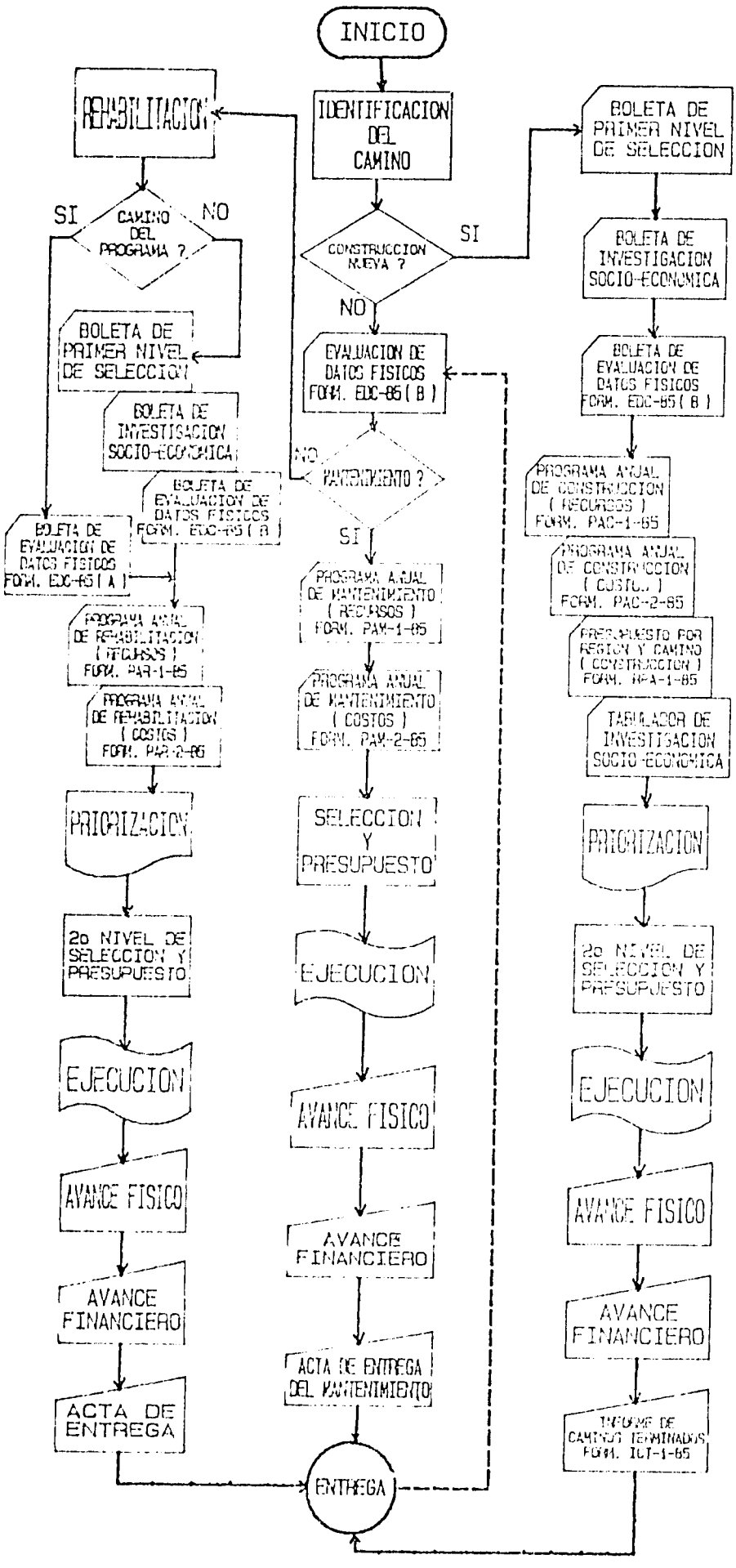
SUMA DE PUNTOS = 600

DISTRIBUCION DE ELEMENTOS MINIMOS A CONSIDERAR EN LA PRIORIZACION DE UN CAMINO RURAL CONSTRUIDO CON USO INTENSIVO DE MANO DE OBRA



SUMA DE PUNTOS = 1000

Exhibit No 9 Annex 3



PROCEDIMIENTO PARA LA EVALUACION Y PLANIFICACION DE LOS PROYECTOS DE CAMINOS RURALES SEGUN SU ACTIVIDAD

I. CONSTRUCCION Y REHABILITACION

I.1 Todas las actividades previo a la priorizacion seran realizadas por la oficina regional del Programa de Caminos Rurales (PCR).

I.2 La Coordinadora del PCR realiza las actividades de PRIORIZACION, SELECCION Y PRESUPUESTACION.

I.3 Las oficinas regionales son las responsables de la EJECUCION y del control de AVANCE FISICO Y FINANCIERO.

II. MANTENIMIENTO

II.1 Estas obras seran realizadas por los Centros de Mantenimiento, los cuales se encuentran en proceso de organizacion.

II.2 Las seis (6) regiones efectuaran los estudios y elaboraran los Programas de Mantenimiento y EJECUCION, controlando el AVANCE FISICO Y FINANCIERO MENSUAL.

II.3 Los Centros de Mantenimiento seran responsables de priorizar y planificar los proyectos, asi como presupuestar los gastos directos. Actualmente las regiones priorizan los proyectos y la Coordinadora del PCR planifica y elabora los presupuestos de Mantenimiento.

Direccion General de Caminos
Programa de Caminos Rurales
Asistencia Tecnica Proyecto A.I.D. 520-0274
Centro de Computo
Julio, 1986

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Exhibit 10 Annex 3

ASISTENCIA TECNICA
PROYECTO AID 520-0274

Form. BS-1-85

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

BOLETA PARA PRIMER NIVEL DE SELECCION

REGION: _____ SEDE: _____

I. DATOS GENERALES

Fecha de Solicitud: _____ Depto: _____ Municipio: _____

Aldea o Caserío: _____ Tramo: _____ Long. _____ Kms.

Origen de Solicitud: _____ Entronca c/Ruta Existente: SI ☐ NO ☐

Tipo de Solicitud:

Construcción nueva:	☐	Urbanización:	☐
Mantenimiento:	☐	Acceso a Aldea:	☐
Ampliación y Mejoramiento:	☐	Rehabilitación:	☐

Area de Influencia _____ Km²

II. ASPECTOS SOCIALES

II.1 Demografía

Poblaciones que se beneficiarán con la obra dentro del área de influencia:

Nombre de Población:	Número de habitantes:
T O T A L:	

Densidad _____ habitantes/Km² Tamaño Familias: _____

Población económicamente activa _____ / _____ %

Grupo Etnico:

Ladino: _____ % Indígena: _____ %

Dialectos en el área de Influencia: _____

Ocupaciones:

De la Familia: _____ De las Mujeres: _____

II.2 Organizaciones

Religiosas:	☐	Comunales:	☐
Sindicales:	☐	Municipales:	☐
Otras:	☐ Especifique: _____	Ninguna:	☐

Exibit 10 Annex 3 p.(2)

Existe colaboración estrecha de las autoridades civiles y/o militares del área en la construcción de Obras en beneficio de las comunidades:

SI ☐ NO ☐ Por qué: _____

_____

II.3 Servicios Públicos

II.3.1 Educación (Escuelas)

	Pública	Privada	Número de Aulas	Número de Grados	Número de Alumnos	Número de Maestros	Estado en que se encuentran B	R	M
Pre-Primaria Bilingüe	☐	☐					☐	☐	☐
	☐	☐					☐	☐	☐
Castellanización	☐	☐					☐	☐	☐
	☐	☐					☐	☐	☐
Primaria	☐	☐					☐	☐	☐
	☐	☐					☐	☐	☐
Secundaria	☐	☐					☐	☐	☐
	☐	☐					☐	☐	☐
Técnica/Vocacional	☐	☐					☐	☐	☐
	☐	☐					☐	☐	☐
Universitaria	☐	☐					☐	☐	☐
	☐	☐					☐	☐	☐

La(s) escuela(s) tiene(n): Agua Potable: ☐ Electricidad: ☐

Servicios Sanitarios: ☐ Drenajes: ☐ Letrina: ☐

No tienen: ☐ Por qué: _____

_____

Alfabetismo: _____ / _____ %

II.3.2 Energía Eléctrica

INDE: ☐

Municipal: ☐

No.: ☐

Otra: ☐

Especifique: _____

_____

_____

_____

II.3.3 Agua

Potable: ☐

II.3.4 Drenaje

A. N: ☐

A. LL: ☐

Mixto: ☐

Letrinas: ☐

No: ☐

Por qué _____

II.3.5 Viviendas

Adobe: _____ %

Ladrillo: _____ %

Block: _____ %

Madera: _____ %

Concreto: _____ %

Bahareque: _____ %

Otros: _____ %

Especifique: _____

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Exhibit 10

II.3.6 Salud	Número	Localización	Distancia
Promotores de Salud	_____	_____	_____ Kms.
Puestos de Salud	_____	_____	_____ Kms.
Centros de Salud	_____	_____	_____ Kms.
Hospital	_____	_____	_____ Kms.
Médico	_____	_____	_____ Kms.
Ninguno	☐		

III. ECONOMIA

III.1 Tenencia de la Tierra

Privado: _____ %

Comunal: _____ %

Municipal: _____ %

Nacional: _____ %

Arrendados: _____ %

Usufructo: _____ %

Tamaño:

Promedio: _____ Has.

III.2 Asistencia Técnica

DIGESA: ☐

INAFOR: ☐

INFOM: ☐

ICTA: ☐

BANDESA: ☐

INTA: ☐

INTERNACIONAL: ☐

III.3 Asistencia Financiera

BANDESA: ☐

INFOM: ☐

INTERNACIONAL: ☐

OTROS: ☐

Especifique:

_____

_____

_____

III.4

Proyectos Agrícolas	En Funcionamiento	En Ejecución	En Programación	Area (Has.)	Localización	Institución
Conservación de Suelos:	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
Reforestación:	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
Mini-Riego:	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
Canalización de agua:	☐	☐	☐			
	☐	☐	☐			
	☐	☐	☐			
Otros:	☐	☐	☐			
	☐	☐	☐			

Especifique: _____

_____

Exhibit 10

III.5 **Producción**

III.5.1 **Agrícola**

Area Cultivada: _____ Has.

Area Cultivada ÷ Area de Influencia: _____ %

Area no Cultivada: _____ Has.

Area no cultivada ÷ Area de Influencia: _____ %

Cultivos (Tipo): _____

Epocas: _____

Mercado: _____

III.5.2 **Pecuaria**

Area: _____ Has.

Area Pecuaria ÷ Area de Influencia: _____ %

Tipos: _____

Epocas: _____

Mercado: _____

III.5.3 **Artesanal**

Tipos: _____ Mercado: _____

III.5.4 **Turísticos**

Tipo		Número	Tipo		Número	Tipo		Numero
Balnearios:	☐	_____	Ruinas:	☐	_____	Hoteles:	☐	_____
Pensiones:	☐	_____	Hospedaje:	☐	_____	Turistas:	☐	_____

IV. **TECNICO (INGENIERIA)**

IV.1 **Entronca con:**

Ruta Nacional: _____ Km. _____

Ruta Departamental: _____ Km. _____

Ruta Municipal: _____ Km. _____

Ruta Privada: _____ Km. _____

Otro: _____ Km. _____

IV.2 **Medios de Transporte que llegan y salen a la comunidad:**

Tipo		Número	Tipo		Número
Camiones:	☐	_____	Carretas:	☐	_____
Camionetas:	☐	_____	Bestias:	☐	_____
Pick-Ups:	☐	_____	Otros:	☐	_____
Automóviles:	☐	_____	Especifique:	☐	_____

IV.3 **Tipos de Terreno:**

Montañoso: _____ %

Ondulado: _____ %

Plano: _____ %

IV.4 **Clase de Material:**

Rocoso: _____ %

Duro: _____ %

Intermedio: _____ %

Suave: _____ %

IV.5 **Movimiento de Tierras**

(Terracería)

Mayor de 15,000 m^3/Km: ☐ De 10-15 mil m^3/Km: ☐ Menor de 10,000 m^3/Km: ☐

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Exhibit 10

IV.6 DRENAJES

OBRAS MAYORES:

	Existentes	Nuevas	Número	Long.	Altura	ESTADO: Bueno	Regular	Malo
Puentes	☐	☐	_____	_____	_____	☐	☐	☐
	☐	☐	_____	_____	_____	☐	☐	☐
Bóvedas	☐	☐	_____	_____	_____	☐	☐	☐
	☐	☐	_____	_____	_____	☐	☐	☐

OBRAS MENORES:

Existentes	Nuevas	Número	Cantidad/Km.
☐	☐	_____	_____
☐	☐	_____	_____

IV.7 Costo total estimado del camino tomando en cuenta el tipo de terreno, drenaje y clase de material:

Q. _____

IV.8 **Bancos de Materiales Existentes**

Sí: ☐ No: ☐

Distancia: _____ Kms.

Localización: _____

V. MEDIO AMBIENTE

V.1 **Existen obras arqueológicas o históricas:**

SI ☐ NO ☐

Son visitadas por el público:

SI ☐ NO ☐

V.2 **Tipo de Vegetación**

Bosques: ☐ Arbustos: ☐

Pastizales: ☐ Otros: ☐

Especifique: _____

Existen incendios forestales:

SI ☐ NO ☐

En qué época _____

V.3 **Especies en peligro de extinción:**

Qué tipo: _____

Lugar donde se encuentra: _____

Qué medidas existen para protegerlas: _____

_____

V.4 **Existen áreas de reserva:**

TIPO	SI	NO	Extensión
Nacionales	☐	☐	_____
Municipales	☐	☐	_____

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Exhibit 10

V.5 **Explotación de Bancos de Préstamo**

(Materiales)

Localización: _____

Tipo de Suelo: _____

Cómo podrían dañar el medio ambiente:

_____

_____

_____

_____

V.6 **Efectos por el uso de la Tierra**

Erosión: _____ %

Rosa y quema: _____ %

Deforestación _____ %

Alteración Ecosistema _____ %

Tipos de Agroquímicos _____ %

Tipo de Depredación Recursos Naturales: _____

V.7 **Posibles daños a Recursos Hídricos**

Calidad de agua: ☐

Canalización: ☐

Ríos: ☐

Quebradas: ☐

Pozos: ☐

Acequia: ☐

Otros: ☐

Especifique: _____

_____

V.8 **Socioeconómicos**

Impacto en patrones culturales:

_____

Impacto en patrones demográficos:

_____

Impacto en patrones laborales:

_____

Otros Impactos: _____

_____

_____

OBSERVACIONES: _____

_____

_____

_____

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_____

_____

Exhibit 10

ELEMENTOS DE NO ELEGIBILIDAD

- ☐ 1. Longitud mayor de 18.0 Km.
- ☐ 2. Pendiente longitudinal mayor de 12% en tramos mayores de 150 m.
- ☐ 3. Terraplenes mayores de 500 m.
- ☐ 4. El movimiento de tierras es mayor de 15,000 m^3/Km.
- ☐ 5. La longitud de inestabilidad mayor del 10%.
- ☐ 6. El número de alcantarillas es mayor de 6 unidades/Km.
- ☐ 7. Puentes mayores de 15 mts. de luz y alturas mayores de 10 mts.
- ☐ 8. El proyecto está ubicado en áreas de Reserva Nacional.
- ☐ 9. Disponibilidad de mano de obra inferior a 50 hombres/día.
- ☐ 10. El proyecto no está localizado en una zona de pequenos agricultores (el 90% de las parcelas no es menor de 20 has).
- ☐ 11. Zona cafetalera donde más del 10% del área son explotaciones de mayores caficultores.
- ☐ 12. Existe transporte en toda época.
- ☐ 13. Planes (definitivos) para la construcción de caminos alternos.
- ☐ 14. La población a beneficiarse no está dispuesta a colaborar con mano de obra.
- ☐ 15. Autoridades locales no están dispuestas a colaborar.
- ☐ 16. La población a servir es menor de 300 habitantes en el **área de Influencia.**
- ☐ 17. Existe otro camino paralelo dentro del área de Influencia.

VI. DECISION ☐ ELEGIBLE ☐ NO ELEGIBLE

FECHA: _____

FIRMA: _____ _____

Area Social Area Técnica

Fecha Recibido por Centro Cómputo: _____

Código Asignado: _____

Firma: _____

Exhibit 11

ASISTENCIA TECNICA
PROYECTO AID 520-0274

Form. EDC-85

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

PROGRAMA DE MANTENIMIENTO DE CAMINOS RURALES

EVALUACION, INVENTARIO Y DATOS FISICOS DE LOS CAMINOS

PARTE A

1. DATOS GENERALES:

1.1 Nombre del camino: _____

1.2 Código: _____ Longitud:
- ☐ Real _____ kilómetro
- ☐ Con Odómetro _____ kilómetro
- ☐ Estimada _____ kilómetro

1.3 Departamento: _____ Municipio _____

1.4 Entronca con:

1 Ruta Centroamericana	No. _____	kilómetro _____
2 Ruta Nacional	No. _____	kilómetro _____
3 Ruta Departamental	No. _____	kilómetro _____
4. Ruta Municipal	No. _____	kilómetro _____
5 Ruta Privada No. o Nombre:	No. _____	kilómetro _____
6. Otro No. o Nombre:	No _____	kilómetro _____

1.5 Estado de transitabilidad en el cual se encuentra:

BUENA	☐	Se transita todo el año a una velocidad de 30 a 50 km/h, sin ninguna interrupción.
REGULAR	☐	Se transita la mayor parte del año y a una velocidad menor de 30-50 km/h., con interrupciones no mayores de 7 días, sobre todo durante la época lluviosa.
MALA	☐	Es transitable solamente en época seca, a una velocidad menor de 20-30 km/hora y las interrupciones son mayores de 15 días, sobre todo en la época lluviosa.

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Exhibit 11

II. ANTIGUEDAD Y MANTENIMIENTO DEL CAMINO

2.1 Fecha de inicio: _____

2.2 Fecha de terminación: _____

2.3 Se le ha dado mantenimiento por parte del programa: SI _____ NO _____

2.4 Si la respuesta anterior es sí, cuándo (fecha): _____

III. TIEMPO DE LLUVIA

3.1 Meses de lluvia No.: _____

3.2 Otro factor atmosférico que pueda dañar el camino (indicarlo): _____

3.3. Precipitación: _____ mm/año.

IV. TRANSITO

4.1 Vehículos que transitan:

Camiones No./día: _____

Camionetas No./día: _____

Pick-Ups No./día: _____

Vehículos particulares No./día: _____

Carretas de bueyes No./día: _____

Otros: _____

V. PRODUCCION AGROPECUARIA Y OTRAS

5.1 <u>Al efectuarse la construcción</u>

Area de influencia: _____ Has.

Area cultivada: _____ Has.

% del área cultivada en relación del área de influencia: _____ %.

5.2 <u>A la fecha de la evaluación</u>

Area de influencia: _____ Has.

Area cultivada: _____ Has.

% del área cultivada en relación del área de influencia: _____ %.

Exhibit 11

CULTIVOS

1	2	3	4	5	6
AL EFECTUARSE LA CONSTRUCCION			A LA FECHA DE LA EVALUACION		
TIPO	HECTAREAS CULTIVADAS	% DEL AREA CULTIVADA	HECTAREAS CULTIVADAS	% DEL AREA CULTIVADA	DIFERENCIA
Maíz					
Frijol					
Arroz					
Café					
Cardamomo					
Caña					
Otros					

GANADERIA

1	2	3	4	5
AL EFECTUARSE LA CONSTRUCCION		A LA FECHA DE LA EVALUACION		
ESPECIE	CANTIDAD	ESPECIE	CANTIDAD	DIFERENCIA
Ovino				
Caprino				
Bovino				
Vacuno				
Porcino				
Otros				

AVES DE CORRAL

1	2	3	4	5
AL EFECTUARSE LA CONSTRUCCION		A LA FECHA DE LA EVALUACION		
ESPECIE	CANTIDAD	ESPECIE	CANTIDAD	DIFERENCIA
Pollos, Pollitos				
Gallos, Gallinas				
Chompipes				
Patos				

ARTESANIAS

1	2	3	4	5
AL EFECTUARSE LA CONSTRUCCION		A LA FECHA DE LA EVALUACION		
ESPECIE	CANTIDAD	ESPECIE	CANTIDAD	DIFERENCIA
Barro				
Madera				
Maguey				
Raices				
Palma				
Cuero				

Otros especifique: _____

_____

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Exhibit 11

TEXTIL

1	2	3	4	5
AL EFECTUARSE LA CONSTRUCCION		A LA FECHA DE LA EVALUACION		
ACTIVIDAD	CANTIDAD	ACTIVIDAD	CANTIDAD	DIFERENCIA
Telares				
Cintas				
Chamarras				
Güipiles				
Cortes				
Morrales				
Perrajes				

ESPECIFICAR: _____

_____

_____

OTRAS ACTIVIDADES

1	2	3	4	5
AL EFECTUARSE LA CONSTRUCCION		A LA FECHA DE LA EVALUACION		
ACTIVIDAD	CANTIDAD	ACTIVIDAD	CANTIDAD	DIFERENCIA
Floricultura				
Cal				
Leña				
Madera				
Sastrería				
Panadería				
Otros				

ESPECIFICAR: _____ _____

_____ _____

_____

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PARTE B

Exhibit 11

VI. ESTADO FISICO

1. TOPOGRAFIA DEL CAMINO

1	2	3	4	5
De Km.	A Km.	PLANO	ONDULADO	MONTAÑOSO

2. TIPO Y DENSIDAD EN PORCENTAJE, DE LA VEGETACION

PASTIZALES ☐ _____ %

CULTIVOS ☐ _____ %

SELVA ☐ _____ %

BOSQUE ☐ _____ %

ARIDO ☐ _____ %

3. TECNOLOGIA A APLICAR POR TRAMOS

1	2	3	4
TRAMO De Km.	A Km.	Con mano de obra Volumen aproximado	Con maquinaria Volumen aproximado

Observaciones: _____

_____

4. TRAMOS DE TERRACERIA EXISTENTES QUE PUEDEN APROVECHARSE TOTAL Y PARCIALMENTE

1	2	3	4	5
TRAMO		APROVECHABLE		NO APROVECHABLE
De Km.	A Km.	Totalmente	Parcialmente	

5. LIMPIA Y CHAPEO

1	2	3	4	5	6
Estación		Longitud	Ancho	Lado	Observaciones
Del Km.	Al Km.				

6. TERRACERIAS

6.1 DERRUMBES

1	2	3	4	5
Estación		Lado	Volumen aproximado	Observaciones
Del Km.	Al Km.			

6.2 DESLIZAMIENTOS

1	2	3	4
Estación		Parte de camino dañado	Observaciones
Del Km.	Al Km.		

6.3 MODIFICACIONES EN EL ALINEAMIENTO HORIZONTAL

1	2	3	4
Estación		Volumen de movimiento de tierras aproximado	Motivo de la modificación
Del Km.	Al Km.		

6.4 MODIFICACIONES EN EL ALINEAMIENTO VERTICAL

1	2	3	4
Estación		Volumen de movimiento de tierras aproximado	Tipo de trabajo
Del Km.	Al Km.		

Exhibit 11

6.5 PENDIENTES MAYORES DEL 12%

1	2	3	4	5
Estación		Longitud	Pendiente %	Tipo de trabajo
Del Km.	Al Km.			

6.6 ZONAS DE REBASE

6.6.1 REHABILITACION

1	2	3	4
Estación		Volumen aproximado de movimiento de tierras (m^3)	Observaciones
Del Km.	Al Km.		

6.6.2 NUEVAS

1	2	3	4
Estación		Volumen aproximado de movimiento de tierras (m^3)	Observaciones
Del Km.	Al Km.		

6.6.3 EXISTENTES

1	2	3	4
Estación		Volumen aproximado de movimiento de tierras (m^3)	Observaciones
Del Km.	Al Km.		

.7 REPARACION DE MUROS

6.7.1 EXISTENTES (BUENOS Y EN MAL ESTADO)

1	2	3	4
Estacion		Volumen a Reparar (m^3)	Observaciones
Del Km.	Al Km.		

Exhibit 11

6.8 ESTABILIZACION DE TALUDES

1	2	3	4	5
Estación		Tipo de trabajo	Dimensiones	Area
Del Km.	Al Km.			

7. DRENAJES

7.1 LONGITUDINAL

7.1.1 CUNETAS

BUENAS (SIN AZOLVAMIENTO)

1	2	3	4	5	6
Estación		Lado	Estación		Lado
Del Km.	Al Km.		Del Km.	Al Km.	

AZOLVADAS

1	2	3	4	5	6
Estación		Lado	Estación		Lado
Del Km.	Al Km.		Del Km.	Al Km.	

RECONSTRUCCION

1	2	3	4	5
Estación		Longitud	Lado	Observaciones
Del Km.	Al Km.			

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Exhibit 11

NUEVAS

1	2	3	4	5
Estacion		Longitud	Lado	Tipo de trabajo
Del Km.	Al Km.			

7.1.2 CONTRACUNETAS Y CANALES DE ALIVIO EXISTENTES

1	2	3			4	5	6		
Estacion		Dimensiones			Estación		Dimensiones		
Del Km.	Al Km.	L	A	H	Del Km.	Al Km.	L	A	H

AZOLVADAS

1	2	3			4		5		
Estacion		Dimensiones			Estación		Dimensiones		
Del Km.	Al Km.	L	A	H	Del Km.	Al Km.	L	A	H

RECONSTRUCCION

1	2	3			4		5		
Estación		Dimensiones			Estación		Dimensiones		
Del Km.	Al Km	L	A	H	Del Km.	Al Km.	L	A	H

CONSTRUCCION (NUEVAS) CONTRACUNETAS ☐ CANALES DE ALIVIO ☐

1	2	3			4	5	6		
Estacion		Dimensiones			Estacion		Dimensiones		
Del Km.	Al Km	L	A	H	Del Km.	Al Km.	L	A	H

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Exhibit 11

7.2 TRANSVERSAL

7.2.1 OBRAS DE DRENAJE EXISTENTES

(Anotar en observaciones: Asolvadas y no asolvadas)

1	2	3	4	5
No.	Tipo de obra	Dimensiones	Estacion	Observaciones
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

7.2.2 OBRAS DE DRENAJE EN MAL ESTADO

1	2	3	4	5
No.	Tipo de obra	Dimensiones	Estación	Especificar reparaciones
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

7.2.3 OBRAS DE DRENAJE FALTANTES

(Si es obra de drenaje mayor, en observaciones anotar ubicación, nombre del accidente geográfico, material del cause y nivel de aguas máximas - externas).

1	2	3	4	5
No.	Tipo de obra	Dimensiones	Estación	Observaciones
1				
2				

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Exhibit 11

1	2	3	4	5
No.	Tipo de obra	Dimensiones	Estación	Observaciones
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

8. REVESTIMIENTO O CAPA DE RODADURA

8.1 ESPESOR EXISTENTE

1	2	3	4	5	6
Estación		ESPESORES			
Del Km.	Al Km.	5 cms.	10 cms.	15 cms.	20 cms.

8.2 CONDICION DE LA CAPA DE RODADURA

1	2	3	4	5
Condición	Estación		Longitud	Observaciones
	Del Km.	Al Km.		
Muy buena				
Buena				
Regular				
Mala				

8.3 TIPO DE LA CAPA DE RODADURA

Grava o Balasto ☐

Tierra ☐

8.4 BACHEO

1	2	3			4
Estación		Dimensiones			Volumen (LxAxH) m³
Del Km.	Al Km.	L	A	H	

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Exhibit 11

8.5 RENIVELACION

1	2	3	4
Estacion		Longitud	Observaciones
Del Km.	Al Km.		

8.6 REPOSICION DE MATERIAL DE REVESTIMIENTO

1	2	3	4	5
Estación		Espesor (m.)	Ancho (m.)	Volumen (m^3)
Del Km.	Al Km.			

9. BANCOS DE MATERIALES

1	2	3	4	5
No.	Estacion	Distancia de desviacion	Der-Izq	Tipo de materiales

10. SEÑALES

1	2	3	4
No.	Tipo	Estación	Estado

11. OBSERVACIONES DE TIPO GENERAL _____

_____

Nombres de las personas que efectuaron la inspección: _____

_____

Fecha de Inspección: _____

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Exhibit 12

ASISTENCIA TECNICA
PROYECTO AID 520-0274

Form. TAB-2-86

DIRECCION GENERAL DE CAMINOS

PROGRAMA DE CAMINOS RURALES CON USO INTENSIVO DE MANO DE OBRA

TABULADOR DE INFORMACION SOCIOECONOMICA

I. IDENTIFICACION

Código: _____ Nomore del proyecto: _____ Fecha: _____

Longitud: _____ Kms. Costo estimado: Q _____

Municipio: _____ Muestreo estimado: _____

Depto.: _____ No. de boletas: _____

Estim. población a muestrear: _____ Costo Km. (Mant.) Q _____

(Provisto por delegado residente)

II. DEMOGRAFIA

II.1

Hombres > 18 Años: _____ Mujeres > 18 Años: _____ Tamaño familias:

Hombres > 14 < 18: _____ Mujeres > 14 < 18: _____ _____ Estimado

Hombres > 7 < 14: _____ Mujeres > 7 < 14: _____

Hombres < 7 Años: _____ Mujeres < 7 Años: _____

II.2	Identificación	Cantidad	II.3	Identificación	Cantidad
Dialecto 1:	_____	_____	Trabajo 1:	Agricultura	_____
Dialecto 2:	_____	_____	Trabajo 2:	_____	_____
Dialecto 3:	_____	_____	Trabajo 3:	_____	_____
Dialecto 4:	_____	_____	Trabajo 4:	_____	_____
Dialecto 5:	_____	_____	Trabajo 5:	_____	_____
			No tienen:		_____

Total de miembros de familia directa que tienen trabajo permanente:

Número: _____

II.5 Tipo de ayuda				II.6 Actividades de esposas			
Papá	_____	Hijos	_____	Artesanales:	_____	Otras	_____
Mamá	_____	Otros	_____	Pequeñas industrias	_____	Especificar:	
Esposa	_____	Ninguna	_____	Ninguna	_____		_____

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Exhibit 12

III. ORGANIZACION

III.1 Tipo de organizaciones	Número:	III.2 Comités pro-mejoramiento	Número
Religiosas	_____	Pro-mejoramiento de aldea:	_____
Comunales	_____	Coordinadora local:	_____
Sindicales	_____	Pro-construcción de camino:	_____
Municipales	_____	Pro-construcción centro o puesto de salud:	_____
Ninguna	_____	Pro-construcción escuelas:	_____
Otras	_____	Introducción agua potable:	_____
Especificar: _____		Otros:	_____
		Especificar: _____	

IV. EDUCACION

IV.1 Educación personal

No. que si leen y escriben: _____

No. que no leen y escriben: _____

		Grado cursado	Nivel existente	No existente
Pre-Primaria Bilingüe:	_____	_____	(1) _____	(1) _____
Primaria:	_____	_____	(2) _____	(2) _____
Técnico-Vocacional:	_____	_____	(4) _____	(4) _____
Ninguna:	_____	_____	(0) _____	(0) _____
Castellanización:	_____	_____	(1) _____	(1) _____
Secundaria:	_____	_____	(3) _____	(3) _____
Universitaria:	_____	_____	(5) _____	(5) _____
Otras:	_____	_____	(6) _____	(6) _____
Especificar:	_____	_____	(Marcar con "X")	

IV.2

¿Estudian hijos? Sí: _____

No. _____

Pública: _____

Privada: _____

Residencia maestro-en escuela: _____

En aldea: _____

Fuera de aldea: _____

Otra: _____

Especificar: _____

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Exhibit 12

IV.3

Días de clase semanal 1: _____

2: _____

3: _____

4: _____

5: _____

IV.4

Transp 1 Maestro: _____ (A pie)

Transp 2 Maestro: _____ (En bestia)

Transp 3 Maestro: _____ (Buses)

Transp 4 Maestro: _____ (Otro vehículo)

IV.5 Educación de hijos	Número hijos	Grados que cursan	Transp. 1	Horas Viaje	Transp. 2	Horas Viaje
Pre-primaria bilingüe:						
Primaria:						
Técnico-vocacional:						
Ninguna:						
Castellanización:						
Secundaria:						
Universitaria:						
Otras:						
Especificar:						

IV.5 (Continuado) Hijos	Transp. 3	Horas Viaje	Transp. 4	Horas Viaje
Pre-Primaria Bilingüe:				
Primaria:				
Técnico-Vocacional:				
Ninguna:				
Castellanización:				
Secundaria:				
Universitaria:				
Otras:				
Especificar:				

V. VIVIENDA

V.1 Calidad de residencias

Propia _____

Alquilada: _____

Usufructo: _____

Exhibit 12

V.2 Numero

Pago alquiler:

Q. 0- 50	_____
Q. 51-100	_____
Q.101-150	_____
Q.151-200	_____

V.3 Servicios:

Item		Si	No
1.	Energía Eléc.	_____	_____
2.	Agua potable	_____	_____
3.	Aguas negras	_____	_____
4.	Aguas de lluvias	_____	_____
5.	Combinado	_____	_____
6.	Letrinas	_____	_____
7.	Ninguno	_____	_____

Pago mensual

Item	Q.0-5	Q.6-10	Q.11-15	Q.16-20	Q.20+
1.	_____	_____	_____	_____	_____
2.	_____	_____	_____	_____	_____

V.4 Número de Aldeas con ese servicio

Item	
1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
7.	_____

V.5 Servicios:

Item		Transp. Agua	Costo Transp.	Usos Energía Eléc. Ilumin.	Indust.	Agrícol.	Comercial
1.	Energía Eléc.			_____	_____	_____	_____
2.	Agua potable	_____	_____				

Item	Usos agua Consumo	Riego	Otros
1.			
2.	_____	_____	_____

	Fuente agua 0-2 Kms.	2 + Kms.
Pozo	_____	_____
Río	_____	_____
Sistema	_____	_____

VI. SALUD

VI.1

Servicios médicos	Si	No	Localización del servicio	Transp. (1, 2, 3, 4)	Dist. 0-2 Kms.	Servicios de salud en el área de influencia:
Puesto de salud:	_____	_____	_____	_____	_____	_____
Centro de salud:	_____	_____	_____	_____	_____	_____
Médico:	_____	_____	_____	_____	_____	_____

(Continúa)

Exhibit 12

VI.1 (Continuada)

Servicios médicos	Si	No	Localización del servicio	Transp. (1, 2, 3, 4)	Dist. 0-2 Kms.	Servicios de salud en el área de influencia:
Promotor de salud:						
Hospital:						
Farmacia:						
Otr. Fnte. Medicin.:						
Comadrona:						
Otros:						
Ninguno:						

Especificar: _____

VI.1 (Continuada)

	Distancia de los servicios médicos					
	2-4 Kms.	4-6 Kms.	6-8 Kms.	8-10 Kms.	10+Kms.	Pago Prom. Transp.
Puesto de salud:						
Centro de salud:						
Médico:						
Promotor de salud:						
Hospital:						
Farmacia:						
Otr. Fnte. Medicin.:						
Comadrona:						
Otros:						
Ninguno:						

Especificar: _____

VII. RECREACION

(Obtener datos de recreación y otros servicios públicos de boleta de 1er. nivel de selección)

	No. de Respuestas	Número de centros turísticos y de recreación en el área de influencia: Turístic.	Recreación
Hoteles:			
Pensiones:			
Hospedajes:			
Ruinas:			
Canchas deportivas:			
Balnearios:			

(Continúa)

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Exhibit 12

(Continuada)

		Número de centros turísticos y de recreación en el área de influencia	
		Turístic.	Recreación
Salones sociales y comunales:	_____		_____
Cines:	_____		_____
Otros:	_____	_____	_____
Ninguno:	_____	_____	_____

Especificar otros: _____

VIII. OTROS SERVICIOS PUBLICOS

Tipo	No. de Servicios
Telégrafo	_____
Correo	_____
Teléfono	_____
Otros	_____

(Obtener datos de recreación y otros servicios públicos de boleta de 1er. nivel de selección)

Especificar _____

IX. PROPIEDAD Y TENENCIA DE LA TIERRA

Tamaño (Cuerdas)	Tenencia Propio	Usufructo	Municipal	Arrendado	Comunales	Nac.
0-10	_____	_____	_____	_____	_____	_____
11-20	_____	_____	_____	_____	_____	_____
21-30	_____	_____	_____	_____	_____	_____
31-40	_____	_____	_____	_____	_____	_____
41-50	_____	_____	_____	_____	_____	_____
51-60	_____	_____	_____	_____	_____	_____
61-70	_____	_____	_____	_____	_____	_____
71-80	_____	_____	_____	_____	_____	_____
81-90	_____	_____	_____	_____	_____	_____
90+	_____	_____	_____	_____	_____	_____

(Continúa)

Exhibit 12

(Continuada)

Tamaño (Cuerdas)	No. de Terrenos 0	1-5	5+	* Costo/Cda. Q.	Tamaño (mts²)	Cda. (vrs²)	Especif Otr.	Ten.
0-10								
11-20								
21-30								
31-40								
41-50								
51-60								
61-70								
71-80								
81-90								
90+								

*Arrendado

X. PRODUCCION

X.1

Nombre de cultivo	Cuerdas Cultiv.	Area en Mts²	Cosechas por año	Prod. Total (qq.)	Auto consumo
Maíz					
Frijol					
Trigo					
Hortalizas					
Frutas					
Café					
No. 7					
No. 8					
No. 9					
No. 10					

(Continua)

Exhibit 12

X.1 (Continuada)

Nombre de cultivo	Venta (qq.)	Costo Prod.	Precio venta	No. personas	* Tiempo cultivo	Costo Jornal (Q)
Maiz						
Frijol						
Trigo						
Hortalizas						
Frutas						
Café						
No. 7						
No. 8						
No. 9						
No. 10						

* Meses

X.2

Nombre cultivo	Distancia mercado	Nombre del mercado
Maiz		
Frijol		
Trigo		
Hortalizas		
Frutas		
Café		
No. 7		
No. 8		
No. 9		
No. 10		

X.3 Costo transporte:

Tipo	Numero	Distancia En Kms.	Costo (Q/qq)	Costo/ Persona	Tiempo Viaje (hrs.)
A pie					
Animal					
Camión					
Camioneta					
Pick-Up					
Otros					
Especif.					

Exhibit 12

XI. INSUMOS

XI.1

Nombre cultivo	No. de agricultores que abonan SI	NO	Método Transp.	Nombre insumo
Maíz				
Frijol				
Trigo				
Hortalizas				
Frutas				
Café				
No. 7				
No. 8				
No. 9				
No. 10				

Nombre cultivo	Cantidad/ Año (qq)	Insumo	Costo por quintal Transp.	Total	Costo anual
Maíz					
Frijol					
Trigo					
Hortalizas					
Frutas					
Café					
No. 7					
No. 8					
No. 9					
No. 10					

XI.2

Nombre cultivo	Asesoría Técnica SI	¿Cuántas?	Asistencia crediticia SI	¿Cuántas?	Institución:
Maíz					
Frijol					
Trigo					
Hortalizas					
Frutas					
Café					
No. 7					
No. 8					
No. 9					
No. 10					

(Continúa)

Exhibit 12

XI.2 (Continuada)

Nombre cultivo	Area (cdas.)	Duración (meses)	Monto	Intereses
Maíz				
Frijol				
Trigo				
Hortalizas				
Frutas				
Café				
No. 7				
No. 8				
No. 9				
No. 10				

XI.3

Interés en participar en programas agrícolas:

SI _____ NO _____ Por qué?: _____

XI.4 Número de proyectos agrícolas en etapa de:

Tipos	Programación	Ejecución	Funcionamiento
Conservación de suelos:			
Reforestación:			
Miniriego:			
Canalización aguas:			
Otros:			
Ninguno:			

XII. GANADERIA Y AVES DE CORRAL

XII.1

Especie -Ganado	Cantidad	Costo Produc.	Precio Venta	Mercado	Tipo Transp.
Vacuno					
Ovino					
Caprino					

(Continúa)

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Exhibit 12

XII.1 (Continuado)

Cuidado de Ganado

Especie -Ganado	Dist Transp.	Area Crianza:	Activid.	No Personas	Jornales /Año	Quet./ Jornal
Vacuno						
Ovino						
Caprino						

M2

XII.2

—Aves—

Especie	Cantidad	Costo Produc.	Precio Venta	Mercado	Tipo Transp.

Cuidado de aves de corral

—Aves— Especie	Dist. Transp.	Area Crianza:	Activid.	No. Personas	Jornales /Año	Quet./ Jornal

XIII. PRODUCCION ARTESANAL, TEXTIL, OTRA PECUARIA Y OTRAS

XIII.1

Tipo Prod. Artesanal	Cantidad	Costo Produc.	Precio Venta	Mercado	Tipo Transp.

(Continua)

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Exhibit 12

XIII.1 (Continuado)

Tipo Prod. Artesanal	Dist.. Transp.	Area M2	Activid.	Requerimientos de personal No. Personas	Jornales/ Año	Quet/ Jornal

XIII.2

Prod. Textil	Cantidad	Costo Prod.	Precio Venta	Mercado	Tipo Transp.

Prod. Textil	Dist. Transp.	Area M2	Activid.	Requerimientos de personal No. Personas	Jornales / Año	Quet./ Jornal

XIII.3

Otra producción pecuaria	Cantidad	Costo Produc.	Precio Venta	Mercado	Tipo Transp.
Porcina					

(Continua)

Exhibit 12

XIII.3 (Continuado)

Otra producción pecuaria	Dist. Transp.	Area M2.	Activid.	Requerimientos de personal No. Personas	Jornales /Año	Quet./ Jornal
Porcina						

XIII.4

Cualquier otra producción	Cantidad	Costo Produc.	Precio Venta	Mercado	Tipo Transp.

Cualquier otra producción	Dist. Transp.	Area M2	Activid.	Requerimientos de personal No. Personas	Jornales / Año	Quet./ Jornal

XIV. INCREMENTO O DIVERSIFICACION DE PRODUCCION

Cultivo o producto	SI	NO	Incremento de producción en quintales Aumento de área	Con abonos	Ambos	Increm. Total

(Continúa)

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Exhibit 12

XIV (Continuado)

Cultivo o producto	Costo Prod.	Precio Venta	Incremento personal SI	NO	No. Jorn.

XV. EMPLEO EN LA COMUNIDAD

XV.1	Maíz	Frijol	Trigo	Horta-lizas	Frutas	Café	No. 7	No. 8	No. 9	No. 10
Personal Adic.- SI										
Personal Adic.-No										
Act. siembras (mes)										
Act. cuido (mes)										
Act. cosecha (mes)										
Act. venta (mes)										
Act. Transp. (mes)										
Act. otras (mes)										
Espec. otras Activ.										
Personal local-SI										
Pago por jornal:										
Pago por siembra:										
No. meses siembra:										
Pago por cuido:										
No. meses cuido:										
Pago por cosecha:										
No. meses cosecha:										
Pago por venta:										
No. meses venta:										

(Continúa)

Exhibit 12

XVI (Continuado)

	Maiz	Frijol	Trigo	Hortalizas	Frutas	Café	No. 7	No. 8	No. 9	No. 10
Pago por transp.:	___	___	___	___	___	___	___	___	___	___
No. meses Transp.:	___	___	___	___	___	___	___	___	___	___
Pago por otro:	___	___	___	___	___	___	___	___	___	___
No. meses otro:	___	___	___	___	___	___	___	___	___	___
Personal local-No	___	___	___	___	___	___	___	___	___	___
Pago por jornal:	___	___	___	___	___	___	___	___	___	___
Pago por siembra:	___	___	___	___	___	___	___	___	___	___
No. meses siembra:	___	___	___	___	___	___	___	___	___	___
Pago por cuido:	___	___	___	___	___	___	___	___	___	___
No. meses cuido:	___	___	___	___	___	___	___	___	___	___
Pago por cosecha:	___	___	___	___	___	___	___	___	___	___
No. meses cosecha:	___	___	___	___	___	___	___	___	___	___
Pago por venta:	___	___	___	___	___	___	___	___	___	___
No. meses venta:	___	___	___	___	___	___	___	___	___	___
Pago por transp.:	___	___	___	___	___	___	___	___	___	___
No. meses Transp.:	___	___	___	___	___	___	___	___	___	___
Pago por otro:	___	___	___	___	___	___	___	___	___	___
No. meses otro:	___	___	___	___	___	___	___	___	___	___

XV.2 Razones del uso o no de personal adicional local

	Exceso M.O.	M.O. Suficiente	M.O. Barata	M.O. Insufic.	M.O. Cara	Procedencia de personal Lugar	Distancia	Transp.
Personal local-SI	___	___	___					
Personal local-No				___	___	___	___	___

XV.3 Meses sin actividad agricola:

—0 a 2 _____ ¿Cuáles? _____

-2 a 4 _____ ¿Cuáles? _____

-4 a 6 _____ ¿Cuáles? _____

-6 a 8 _____ ¿Cuáles? _____

-8-+ _____ ¿Cuáles? _____

Exhibit 12

XVI. EMPLEO PERSONAL

	Siembra	Cuido	Cosecha	Venta	Transp.	Otro
¿Trabaja para otros?						
SI	_____	_____	_____	_____	_____	_____
¿Meses?	_____	_____	_____	_____	_____	_____
No	_____	_____	_____	_____	_____	_____
Pago por jornal (promedio)	_____	_____	_____	_____	_____	_____

	Especific. Otro	Gobierno	Fuera Comun	¿Dónde?	Trabajo No existe	Escaso
¿Trabaja para otros?						
SI	_____	_____	_____	_____	_____	_____
¿Meses?	_____	_____	_____	_____	_____	_____
No	_____	_____	_____	_____	_____	_____
Pago por jornal (promedio)	_____	_____	_____	_____	_____	_____

XVII. GRADO DE COOPERACION EN CONSTRUCCION Y/O MANTENIMIENTO DEL CAMINO

	SI	NO	Por qué?:
Participación en comité pro-construcción y/o Mantenimiento de caminos rurales	_____	_____	_____
Disposición a trabajar en construcción o mantenimiento del camino	_____	_____	_____
Autorización para paso gratuito del camino por tierras privadas	_____	_____	_____
Autorización para extracción gratuita de recursos naturales aprovechables para el camino	_____	_____	_____

XVIII. IMPACTO AMBIENTAL

XVIII.1	Leña	Carbón	Eléctrica	Gas	Otra
Energía para cocinar	_____	_____	_____	_____	_____

Especificar: _____

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Exhibit 12

XVIII.2	SI	NO	Lugar	Dist.	Pago/ Tarea	Area (cuerdas)	Tareas/ cuerda
Tala de árboles	___	___	_____	_____	_____	_____	_____
Venta de leña	___	___	_____	_____	_____	_____	_____
Compra de leña	___	___	_____	_____	_____	_____	_____
Venta a aserrad.	___	___	_____	_____	_____	_____	_____
Compra a aserrad.	___	___	_____	_____	_____	_____	_____
Corte Terr. Prop.	___	___	_____	_____	_____	_____	_____
Corte comunal	___	___	_____	_____	_____	_____	_____
Corte municipal	___	___	_____	_____	_____	_____	_____
Corte nacional	___	___	_____	_____	_____	_____	_____

XVIII.3

Utilización	Consumo	Carbón	Venta	Otros
No. tareas/año	_____	_____	_____	_____
No. leños/tarea	_____	_____	_____	_____
Venta (Q/tarea)	_____	_____	_____	_____

XVIII.4	SI	NO
Consumo-hacer carbón	_____	_____
Revender:	_____	_____
Caleras:	_____	_____
Hacer pan:	_____	_____
Tortillerías:	_____	_____
Otros:	_____	_____

Especificar: _____

XVIII.5 Forma de transportarla:	Si	No	Pago transporte de leña (Q/tarea)
A pie	___	___	_____
Bestia	___	___	_____
Carreta	___	___	_____
Pick-Up	___	___	_____
Camión	___	___	_____
Camioneta	___	___	_____
Otros:	___	___	_____

Especificar: _____

XVIII.6
Resiembra de árboles

Si _____

No _____

¿Por qué? _____

_____

Arboles Semb./Arboles Cort.		
De 0-2	De 3-5	De 6+
___	___	___

Exhibit 12

XVIII.7 Lugar de sembrado	Si	No	¿Por qué?
Terreno propio:			
Comunal:			
Municipal:			
Nacional:			
¿Hay programa de reforestación?			
¿Participación en reforestación?			
Ayuda forestal por : Inafor			
Municipal			
Otras			
Especificar			
Número que participaría en programa futuro de reforest.			

XIX. IMPACTO SOCIO-ECONOMICO

XIX.1

Construcción de camino aumentará la producción

¿ Agrícola ?			
¿ Ganadera ?			
¿ Textil ?			
¿ Artesanal ?			
¿ Avícola ?			
¿ Otras ?			
Especificar			

XIX.2 Terminado el camino; prioridad de servicios a introducirse

	Prior. 1	Prior. 2	Prior. 3	Prior. 4	Prior. 5	Prior. 6
Centro de Salud						
Escuela						
Iglesia						
Canchas deportivas						

Exhibit 12

XIX.2 (Continuado)

	Prior. 1	Prior. 2	Prior. 3	Prior. 4	Prior. 5	Prior. 6
Agua potable						
Luz eléctrica						
Otras						

Especificar _____

XX. OBSERVACIONES

_____

Nombre de quien levanta la encuesta:

_____

XXI. SUPLEMENTO TECNICO

Tipo de acceso actual y su estado físico

(Proveniente de Form. EDC-85.A.B.)

Tipos:

Acceso ó camino del Programa:

Buen estado	(1)
Regular estado	(2)
Mal estado	(3)

Acceso ó camino de otro origen:

Buen estado	(4)
Regular estado	(5)
Mal estado	(6)

(Marcar con una "X" el número que corresponda)

CENTRO DE COMPUTO - PROYECTO A.I.D. 520-0274

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
SOCIALES					
I. Demografía			150	1	150
1. Densidad (Habitantes/Km 2).		50			
0 - 25	12				
26 - 50	25				
51 - 75	37				
más de 75	50				
2. Costo por Habitante servido (Q/Habitante).		50			
0 - 100	50				
101 - 200	40				
201 - 300	30				
301 - 400	20				
más de 400	10				
3. Porcentaje de Jefes de Familia que se dedican a la agricultura.		25			
0 - 20	5				
21 - 40	10				
41 - 60	15				
61 - 80	20				
81 - 100	25				
4. Porcentaje de mujeres que se dedican a actividades artesanales o pequeña industria.		25			
0 - 20	5				
21 - 40	10				
41 - 60	15				
61 - 80	20				
81 - 100	25				
II. Organización			100	1	100
1. Número de Tipos de Organización que existen en el área de influencia.		30			

Exhibit 13 p(2)

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
0 - 2	10				
3 - 4	20				
más de 4	30				
2. Número de Comités Pro Mejoramiento de las aldeas en el área de influencia.		30			
0 - 2	10				
3 - 4	15				
5 - 6	20				
7 - 8	25				
más de 8	30				
3. Existe comité Pro-Construcción del camino.		40			
0	0				
1	8				
2	16				
3	24				
5 ó más	40				
III. Servicios Públicos			150	1	150
1. Educación (nivel máximo de educación - dentro del área de influencia).		30			
-Ninguna	30				
-Pre-Primaria, bilingüe, Castellanización u otra.	24				
-Primaria	18				
-Secundaria	12				
-Técnico/Vocacional	6				
-Universitaria	0				
(6 puntos menos por cada tipo de educación que exista).					
2. Número de proyectos de electrificación en el área de influencia.		20			
0	20				
1	16				

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Exhibit 13 p. (3)

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
2	12				
3	8				
4	4				
5	0				
3. Número de proyectos de agua potable en el área de influencia		30			
0	30				
1	25				
2	20				
3	15				
4	10				
5	5				
4. Número de proyectos de drenaje en el área de influencia.					
Ninguno		20			
-Aguas Negras					
0	6.67				
1	5				
2	4				
3	3				
4	2				
5	1				
-Aguas de Lluvia					
0	6.67				
1	5				
2	4				
3	3				
4	2				
5	1				
-Letrinas					
0	6.67				
1	5				
2	4				
3	3				
4	2				
5	1				
5. Salud		30			
Ningún Servicio	30				
Promotores de Salud	25				
Puestos de Salud	20				

Exhibit 13 p.(4)

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
Médico	15				
Centro de Salud	10				
Hospital	5				
6. Recreación		10			
Ninguno	10				
Un solo medio	6				
2 o más medios	3				
7. Otros servicios públicos:					
-Ninguno		10			
-Número de telégrafos en el área de influencia					
0	2.5				
1	2.0				
2	1.5				
3	1.0				
4	0.5				
5	0				
-Número de Oficina de Correos en el área de influencia.					
0	2.5				
1	2.0				
2	1.5				
3	1.0				
4	0.5				
5	0				
-Número de teléfonos en el área de influencia.					
0	2.5				
1	2.0				
2	1.5				
3	1.0				
4	0.5				
5	0				
-Otros servicios en el área de influencia.					
0	2.5				
1	2.0				
2	1.5				
3	1.0				
4	0.5				
5	0				
IV. Economía			200	1	200
1. Proyectos agrícolas en el área de influencia		15			
	F E P				
-Conservación de suelos	1 1 1				
-Reforestación	1 1 1				
-Miniriego	1 1 1				

Exhibit 13 p.(5)

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
-Canalización de Agua	1 1 1				
-Otros	1 1 1				
-Ninguno	0				
F = Funcionamiento					
E = Ejecución					
P = Programado					
2. Número de Asistencias Técnicas en el área de influencia		15			
0	0				
1	3				
2	6				
3	9				
4	12				
5	15				
3. Número de Asistencias Crediticias en el área de influencia		15			
0	0				
1	3				
2	6				
3	9				
4	12				
5	15				
4. Porcentaje del área de influencia cultivada		15			
0 - 10 %	3				
11 - 20 %	6				
21 - 30 %	9				
31 - 40 %	12				
más de 40 %	15				
5. Otros tipos de producción además de la Agricultura.		15			
-Pecuaria					
0 - 20 %	1				
21 - 40 %	2				
41 - 60 %	3				
61 - 80 %	4				
81 - 100 %	5				
-Artesanal					
0 - 10 %	1				
11 - 20 %	2				

200

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
21 - 40 %	3				
41 - 60 %	4				
61 - 80 %	5				
-Otros					
0 - 20 %	1				
21 - 40 %	2				
41 - 60 %	3				
61 - 80 %	4				
81 - 100 %	5				
6. Oportunidad de empleo en el área de influencia		15			
0 - 25 %	15				
26 - 50 %	10				
51 - 75 %	5				
76 - 100 %	0				
7. Número de atractivos turísticos en el área		10			
0	0				
1	4				
2	7				
3	10				
8. Tasa interna de retorno		50			
Menor de 0 %	0				
0 - 2 %	5				
2.1 - 4 %	10				
4.1 - 6 %	15				
6.1 - 8 %	20				
8.1 - 10%	25				
10.1 - 12%	30				
12.1 - 14%	35				
14.1 - 16%	40				
Mayor del 16 %	50				
9. Relación Beneficio-Costo.		50			
0 - 0.25	0				
0.26 - 0.50	5				
0.51 - 0.75	10				
0.76 - 1.00	15				
1.01 - 1.25	20				

Exhibit 13 p(7)

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
1.26 - 1.50	30				
1.51 - 1.75	40				
1.76 - 2.00	45				
2.01 ó más	50				
V. Cooperación			100	1	100
Grado de cooperación de la Comunidad en la construcción y/o mantenimiento del camino.					
1. En relación a población, mayor de edad porcentaje de gente del área de influencia que desea colaborar en la construcción del camino.		34			
0 - 20 %	6				
21 - 40 %	13				
41 - 60 %	20				
61 - 80 %	27				
81 - 100 %	34				
2. En relación al total de personas del área de influencia con terreno, porcentaje de gente que cedería gratuitamente el derecho de vía		33			
0 - 20 %	6				
21 - 40 %	12				
41 - 60 %	19				
61 - 80 %	26				
81 - 100 %	33				
3. En relación al total de personas del área de influencia, con terreno, porcentaje de gente con terreno que cedería gratuitamente recursos naturales aprovechables para el camino.		33			

Exhibit 13 p.(8)

SISTEMA DE PRIORIZACION DE PROYECTOS NUEVOS

Aspecto y/o Subaspecto	Punteo Subparcial	Punteo Parcial	Punteo Subtotal	Factor	Punteo Total
0 - 20 %	6				
21 - 40 %	12				
41 - 60 %	19				
61 - 80 %	26				
81 - 100 %	33				
VI. Estado del Camino anterior al cual debe entroncar el camino nuevo.			100	1	100
1. Tipo de camino y su estado físico.		100			
-Camino rural (del Programa):					
Buen estado	100				
Regular estado	25				
Mal estado	12				
-Otro tipo de camino					
Buen estado	50				
Regular estado	25				
Mal estado	12				
VII. Costo de Construcción.			200	1	200
1. Costo de construcción por kilómetro.		200			
Menor de Q15,000	200				
Q 15,001--Q20,000	170				
Q 20,001--Q25,000	140				
Q 25,001--Q30,000	110				
Q 30,001--Q35,000	80				
Q 35,001--Q40,000	50				
Mayor de Q 40,000	20				
T O T A L					1,000

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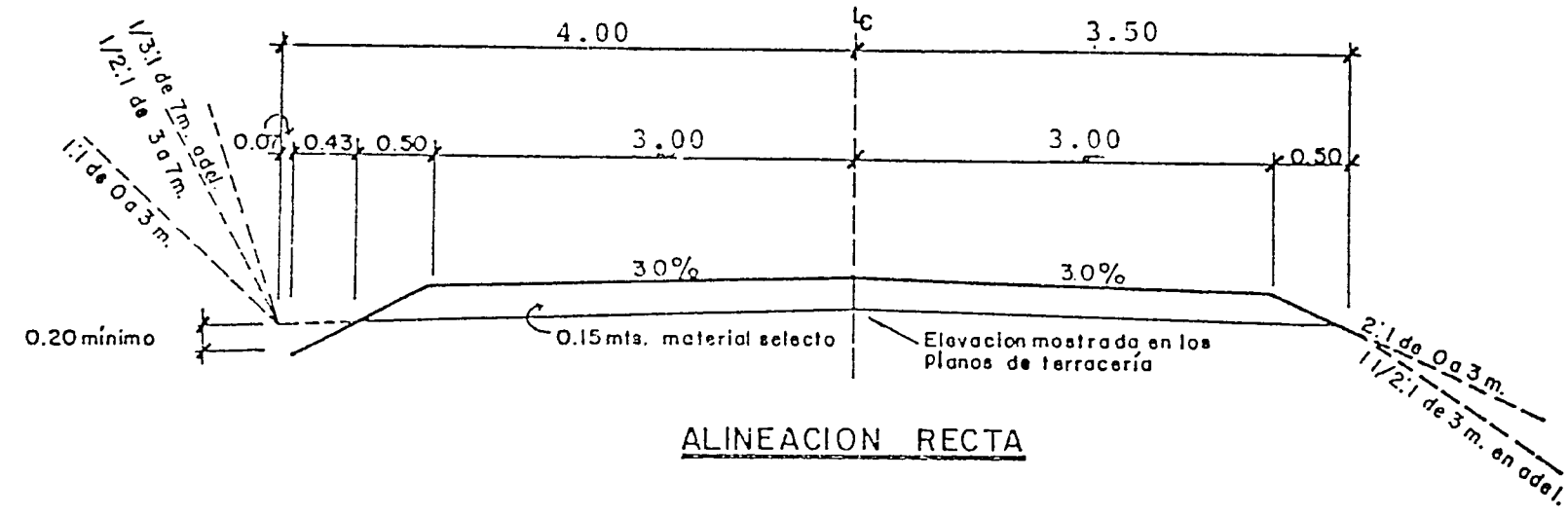
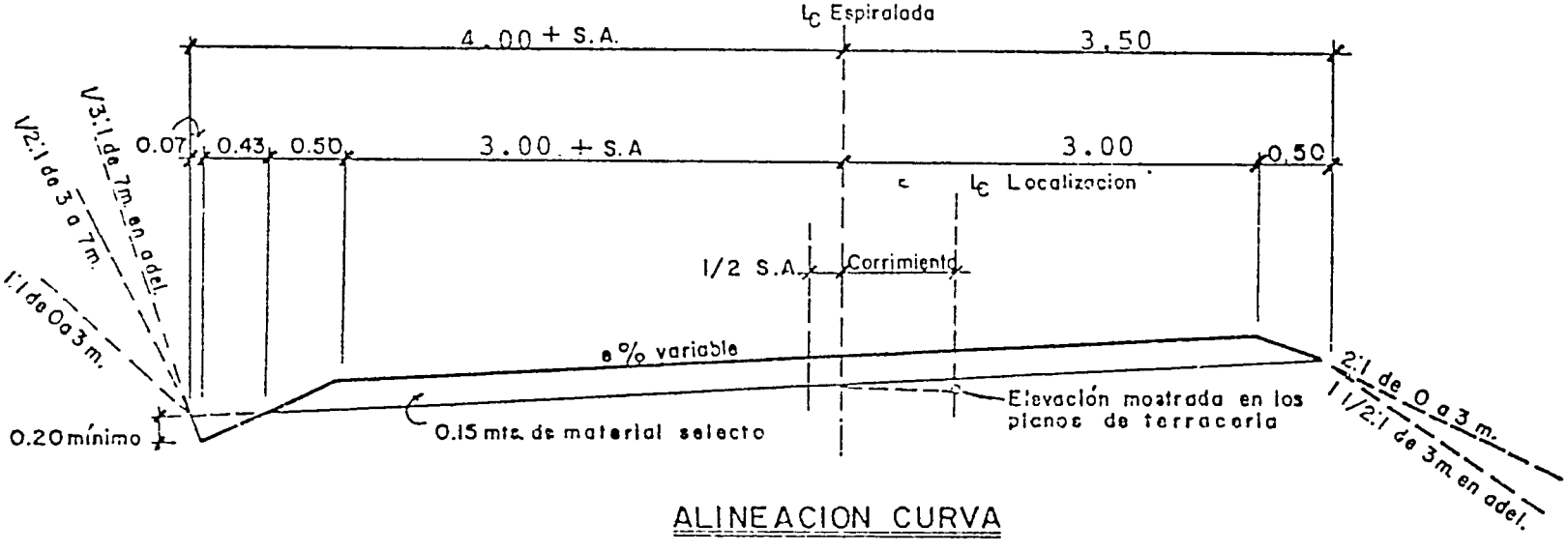


ALINEACION RECTA



ALINEACION CURVA

SECCION TIPICA
SIN ESCALA 1:50

FIG.-1

CAMINOS TERCIARIOS

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ANNEX 4

Administrative Analysis

1. Ministry of Communications, Transportation and Public Works

The Ministry of Communications, Transportation and Public Works (MCTOP) is responsible for the construction, operation, and maintenance of all airports, seaports, public buildings, post offices, telecommunications, highways, rural roads, and for the management and regulation of public transportation.

The Central Ministry Office makes general policy decisions, leaving day-to-day management to various general directorates.

2. General Directorate of Roads (DGC)

The General Directorate of Roads (Dirección General de Caminos - DGC) is a dependency of the MCTOP and is responsible for the planning, design, construction, and maintenance of all national roads and bridges. The DGC is presently divided into six departments: (1) Director's Office, (2) Technical, (3) Construction, (4) Maintenance, (5) Finance, and (6) Administration. The Construction Division has the responsibility for supervising all construction projects by contract and force account. It employs 450 professionals and technicians besides the personnel associated with the access roads program.

To implement the previous pilot access roads program under AID Small Farmer Development Project 520-0233, the Construction Division was expanded to include an access roads coordinating section with additional personnel responsible for activities related to labor-intensive access roads construction. (See organizational chart of DGC in Exhibit 1.).

3. Rural Roads Program of DGC

The Rural Roads Program of DGC has a General Coordinator within the Construction Division, who is responsible for supervising all aspects of the labor-intensive construction program. The Farm to Market Access Roads Project (520-0332) is implemented by the six regional access roads offices located at the different sites in the Highland regions of the country. A seventh regional office was established through Project Amendment No. 1 and started functioning in mid 1987 in Baja Verapaz to construct an additional 105 kilometers of AID financed access roads. See organizational chart in Exhibits Nos. 2 and 3 of this Annex.

The General Coordinator and his Assistant Engineer are in charge of coordinating all administrative activities related to the program including the provision of logistical support for the supply of construction materials, handtools, and other requirements of the regional offices. In conjunction with the regional offices, the General Coordinator also establishes the basis for the selection and prioritization of access roads for annual implementation plans developed by all seven regional offices. The General Coordinator's unit in Guatemala City has 18 employees including professionals, technicians, and drivers. (See Table 2 of this Annex)

Seven regional offices and four maintenance centers are responsible for the implementation of the access roads construction and maintenance activities at the regional level respectively. These activities are scheduled and budgeted in conjunction with the General Coordinator. The regional offices are also responsible for the preliminary screening for selection, technical feasibility studies, cost estimate, and socio-economic survey of each candidate access road prior to the final selection by the General Coordinator.

Each regional office is headed by a resident civil engineer/administrator who is responsible for the technical and administrative management of the program activities in the region. Each regional office is staffed by 70 employees; with the addition of two new regional offices, this staff will reach 630 employees. In Region V, 58 additional employees are responsible for carrying out the access and urbanization of new settlements being implemented with a separate GOG budget. The summary of yearly assigned budgets from 1977 through 1987 is given in Table 1 below. The budgets for the additional activities in Region V are indicated separately.

The maintenance centers are also headed by a resident civil engineer/administrator who is responsible for the technical and administrative management of the program activities in its area. Each center is staffed by 27 employees. For the four centers established up to 1987 the total staff reaches 108 employees. This staff will increase in 54 employees with the addition of the fifth and sixth region for a total of 162 employees. Therefore, by the end of the Project the Rural Roads Program of DGC will be staffed by 792 employees implementing the access roads construction and maintenance activities.

The Computer Center of DGC is headed by an engineer responsible for the processing and management activities of the Center. In addition, this Center is staffed with 2 program analysts and one operator.

The basic technical and administrative structure for the Farm to Market Project is currently in place for the existing seven regions. The establishment within the Rural Roads Program of the eighth and ninth new regions, as well as of the mobile unit for the also new tertiary roads, will increase the professional and administrative personnel of the Rural Roads Program of DGC to implement the proposed project. Similar to the regional offices, the mobile unit created to implement the tertiary roads component will be headed by a resident civil engineer/administrator who will be responsible, before the General Coordinator, of the monitoring, management and implementation of the new component. Also, to implement the tertiary roads pilot component under this proposed Amendment, technical and administrative personnel will be hired by the PCR as shown in Table 5. The Rural Roads Program will provide space and workshop support at the different regions to this tertiary roads mobile unit.

The Administrative costs for the new regional offices and the maintenance units and for the mobile unit are detailed in tables V, XI and XXII of the technical analysis.

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TABLE 1
SUMMARY OF YEARLY ALLOCATED GOG BUDGETS
From 1977 Through 1984

YEAR	ALLOCATED (Q.)
1977	291,157
1978	680,865
1979	753,425
1980	1,636,063
1981	775,831
1982	2,137,390
1982*	1,425,555
1983	3,825,080
1983*	3,675,000
1984	1,737,013
1984*	2,214,696
1985	1,559,746
1985*	1,336,636
1986	1,617,040
1986*	2,096,973
1987	2,705,215
1987*	2,798,172
TOTAL	Q 31,265,857

GOG budgets for expansion, improvement of secondary roads and access roads, and construction of new settlements in Region V using labor-intensive methods. This is not included as counterpart to the AID-financed portion of the construction program.

TABLE 2
PERSONNEL AT THE DGC's GENERAL COORDINATOR UNIT

General Coordinator	1
Assistant to the General Coordinator	1
Social Area Coordinator	1
Secretaries	3
Chief of the Heavy Equipment Operators	1
Watchman	1
Warehouseman	1
Draftsman	1
Drivers	3
Soils Laboratory Worker	1
Warehouse Helpers	4
T O T A L	18

TABLE 3
ADDITIONAL PERSONNEL FOR THE DGC's NEW REGIONAL OFFICES
(Per Region)

Regional Resident Engineer	1
Assistant to Regional Engineer	1
Field Auxiliary to the Engineer	1
Surveyor	1
Social Worker	1
Office Assistant	2
Rodman	1
Chainman	2
Helpers	12
Warehouse Attendant	1
Fuel and Lubricants Attendant	1
Gas Mechanic (First class)	1
Diesel Mechanic	1
Drivers	14
Heavy Equipment Operators	5
Watchmen	4
Accountant	1
Chief of Foremen	1
Payroll Clerk	1
Masons	6
Welder	1
Electrician	1
Cook	1
Materials Control Person	1
Foremen	2
Compressor Operator	2
Concrete Mixer Operator	1
Greaser	1
Carpenter	1
Radio Operator	1
TOTAL	70

TABLE 4

Additional Personnel Requirements

Quantity	Title of Position	Salary Monthly Q	Salary Annual Q	Christmas Bonus Q	Cost/Year Q
2	Resident Engineers	1,325	31,800	2,200	34,000
2	Assistant to the Eng.	620	14,880	890	15,770
6	Social Worker	450	32,400	1,650	34,050
2	Warehouseman	510	12,240	670	12,910
2	Payrollman	460	11,040	570	11,610
22	Drivers	331	87,384	3,432	90,816
12	Operators	429	46,332	2,106	48,438
TOTAL			Q 236,076	Q 11,518	Q 247,594

Table 5

PERSONNEL FOR THE DGC's MOBILE UNIT TO IMPLEMENT THE TERTIARY ROADS COMPONENT

Position	Quantity	Monthly Salary	Christmas Bonus	Annual Salary
Assistant to the Coordinator (Engineer)	1	Q 1,325	Q 1,100	Q 17,000
Resident Engineer	1	1,325	1,100	17,000
Field Auxiliary to the Engineer	1	620	445	7,885
Soils Laboratory Worker	1	420	490	5,530
Auxiliary Laboratory worker	1	350	175	4,375
Surveyor	1	620	445	7,885
Levelman	1	450	285	5,685
Chainman	2	325	150	8,100
Social Worker	1	450	275	5,675
Chief of Operators	1	524	349	6,637
Operators	11	429	254	59,422
Costs Controler	1	460	285	5,805
Warehouseman	1	510	335	6,455
Payroll Clerk	1	460	285	5,805
Office Attendant	1	520	345	6,585
Materials Control Person	2	376	150	8,100
Watchmen	2	368	193	9,218
Drivers	22	331	156	90,816
Compressor Operator	1	481	306	6,078
Concrete Mixer Operator	1	368	123	4,539
Electric Welder Operator	1	312	137	3,881
TOTAL	55			Q 292,476

At its present staff level DGC has been very effective in implementing the Farm-to-Market Access Roads Project (520-0332). DGC, as the implementing unit of this project has also demonstrated to AID its ability to achieve its targets by having constructed 200 Kms. of access roads by the end of CY 1986 and having under maintenance in 1987, 900 Kms. of access roads previously constructed as originally planned.

The use of descentralized regional offices has enabled the Rural Roads Program of DGC to manage and implement the previous Small Farmer Development Project 520-0233 and 520-0233A as well as the ongoing projects Farm-to-Market Access Roads 520-0332 and the Roads component within the Highlands Agricultural Development Project 520-0274. Based on the above the Dirección General de Caminos is considered by the AID Mission to be a dependable implementing unit for the proposed project amendment.

4. Maintenance Division of DGC

The Dirección General de Caminos, Maintenance Division is responsible for the maintenance of all public roads in Guatemala. An exception is the access roads maintenance which is being provided by the Rural Roads Program with labor intensive techniques through the maintenance units integrated to the regional offices of the Program. The Maintenance Division is decentralized, working through eight Zone Offices (Zonas Viales), and three mobile groups of maintenance throughout the country, as follows:

MAINTENANCE DIVISION
REGIONAL ZONE OFFICES LOCATION

Description	Location
Headquarters	Guatemala, City
Engineering Department of Maintenance	Guatemala, City
Signalization and Marks	Guatemala, City
Zone Vial No. 1	Las Vacas, Km. 13, CA09N
Zone Vial No. 2	Jutiapa, City
Zone Vial No. 3	Escuintla, City
Zone Vial No. 4	Retalhuleu, City
Zone Vial No. 5	Quetzaltenango, City
Zone Vial No. 6	Chiantla
Zone Vial No. 7	Santa Cruz Verapaz

Description	Location
Zone Vial No. 8	Chiquimula, City
Asphalts Section	Amatitlán
Mobile Group Km. 185 CA09N	

Each Zone Vial is divided in Administrative Warehouse and Workshop areas as shown in Exhibit No. 8 of this Analysis.

The Division maintains and repairs some 11,390 Kms annually. It employs about 6,000 professional, technicians and maintenance personnel distributed among the central headquarter the zones viales and the maintenance mobile groups.

The Maintenance Division headquarter has 28 employees among professionals, technicians, and others as indicated in the table below:

MAINTENANCE DIVISION HEADQUARTERS PERSONNEL

Chief Engineer	1
Assistant to the Chief Engineer	1
Secretary	1
Office Personnel	16
Heavy Equipment Inspectors	3
Procurement Agents	2
Drivers	4
Total	28

The Chief Engineer is responsible for the coordination of all administrative activities related to the roads maintenance as well as the provision of logistical support for the supply of construction materials, spare parts, tools, etc., required at the regional zones.

The Engineering Department of Maintenance is responsible for managing the maintenance cost control and planning for the material network and bridges. This department makes annual inventory of maintenance work required for the roads and prepares annual plans and budget for maintenance implementation at the different work fronts. Exhibit No. 6 shows the organigram of this Engineering Department.

The regional Zones are responsible for the roads maintenance implementation of all the national network. Each Zona Vial has approximately 685 employees as detailed in table below:

PERSONNEL AT EACH ZONA VIAL

1	Chief Engineer of Zone
1(2)	Auxiliary to the Chief of Zone
1	Administrative Chief
1(2)	Asphalt's Auxiliary
1	Heavy Equipment Inspector
1	Chief of Maintenance Workshops
8	Office Personnel
6-8	Mechanics
100-80	Operators
2	Radio Operators
5-10	Foremen of Roads
50-80	oremen
300-700	Helpers

Exhibit No. 8 shows the Administrative Organigram of a Zona Vial.

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EXHIBIT 1

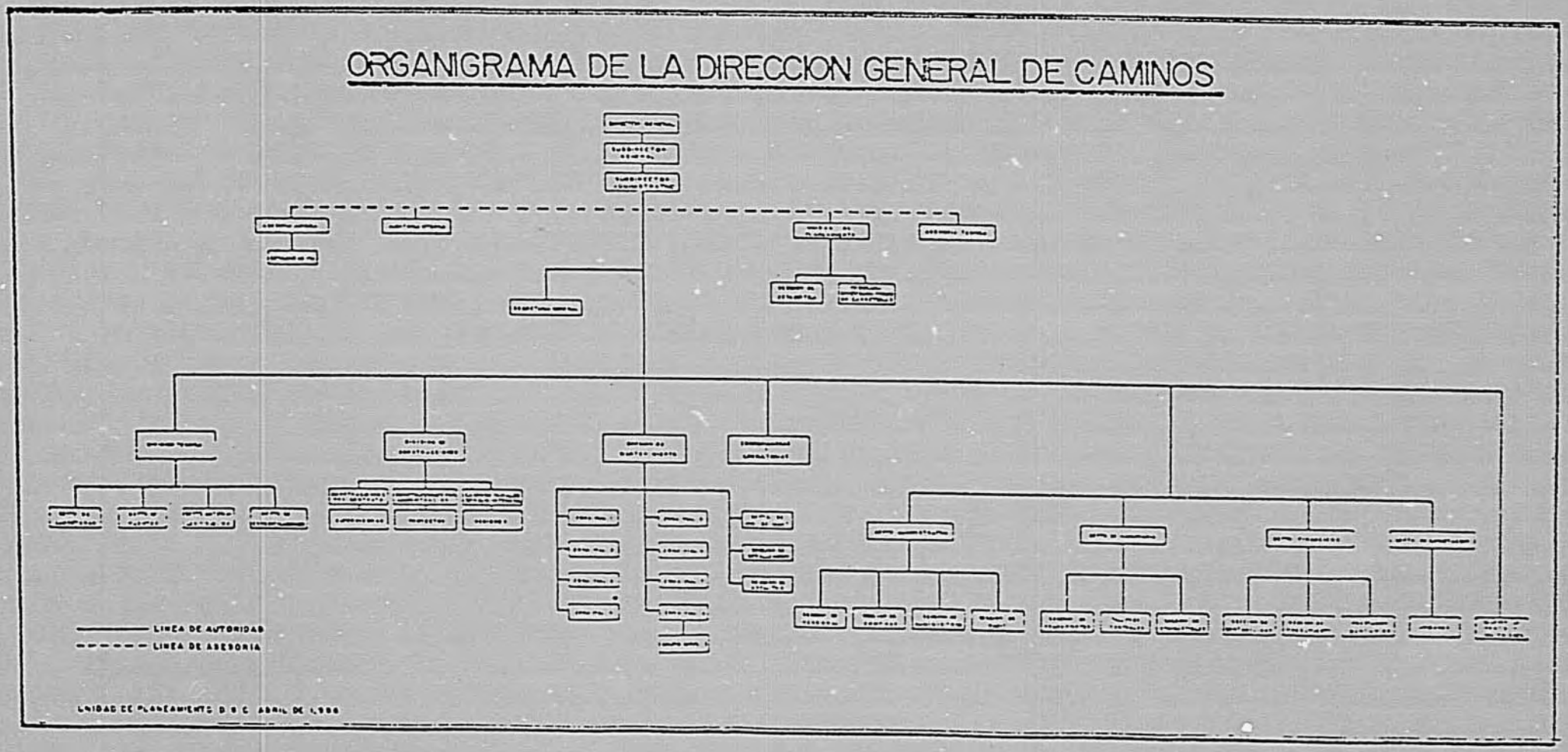

ORGANIGRAMA DE LA DIRECCION GENERAL DE CAMINOS
LINEA DE AUTORIDAD
LINEA DE ASESORIA

EXHIBIT 2

ORGANIGRAMA
PROGRAMA DE CAMINOS RURALES

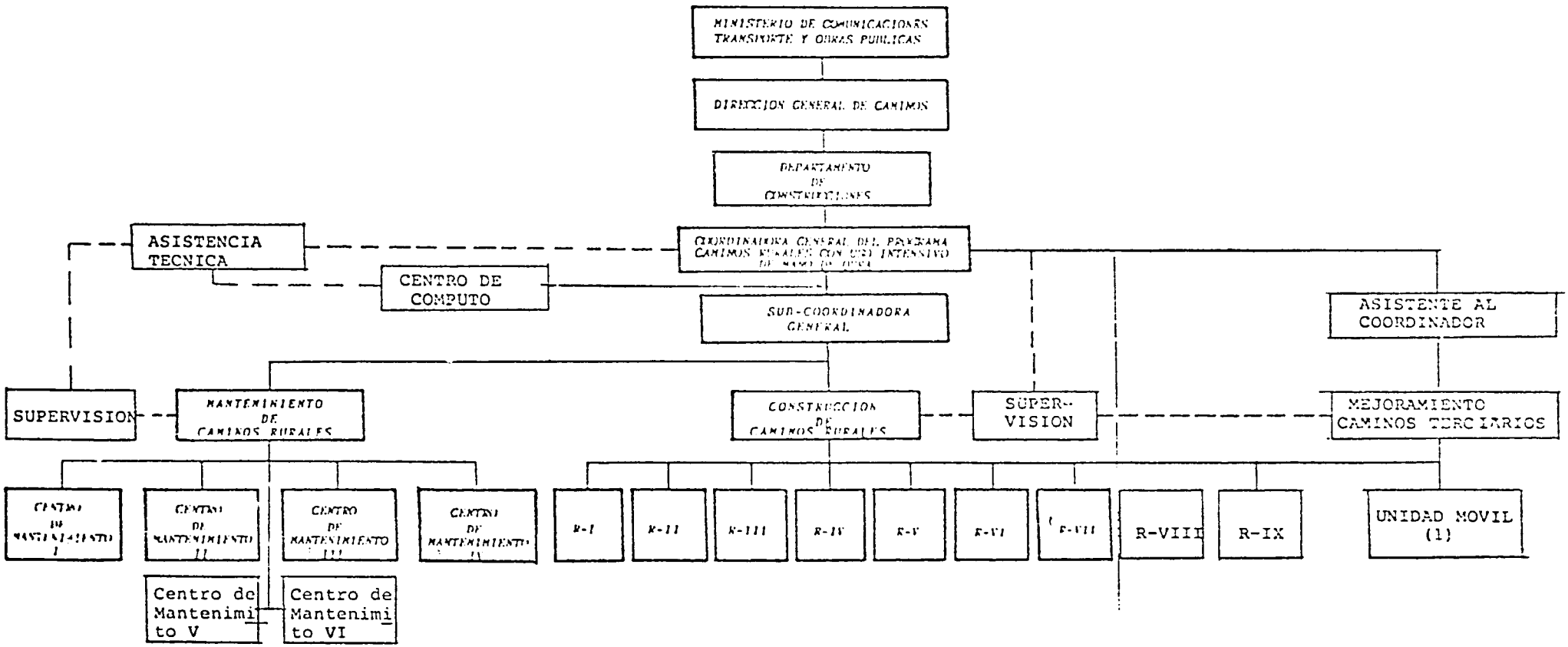


EXHIBIT 3

ORGANIGRAMA

COORDINADORA DE CAMINOS RURALES

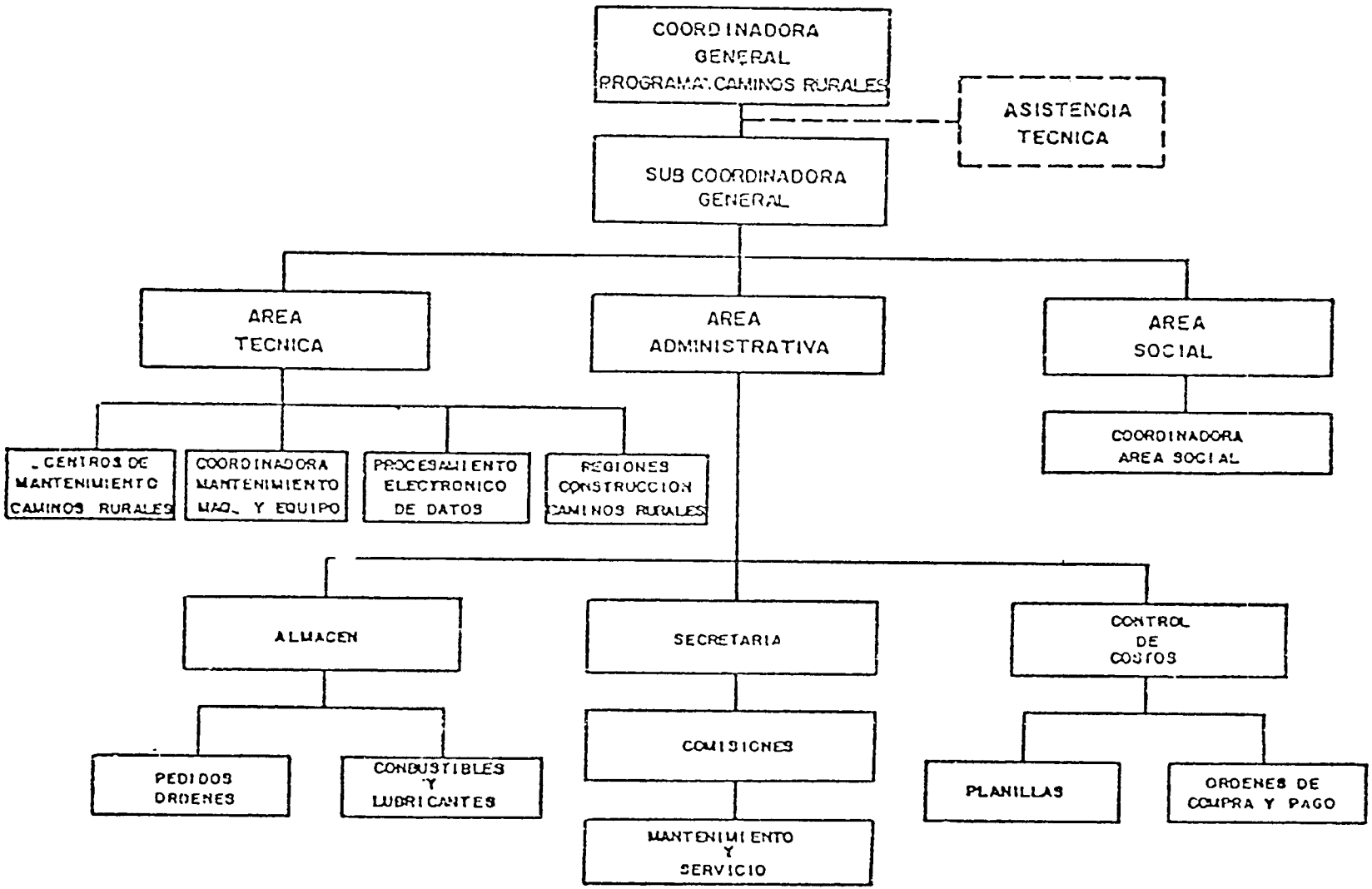


EXHIBIT 4

ORGANIGRAMA DE UNA REGION

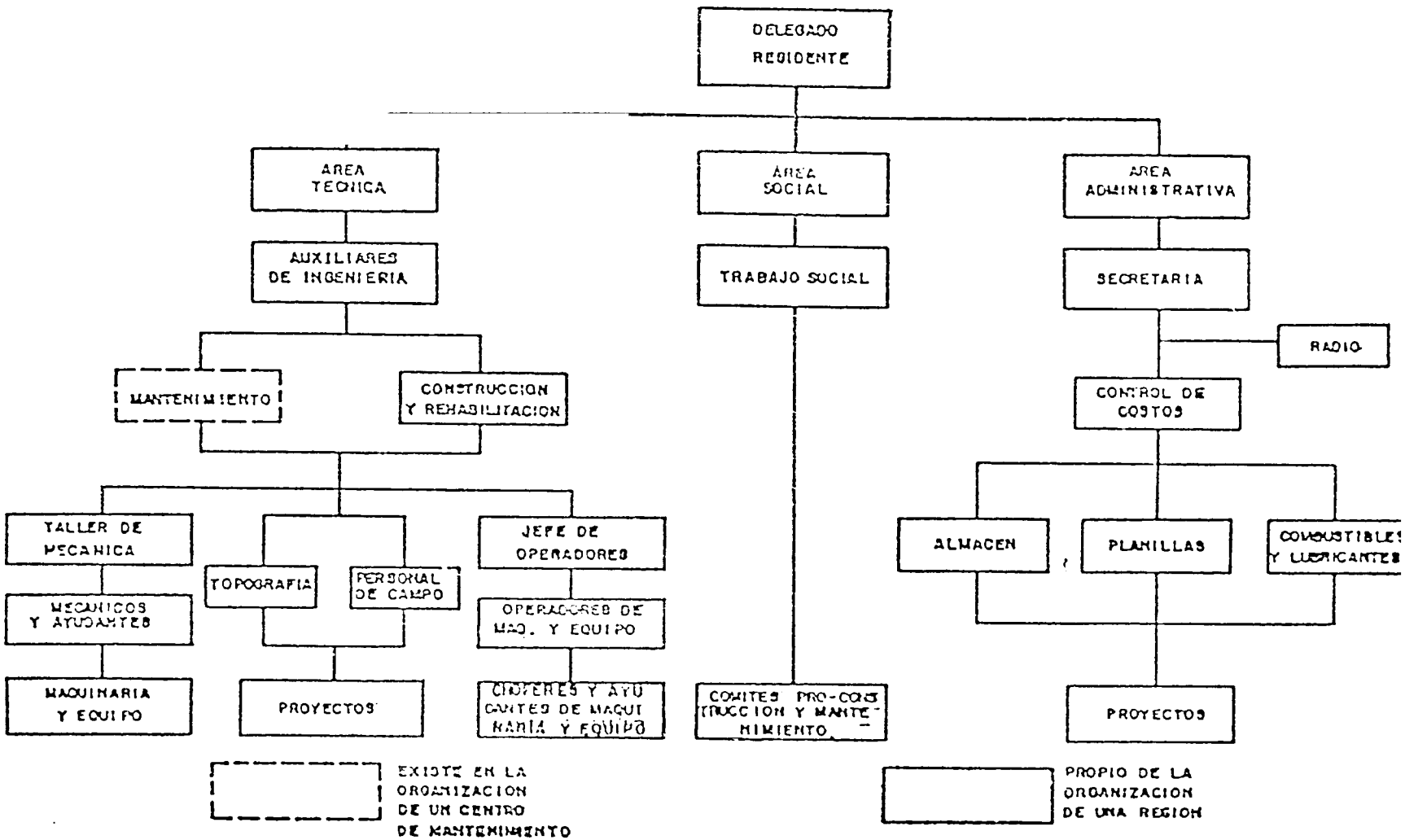
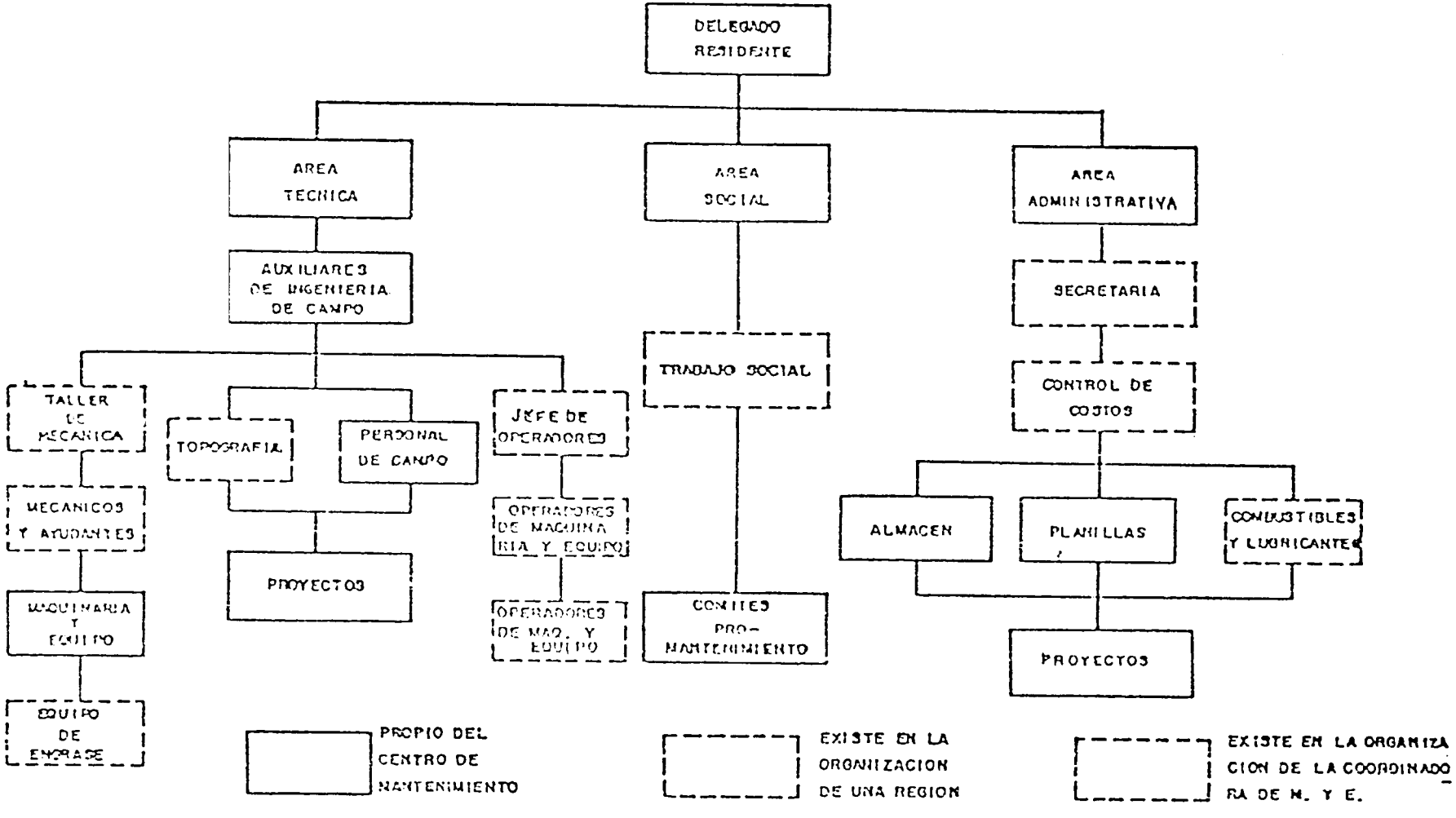


EXHIBIT 5

ORGANIGRAMA

CENTRO DE MANTENIMIENTO



ORGANIGRAMA
DEL DEPARTAMENTO DE INGENIERIA DE MANTENIMIENTO

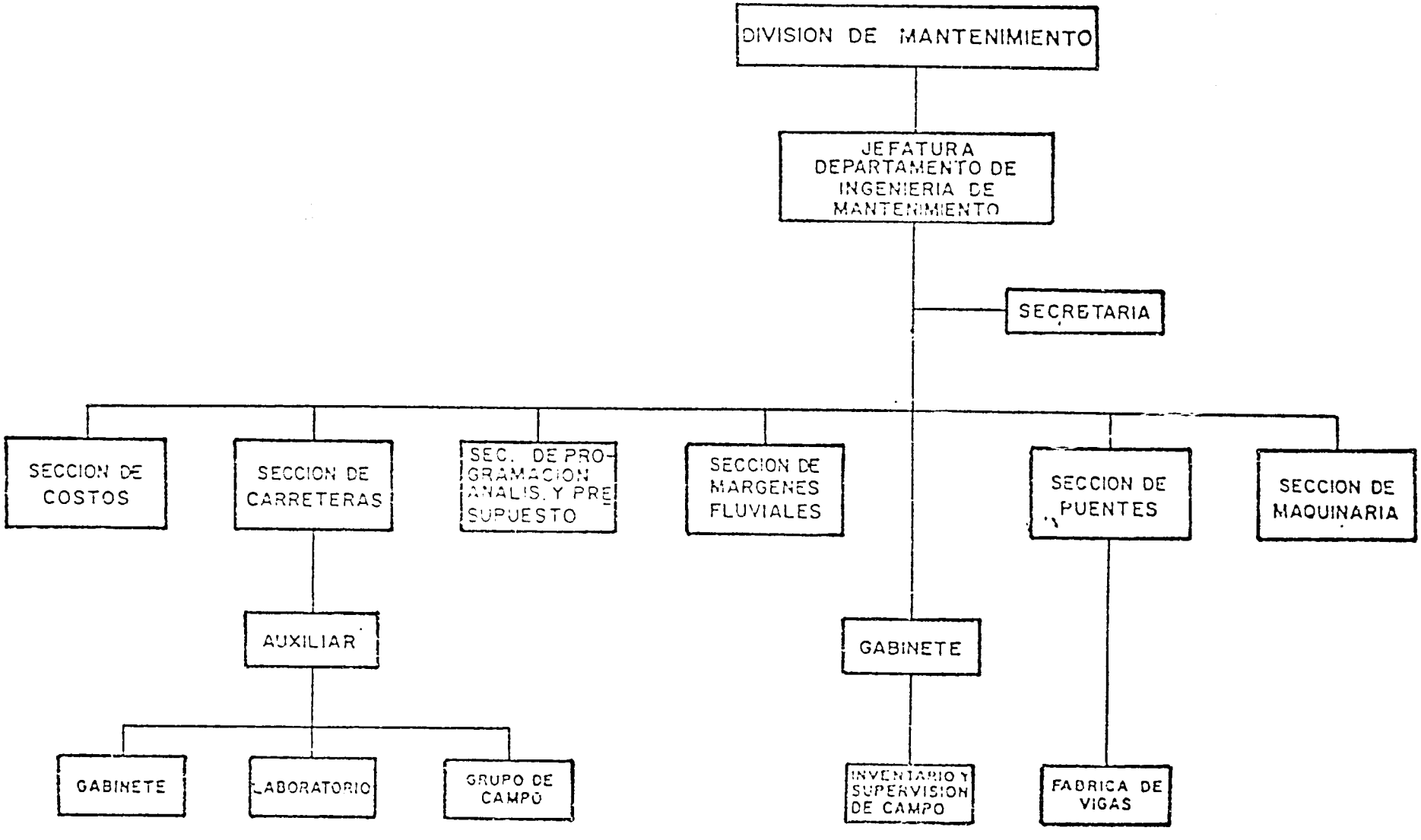
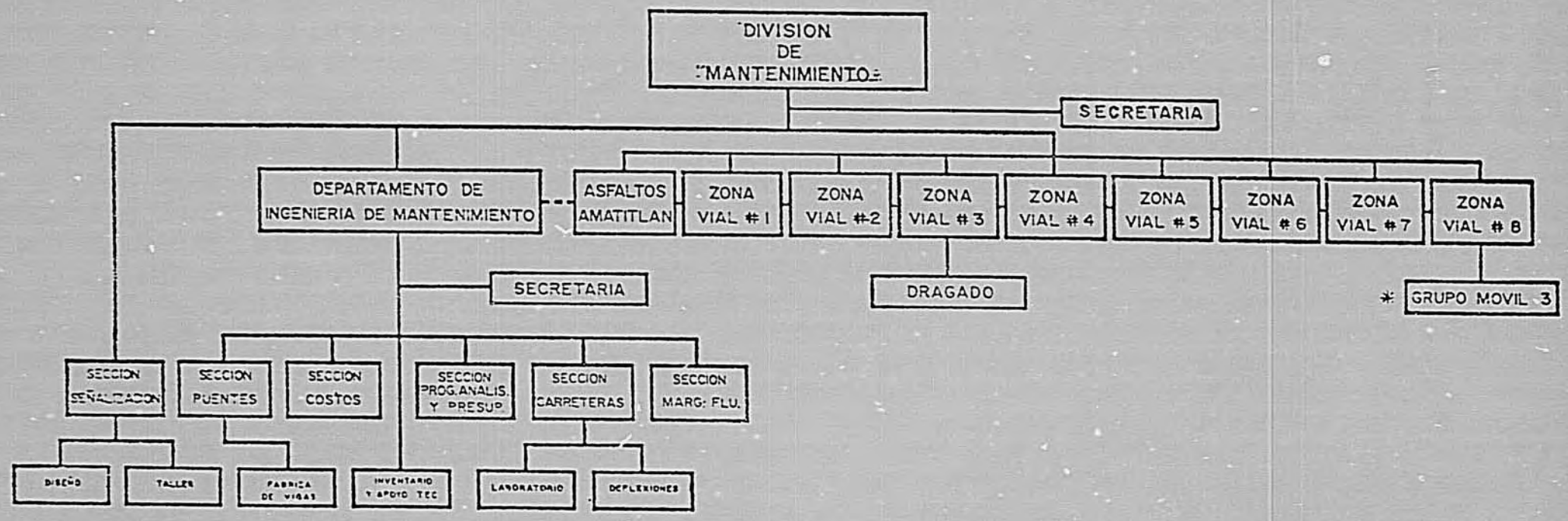


EXHIBIT 7



* CONFORME NECESIDADES SE PUEDE TRASLADAR A OTRAS ZONAS.

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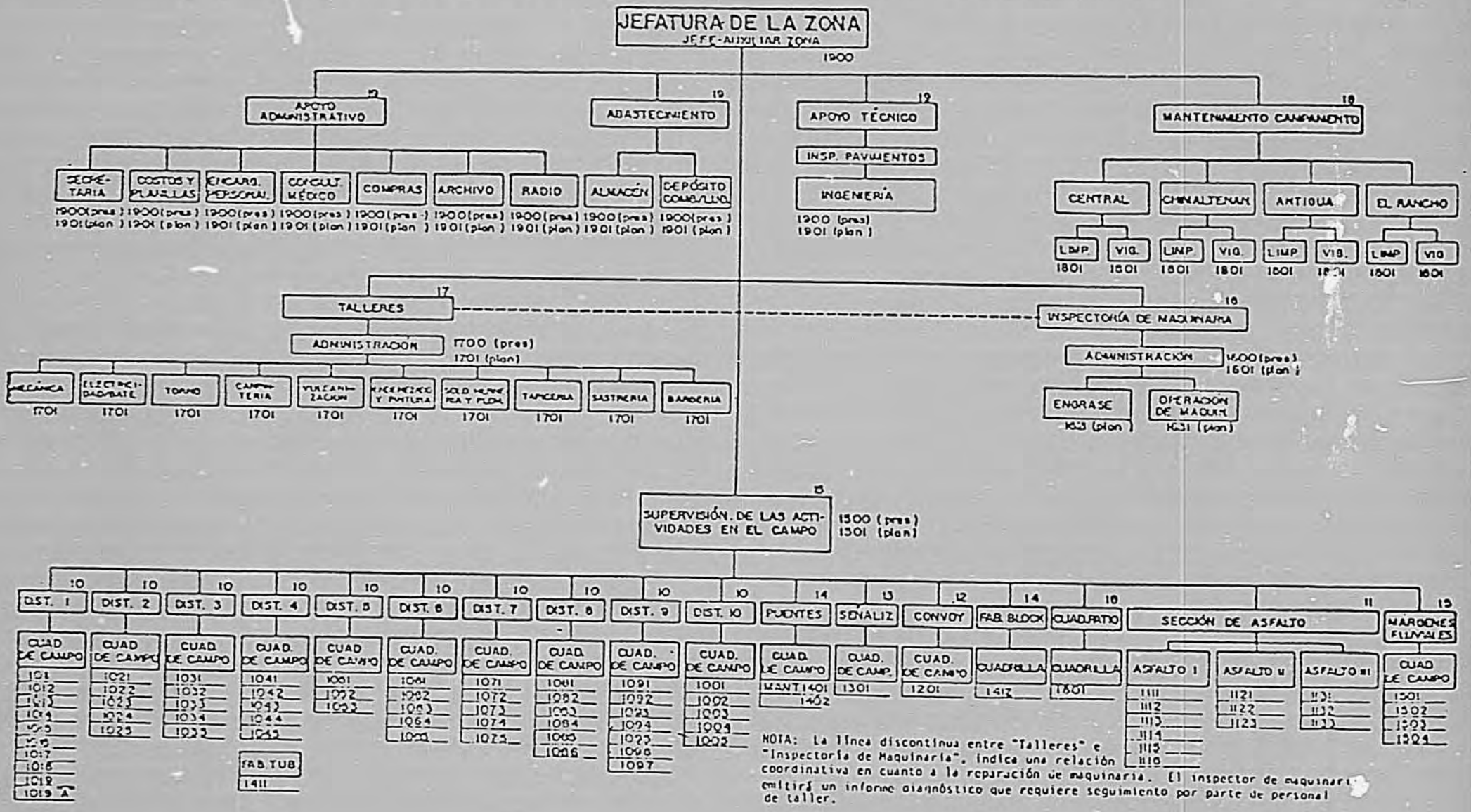
EXHIBIT 8

ORGANIGRAMA DE LA ZONA VIAL No. 1- GUATEMALA



NOTA: La línea discontinua entre "Talleres" e "Inspectoría de Maquinaria", indica una relación coordinativa en cuanto a la reparación de maquinaria. El inspector de maquinaria emitirá un informe diagnóstico que requiere seguimiento por parte de personal de taller.

ANNEX 5

ECONOMIC ANALYSIS

A. Introduction

The purpose of this economic analysis of the Farm to Market Access Roads Amendment is to determine whether the application of funds to this project is an appropriate use of scarce economic resources in Guatemala. As a result of the Amendment, 800 kilometers of new access roads will be constructed (bringing the total for the project to 1,705 kilometers), 240 kilometers of tertiary roads will be upgraded, and 800 kilometers of roads maintained. With these additional activities, the life of project total will be 2,180 kilometers of roads maintained.

The conventional methodology for the appraisal of road projects relies upon the quantification of road user savings. This will be accomplished here through the performance of a benefit-cost analysis which will provide the present value of the net benefit stream over the period of analysis. As is usually the case with development projects, many of the benefits generated by a project are very difficult to quantify accurately. A discussion of those nonquantifiable benefits will be listed below. Quantifiable benefits of the project, such as increased farmer income, increased transporter income, and reduced transportation costs will be used in the benefit-cost analysis.

Because the project components differ substantially, they will each be dealt with separately. The first analysis will focus on the construction of access roads in areas where there is currently little traffic on the road and low levels of economic activity in the area of influence. An estimate of the expected increases in income due to increased agricultural productivity and decreased costs will be used to generate an internal rate of return. Tertiary Roads and the Roads Maintenance Components will be discussed and recent benefit-cost analyses performed on roads falling under this project description will be cited to illustrate the potential economic benefits and costs over the life of project. Based on the internal rates of return obtained and cited, 41.99, 20.33, and 20.05, respectively, overall the project is expected to be a good investment.

B. Distribution of Benefits

The distribution of benefits under the project components varies. The Farm to Market Access Roads Component should provide the greatest proportion of benefits to the economically disadvantaged. This occurs because their income levels should increase as agricultural production in the area increases, and also due to increased availability of short-term jobs in the area during the construction process. Throughout the project, labor intensive techniques will be emphasized (especially those using unskilled labor) to create rural employment opportunities and to maximize the positive impact of

the project on low-income families. For the Tertiary Roads and Roads Maintenance Component the distribution of benefits will differ from that of the Farm to Market Access Roads Component. Most of the project benefits under these components will be in the form of transport savings. Much of these savings will be retained by the transporter and/or middleman and not be passed on to the farmer in the form of higher farm gate prices, nor to the consumer in the form of lower prices. These components will, however, generate substantial benefits for society as a whole.

A review of other roads projects highlights the importance of designing road projects in conjunction with other forms of development assistance. The producer response to the construction of the new road can be measurably increased if there is an agricultural development program operating in the same area. This is a strong incentive to ensure that the Direcion General de Caminos (Caminos) and DIGESA (part of the Ministry of Agriculture) work together to ensure that, to the extent possible, the roads constructed under the project are in communities where there will also be agricultural training and assistance ongoing or planned.

C. Nonquantifiable Benefits

The construction of a new road, or upgrading of an existing road resulting in a more production utililization of the farm labor force, in a community brings with it many benefits other than those used in a benefit-cost analysis. These include a better standard of living brought about by increased access to health care and facilities, and to other social services provided by the government such as agricultural extension services. Other benefits include increased production of high value crops as transportation costs of those crops fall and frequency of transport increases. Also, the regional mobility of labor resources should increase allowing for a more economic use of existing resources for society. In the case of the community examined in this analysis of an access road which does not have electricity, the presence of the road will also increase the probability that the community will obtain electricity. The existing system used to evaluate which communities will receive electricity versus those that will not is based on a series of weighted factors, one of which is the presence of a road into the community. While the project could not claim sole responsibility for a participating community subsequently obtaining access to the electrical network, the presence of a new road would be a contributing factor.

Another major benefit will be the time savings afforded by more frequent access to mechanized forms of transportation. The predominant method of transporting produce in the model access area road used in the analysis is on foot or with the use of an animal. The economic opportunity cost of the time savings generated over the life of project due to a reduction in the time required to haul produce to the nearest market 12 kilometers away, from 4 hours to less than 1 hour, are potentially enormous. Time savings will also be a major benefit of the Tertiary Roads and Roads Maintenance Components.

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Roads that are upgraded and maintained properly will allow for vehicles traveling on them to operate at maximam efficiency levels and at optimal speeds.

The roads constructed and maintained under this project may also have a negative development impact as well. Examples of this would be a case where there was a substitution of imported goods for locally produced items, or if there was a substantial increase in migration rates out of the area.

D. Access Road Benefit-Cost Analysis

1. Methodology:

As part of their prioritization process, Caminos has a large data base of socio-economic information collected in surveys of prospective access road projects. The survey results from one of these roads provided the information used in the benefit-cost analysis. The analytical method employed here is based on the producer surplus approach used in the World Bank document, The Economic Analysis of Rural Road Projects. To perform this analysis, the expected project benefit stream was compared to the cost stream over the life of project to determine whether discounted benefits would exceed costs. Both the benefit and cost streams were discounted using a rate of 15 percent to reflect the opportunity cost of capital. An internal rate of return was also calculated.

a. Project Benefits

The benefits generated as a result of the construction of the access road come from two primary sources. The first is the incremental increase in the total value added of production attributable to the project. In the analysis of an access roads project this is by far the largest contributor to the benefits category. The second is the savings resulting from the reduction in transportation costs and prices for the exportable surplus of production.

b. Project Costs

Project costs arise from the construction, upgrading and maintanence of the roads throughout the life of project, at an average of Q39,000, Q63,988, and Q2,105 per kilometer, respectively. The economic cost used in the Farm to Market Access Road analysis is slightly lower than the financial costs listed above because they have been adjusted downward to reflect the lower economic opportunity cost of the use of unskilled labor (of which Guatemala has an abundance.) In line with the current GOG policy, the major portion of project resources are paid out in labor costs due to the labor intensive method of construction. Also in concurrence with this policy (and to minimize the use of foreign exchange), where possible the necessary construction materials (i.e. cement, lime, or concrete) will be obtained from local sources.

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Other project costs which are netted out of the analysis include the production cost of land under cultivation, and of new land brought into production either to meet increasing local consumption requirements and/or as a direct result of the construction of the road. In both the "without" and "with" project scenarios the cost of production on new land was estimated to be 5 percent higher than that on land currently under cultivation. This adjustment was made to reflect the higher economic opportunity cost involved in bringing the additional land into production. An example of this opportunity cost would be the greater distance between the land where the crop is grown and the location to which the produce must be carried to be sold or transported. The clearing cost of new land was calculated based on a Mission estimate of 36 jornales, or person-days of labor to clear each hectare. Again, labor costs were shadow-priced to reflect the relative abundance of unskilled labor in Guatemala.

The average transport price and cost were calculated based on survey data and on information in the Mission. In the "without" project scenario, transportation prices and costs remained constant throughout the life of project. In the "with" project scenario, it was assumed that both prices and costs would gradually decline over the 10-year project life. This decline can be attributed primarily to two factors. First, there would be a change in the composition of transportation, away from almost exclusive reliance on manpower or animal power to carry produce, toward increasing reliance on small trucks as accessibility is increased by the road. And second, there would be a reduction in operating costs of vehicles.

c. Results of the Benefit-Cost Analysis

Table 3 provides a summary of project costs, benefits and net present worth of the access road in question. The internal rate of return generated by the analysis is 41.99. This result compares favorably with many of the projects in the A.I.D. portfolio and also with the estimated 15 percent opportunity cost of capital in Guatemala. The nonquantifiable benefits discussed above, and the conservative assumptions used in the analysis, suggest that the economic benefits are understated and that the true economic benefits are higher than those obtained in the analysis. This finding is supported by an analysis performed for Caminos as part of their prioritization program. An Interamerican Development Bank computer model, Road Sim, which has been installed at Caminos was used to perform the analysis. The 7 kilometer road project, El Guayabito-Potrero Grande, was analyzed in June, 1986. That analysis yielded an internal rate of return of 37.83 percent.

A sensitivity analysis was performed in which construction and maintenance costs were increased by 30 percent. This yielded an internal rate of return of 35.28 percent, which implies that the Farm to Market Access Roads Component would still be economically viable even if these costs increased by 30 percent.

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E. Tertiary Roads

The primary thrust of this pilot project component will be upgrading or improving selected existing routes to the all weather standards of Caminos. Tertiary roads are usually located in an area where the level of economic activity is already substantial. The analytical approach used with this type of road differs from that used above with access roads because benefits come from different sources. With tertiary roads the project benefits are largely road user savings on normal traffic, and the magnitude of developmental benefits is comparatively small. As vehicle operating costs decline, additional agricultural and non-agricultural traffic should be generated increasing the level of benefits.

A benefit-cost analysis of a tertiary road was not performed specifically for this analysis due to insufficient information. While Caminos has a large data base on access road-related data, the information on tertiary roads is sketchy and out-dated. However, as a part of the IDB computer model mentioned above, there have been some recent analyses of tertiary roads. The results of an analysis performed in April, 1986, the Olintepeque-S.F. La Union project, a 20 kilometer road located in the department of Quetzaltenango are discussed here. The analysis generated an internal rate of return of 20.33 percent. This implies that over the 20-year project life used in the analysis that the discounted benefit stream will exceed the cost stream and that the project will be a good economic investment

Factors exogenous to the project may affect the impact of the project on economic activity in the area of influence. One such constraining factor would be a lack of resources to build a warehouse near the road. If there is no facility for storing a sufficient amount of produce to fully utilize the increased volume of traffic potential economic benefits could be lost.

F. Maintenance of Roads

The third component of the project will involve the maintenance of new roads constructed under this project. As with tertiary roads, most of the benefits of the project will come from the future savings occuring as a result of road maintenance over the life of project. Maintenance of an existing road should not have a major impact on the volume of traffic but it will affect the operating costs of the vehicles traveling over the road. As is mentioned above, the distribution of benefits under a roads maintenance project is similar to that of a tertiary roads project. That is, most of the benefit will be in the form of savings on transport costs and a major portion of the benefit will be realized by the transporters of produce and people.

Due to the existance of recent IDB analyses for this area and the lack of current information related to road maintenance savings, the IDB analysis will be cited here. A recent test analysis run through their computer model provides economic justification for the Roads Maintenance Component. The

analysis which was performed in June, 1987, compared the costs of maintaining 10 kilometers of road over a 15 year project life, with the expected transport cost savings. This analysis generated an internal rate of return of 20.05 percent. These results indicate that road maintenance is also a good use of scarce economic resources.

G. Employment Generation

The employment generation impact of this project will be substantial. As can be seen in Table 4, over the life of project a total of 18,746 person-years of employment will be generated. Of this total, 16,052, or 86 percent will be for unskilled laborers. Of the total, the Farm to Markets Access Roads Component accounts for 80 percent ; the Tertiary Roads Component represents 12 percent, and; the Roads Maintenance Component will provide 8 percent.

H. Public versus Private Sector Road Construction

When designing a project of this nature, cost considerations should be of paramount importance. As is generally known, for several reasons private firms are often more cost effective that government entities. Thus, the question of who will perform the construction, upgrading, and maintenance activities of this roads project must be addressed.

Three major private road construction firms in Guatemala have been consulted about their capability and willingness to build under contract the types of roads included in this project. Two important findings have come from these consultations.

1. While private firms have been involved in road construction in Guatemala, the type of road they have been involved with differs substantially from those included in this project. For the most part these have been primary or secondary roads connecting departmental capitals. Thus, the private firms don't have a great deal of experience with access and tertiary roads and the labor intensive methods used in this project.

2. The method of construction used by these firms is much more capital intensive than that proposed in this project. Although they may be concerned with the overall economic development of the country, as private businesses these firms have as their primary goal profit maximization. This was evidenced by their unwillingness to become involved with labor intensive road projects like those in this project because they perceive that their profit margins would be lower if they were restricted from fully utilizing their capital intensive heavy equipment.

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The Inter-American Development Bank published in November, 1986 a docment entitled, Proposal for Loans for the Fourth Stage of a Local and Rural Roads Program, contains the cost recent construction cost information received from prospective firms. These cost which are based on bids received from prospective firms, ranged from U.S. $76,000 to U.S. $110,000 per kilometer. These cost figures are not comparable to the average cost figure of Q39,000 used throughout the Farm to Market Access Roads Amendment, however, due to the varying nature of the roads in question. For example, the roads covered under the IDB project will be surfaced with different material and usually have a greater proportion of bridges per kilometer of road constructed.

I. Selection Criteria

The roads included under this Project will be selected based on Caminos' Prioritization System of Construction Projects. The areas in which the following criteria hold will have the greatest possibility of being included under this Project:

1. Communities which are isolated and where it is technically feasible to construct a road.
2. Communities whose inhabitants are, for the most part, small farmers.
3. The cost of construction per kilometer of road is the lowest, (in comparison with other communities participating in the selection process.)
4. Communities which have good agricultural production.
5. Communities with litte access to Public Services.
6. Communities with a substantial population.
7. Communities with agricultural projects.
8. Access to the right of way and extraction of the natural resources necessary for the construction of the road.
9. High level of community cooperation in the construction of the road.
10. The existance of a previous road which caused the solicitation of the new access road.
11. Sufficient amount of non occupied labor.
12. The community should have the ability and/or the experience to solve their problems.

All of these criteria are factored into the selection process and are grouped into the seven major categories used on the survey forms. The data collected in each of these categories is input into a computer model which calculates the ranking the road has among all of the proposed roads in the data base. The roads to be constructed under the Project will be selected based on their relative ranking, e.g. from highest ranked to lowest ranked. The categories and their respective weights are listed below:

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Category	Weight
Demographics	15
Organization	10
Access to Public Services	15
Economic Feasibility	20
Community Cooperation	10
Condition of Previous Road	10
Cost of Construction	20
Total	100

As can be seen in the above list, the economic feasibility and construction costs are the categories with the highest weights. If these criteria are followed throughout the selection process, then there is a high probability that the actual roads constructed will have high returns similar to those calculated for the sample access road in this analysis.

The selection process for tertiary roads will be similar to the one described above for access roads.

J. Conclusion

The internal rates of return for the Access Road Component, (41.99), the Tertiary Road Component (20.33), and the Roads Maintenance Component (20.05), demonstrate that this project will be an appropriate use of scarce resources. In addition to the benefits used in the benefit-cost analyses, there are several others attributable to this project. The construction of new roads into a community should bring with it not only increased farmer income as agricultural output grows, but also greater access to many social services (such as health care) and a reduction in the travel time to the nearest market.

The benefits arising as a result of the Farm to Market Access Roads Component should be realized, for the most part, by low-income farmers. The upgrading of tertiary roads and road maintenance in general will bring some savings to farmers in the form of reduced transportation rates for their produce, however experience has shown that often much of the transport savings is retained by the transporter or middleman. Still, this is a benefit for the society as a whole. Due to the labor intensive construction methods employed in this project, it will also have a substantial employment generation effect.

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ACCESS ROADS

ASSUMPTIONS

1. The Benefit-Cost Analysis is based on a 10-year project life to better estimate the long-term benefits resulting from the fund.

2. A discount rate of 15 percent was used to reflect the opportunity cost of capital.

3. The analysis was performed in quetzals.

4. The information used in the analysis was collected by Caminos in December, 1986 in one of their Socio-Economic Qualification Surveys as part of their prioritization system. Survey data are based on information obtained from 49 respondants, representing approximately 12 percent of the total population of 2,931. The name of the project is Santa Clara La Laguna-Pasajquim, located in the Department of Solola. The proposed 12 kilometer road has an area of influence of 170 square kilometers. The community has access to potable water and latrines, however it does not currently have access to electricity.

5. Agricultural production is focused primarily on four crops; corn, beans, coffee, and cardomom. During the period in which the data were reported, corn accounted for 36 percent of land in production and 18 percent of total value of output, beans for 3 percent and 1 percent, coffee for 50 percent and 68 percent, and cardomom for 11 percent and 13 percent, respectively. (Due to the lack of historical data, it is not possible to determine whether coffee has in the past accounted for such a large percentage of both land in production and value of output. The high value of output may be due to unusually high coffee prices during the period covered.) As can be seen in Table 1, approximately 40 percent of the land planted in corn and coffee and 20 percent of the land planted in beans, was "improved", that is to say that it was fertilized. According to survey results, none of the land planted in cardomom was improved. Yield and price information about the agricultural products was obtained from the survey results. The "with" and "without" project assumptions about production over the life of project are listed below:

Without Project: (See Table 1)

A. Extrapolating from survey data, it was calculated that 11.2 percent of the area of influence was under cultivation. The amount of land in production was increased by 3 percent a year (applied to each crop equally) because it was assumed that production would have to increase by that amount to keep pace with the rate of population growth.

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B. The percentage of "improved" land in production was assumed to remain constant throughout the 10-year project life.

C. The yield obtained from improved land was estimated to be 20 percent greater than that from unimproved land. This is a conservative assumption; Mission sources indicate that proper fertilization of crops, ceteris paribus, will cause on the average a 30 percent increase in yield.

With Project: (See Table 2)

A. Based on historical data, Caminos has calculated that for each kilometer of access road constructed, an average of 2.3 hectares of new land will be brought into production. Although this number is greater in some regions than in others ranging from .4 to 4.5, a conservative increase of 2 hectares annually of the ten-year project life was used in the analysis. Thus, the total number of hectares in production was increased annually by 24, that is 2 times the 12 kilometers of road constructed. This is in addition to the 3 percent annual increase which would have occured without the project.

B. After the road is constructed in year 1, access to fertilizers and information related to agricultural production should improve. For this reason, after the first year of the project, the percentage of improved land was increased by 10 percent annually for a period of five years and then remained at that level throughout the remaining project life, (e.g. the proportion of improved land planted in corn increased from 40 percent in year 1 to 64 percent in years 6-10.).

7. Prices and yields of produce remained constant throughout the life of project in both the without and with project scenarios.

8. Population was assumed to increase at a rate of 3 percent annually. Per capita consumption of local produce remained constant in the without and with project scenarios.

9. Production cost of new land brought into production in both scenarios was estimated to have an cost of production 5 percent greater than the land originally under production. This adjustment was made to reflect the higher economic opportunity cost of, for example, the greater distance between the land where the crop is grown and the location to which the produce must be carried to be sold or transported.

10. The clearing cost of new land was obtained based on a Mission estimate of 36 jornales, or person-days required to clear each hectare. Labor costs were shadow-priced at 80 percent of the minimum wage to reflect the relative abundance of unskilled labor in Guatemala.

11. The average transport price was calculated based on survey data and on information already in the Mission. In the "without" project scenario, transportation prices and costs remained constant throughout the life of project. In the "with" project scenario, it was assumed that both prices and costs would gradually decline (for a total decrease of 18 percent at the end of year 10.) This decline can be attributed primarily to two factors; first a change in the composition of transportation, away from heavy reliance on animals to carry produce toward increasing reliance on small trucks as accessibility is increased by the road, and second, a reduction in operating costs of vehicles.

12. As can be seen in Table 3, project costs arise as a result of the direct cost of constructing and maintaining the road through the life of project, at Q39,000 and Q2,105, respectively. The unskilled labor used in these processes was also shadow priced at 80 percent of the average wage rate. An additional cost used in the analysis was that of transporting the increased production occuring as a result of the project.

13. One project benefit used in the benefit-cost analysis was the difference between the total value of production with the project and that without the project. Another benefit included the savings generated as a result of a the reduction in operating costs of the vehicles transporting the produce.

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Summary Economic Analysis

The internal rates of return for the Access Road Component, (41.99), the Tertiary Road Component (20.33), and the Roads Maintenance Component (20.05), demonstrate that the Farm to Market Access Road Amendment will be an appropriate use of scarce resources (see Annex __), particularly when compared with the estimated opportunity cost of capital of 15 percent in Guatemala. Under the Amendment, 800 kilometers of new access roads will be constructed bringing the total for access roads under the project to 1,705 kilometers. Under the project, 240 kilometers of tertiary roads will be upgraded, and 800 kilometers of roads maintained (with these additional activities, the life of project total will be 2,180 kilometers of roads maintained.)

In addition to the benefits used in the benefit-cost analyses, (e.g. increased farmer and transporter income) there are several others attributable to this project. The construction of new roads into a community should bring with it not only increased farmer income as agricultural output grows, but also greater access to many social services (such as health care and agricultural extension services) and a reduction in the travel time to the nearest market.

Low-income farmers will be the primary beneficiaries of the Access Roads Component of this Project as they receive increased income due to greater agricultural production and to increased employment opportunities. The upgrading of tertiary roads and road maintenance in general will also bring savings to farmers in the form of reduced transportation rates for their produce, however experience has shown that often much of the transport savings is retained by the transporter or middleman. Still, this is a benefit for the society as a whole. Due to the labor intensive construction methods employed in this project, it will also have a substantial employment generation effect by creating 18,746 person-years of employment over the LOP.

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TABLE 1

AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND TRANSPORT COSTS "WITHOUT" PROJECT

YEAR	CROP AREA BREAKDOWN (Hectares)				TOTAL NEWLY CROPPED AREA (Hectares)				INCREMENTAL CROPPED AREA (Hectares)			
	Corn	Beans	Coffee	Cardomom	Corn	Beans	Coffee	Cardomom	Corn	Beans	Coffee	Cardomom
1	693	47	955	212	0	0	0	0	0	0	0	0
2	714	48	984	218	21	1	29	6	21	1	29	6
3	735	50	1,013	225	42	3	58	13	21	1	30	7
4	757	51	1,044	232	64	4	89	20	22	1	30	7
5	780	53	1,075	239	87	6	120	27	23	2	31	7
6	803	54	1,107	246	110	7	152	34	23	2	32	7
7	827	56	1,140	253	134	9	185	41	24	2	33	7
8	852	58	1,175	261	159	11	220	49	25	2	34	9
9	878	60	1,210	269	185	13	255	57	26	2	35	8
10	904	61	1,246	277	211	14	291	65	26	2	36	8

TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

IMPROVED CROP AREA								YIELDS			
Percent				Hectares				Unimproved (qq/ha.)			
Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom
40	20	40	0	277	9	382	0	40.04	19.37	46.20	22.30
40	20	40	0	286	10	393	0	40.04	19.37	46.20	22.30
40	20	40	0	294	10	405	0	40.04	19.37	46.20	22.30
40	20	40	0	303	10	417	0	40.04	19.37	46.20	22.30
40	20	40	0	312	11	430	0	40.04	19.37	46.20	22.30
40	20	40	0	321	11	443	0	40.04	19.37	46.20	22.30
40	20	40	0	331	11	456	0	40.04	19.37	46.20	22.30
40	20	40	0	341	12	470	0	40.04	19.37	46.20	22.30
40	20	40	0	351	12	484	0	40.04	19.37	46.20	22.30
40	20	40	0	362	12	498	0	40.04	19.37	46.20	22.30

TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

YIELDS Improved (qq/ha.)				Unimproved (qq)				AGRICULTURAL PRODUCTION Improved (qq)			
Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom
48.06	23.25	55.44	26.76	16,649	728	26,473	4,728	13,323	219	21,178	0
48.06	23.25	55.44	26.76	17,148	750	26,473	4,869	13,722	225	21,582	0
48.06	23.25	55.44	26.76	17,653	773	27,267	5,016	14,134	232	22,456	0
48.06	23.25	55.44	26.76	18,192	796	28,879	5,166	14,559	239	23,141	0
48.06	23.25	55.44	26.76	18,739	820	29,745	5,321	14,995	246	23,835	0
48.06	23.25	55.44	26.76	19,300	844	30,638	5,481	15,445	253	24,550	0
48.06	23.25	55.44	26.76	19,879	870	31,557	5,645	15,908	261	25,287	0
48.06	23.25	55.44	26.76	20,476	896	32,504	5,814	16,385	269	26,046	0
48.06	23.25	55.44	26.76	21,090	923	33,479	5,989	16,877	277	26,827	0
48.06	23.25	55.44	26.76	21,723	950	34,483	6,168	17,383	285	27,632	0

TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

Total (qq)				POPULATION	Per Capita				Total (qq)				LOCAL CON
Corn	Beans	Coffee	Cardoon		Corn	Beans	Coffee	Cardoon	Corn	Beans	Coffee	Cardoon	
29,971	947	47,651	4,729	2,931	5.01	0.11	5.36	0.53	14,686	322	15,725	1,097	
30,831	975	49,275	4,869	3,019	5.01	0.11	5.28	0.53	15,127	332	15,931	1,120	
31,797	1,005	49,723	5,016	3,109	5.01	0.11	5.28	0.53	15,580	342	16,409	1,154	
32,751	1,035	52,020	5,166	3,203	5.01	0.11	5.36	0.53	16,048	352	17,157	1,188	
33,723	1,066	53,581	5,321	3,299	5.01	0.11	5.36	0.53	16,529	362	17,692	1,224	
34,745	1,098	55,188	5,481	3,398	5.01	0.11	5.36	0.53	17,025	373	18,212	1,261	
35,797	1,131	56,844	5,645	3,500	5.01	0.11	5.36	0.53	17,536	384	18,758	1,299	
36,861	1,165	58,549	5,814	3,605	5.01	0.11	5.36	0.53	18,062	396	19,321	1,337	
37,957	1,199	60,306	5,989	3,713	5.01	0.11	5.36	0.53	18,604	408	19,901	1,377	
39,106	1,235	62,115	6,168	3,824	5.01	0.11	5.36	0.53	19,162	420	20,498	1,419	

TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

SUMPTION

Price (Q/qq)				Value (000 Q's)				Quantity (qq)			
Corn	Beans	Coffee	Cardomom	Corn	Beans	Coffee	Cardomom	Corn	Beans	Coffee	Cardomom
20.00	34.80	46.51	85.15	293.72	11.20	731.36	93.68	15,285.42	624.93	31,925.96	3,640.25
20.00	34.80	46.51	85.15	302.53	11.54	740.93	96.49	15,743.99	643.68	32,343.95	3,749.45
20.00	34.80	46.51	85.15	311.61	11.89	753.16	99.38	16,216.31	662.99	33,314.28	3,861.94
20.00	34.80	46.51	85.15	320.96	12.24	793.42	102.36	16,702.79	682.88	34,853.49	3,977.80
20.00	34.80	46.51	85.15	330.58	12.61	822.37	105.43	17,203.88	703.36	35,899.09	4,097.14
20.00	34.80	46.51	85.15	340.50	12.99	847.04	108.60	17,720.00	724.46	36,976.06	4,220.05
20.00	34.80	46.51	85.15	350.72	13.38	872.46	111.85	18,251.59	746.20	38,085.34	4,346.65
20.00	34.80	46.51	85.15	361.24	13.78	898.63	115.21	18,799.14	768.58	39,227.90	4,477.05
20.00	34.80	46.51	85.15	372.08	14.19	925.59	118.66	19,363.12	791.64	40,404.74	4,611.36
20.00	34.80	46.51	85.15	383.24	14.62	953.36	122.22	19,944.01	815.39	41,616.88	4,749.70

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TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

EXPORTABLE SURPLUS Price (Q/qq)				Value (000 Q's)				TOTAL VALUE O PRODUCTION (000 Q's)
Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom	
20.00	34.80	46.51	86.15	305.71	21.75	1,484.88	313.61	3,255.90
20.00	34.80	46.51	86.15	314.88	22.40	1,504.32	323.02	3,316.10
20.00	34.80	46.51	86.15	324.33	23.07	1,549.45	332.71	3,415.58
20.00	34.80	46.51	86.15	334.06	23.76	1,621.04	342.69	3,555.52
20.00	34.80	46.51	86.15	344.08	24.48	1,669.67	352.97	3,662.19
20.00	34.80	46.51	86.15	354.40	25.21	1,719.76	363.56	3,772.05
20.00	34.80	46.51	86.15	365.03	25.97	1,771.35	374.46	3,885.22
20.00	34.80	46.51	86.15	375.98	26.75	1,824.49	385.70	4,001.77
20.00	34.80	46.51	86.15	387.26	27.55	1,879.22	397.27	4,121.83
20.00	34.80	46.51	86.15	398.88	28.38	1,935.60	409.19	4,245.48

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TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

F

PRODUCTION COST OF OLD LAND (Q/ha.)				Total (000 Q's)			
Corn	Beans	Coffee	Cardoxoa	Corn	Beans	Coffee	Cardoxoa
649.00	304.24	887.70	870.80	449.76	14.30	847.75	184.61
649.00	304.24	887.70	870.80	463.25	14.73	873.19	190.15
649.00	304.24	887.70	870.80	477.15	15.17	899.38	195.85
649.00	304.24	887.70	870.80	491.46	15.63	926.36	201.73
649.00	304.24	887.70	870.80	506.21	16.09	954.15	207.78
649.00	304.24	887.70	870.80	521.39	16.58	982.78	214.01
649.00	304.24	887.70	870.80	537.03	17.07	1,012.26	220.43
649.00	304.24	887.70	870.80	553.14	17.59	1,042.63	227.05
649.00	304.24	887.70	870.80	569.74	18.11	1,073.91	233.86
649.00	304.24	887.70	870.80	586.83	18.66	1,106.13	240.87

TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS 'WITHOUT' PROJECT

PRODUCTION COST OF NEW LAND (Q/ha.)				Total (000 Q's)				CLEARING COST OF NEW LAND		TOTAL PROD. COST	AVERAGE TRANSPORT PRICE	
Corn	Beans	Coffee	Cardomom	Corn	Beans	Coffee	Cardomom	Q/ha	Total (000 Q's)	(000 Q's)	Q/qq-km	Revenue (000 Q's)
681.45	319.45	932.09	914.34	0.00	0.00	0.00	0.00	92.16	0.00	1,496.42	0.2083	10.72
681.45	319.45	932.09	914.34	14.17	0.45	26.70	5.82	92.16	5.27	1,593.72	0.2083	10.93
681.45	319.45	932.09	914.34	28.76	0.91	54.21	11.80	92.16	5.43	1,688.67	0.2083	11.26
681.45	319.45	932.09	914.34	43.79	1.39	82.54	17.97	92.16	5.59	1,786.47	0.2083	11.71
681.45	319.45	932.09	914.34	59.27	1.88	111.72	24.33	92.16	5.76	1,887.20	0.2083	12.06
681.45	319.45	932.09	914.34	75.22	2.39	141.78	30.87	92.16	5.93	1,990.95	0.2083	12.42
681.45	319.45	932.09	914.34	91.64	2.91	172.73	37.62	92.16	6.11	2,097.82	0.2083	12.80
681.45	319.45	932.09	914.34	108.56	3.45	204.62	44.56	92.16	6.30	2,207.89	0.2083	13.19
681.45	319.45	932.09	914.34	125.98	4.01	237.46	51.71	92.16	6.48	2,321.26	0.2083	13.53
681.45	319.45	932.09	914.34	143.93	4.58	271.29	59.08	92.16	6.68	2,438.04	0.2083	13.98

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TABLE 1
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITHOUT" PROJECT

AVERAGE TRANSPORT COST

B/qq-da	Total (000 B's)
0.1667	8.58
0.1667	8.75
0.1667	9.01
0.1667	9.37
0.1667	9.65
0.1667	9.94
0.1667	10.24
0.1667	10.55
0.1667	10.86
0.1667	11.19

TABLE 2

AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

YEAR	CROP AREA BREAKDOWN (Hectares)				TOTAL NEWLY CROPPED AREA (Hectares)				INCREMENTAL CROPPED AREA (Hectares)			
	Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom
1	693	47	955	212	0	0	0	0	0	0	0	0
2	723	48	996	221	30	1	41	9	30	1	41	9
3	753	50	1,038	231	60	3	83	19	31	1	42	10
4	785	51	1,081	241	92	4	126	29	32	1	43	10
5	818	53	1,125	251	125	6	170	39	33	2	44	10
6	851	54	1,171	262	158	7	216	50	34	2	46	11
7	886	56	1,218	273	193	9	263	61	35	2	47	11
8	921	58	1,266	284	228	11	311	72	36	2	49	11
9	958	60	1,316	295	265	13	361	83	37	2	50	12
10	996	61	1,368	307	303	14	413	95	38	2	51	12

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TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

IMPROVED CROP AREA								YIELDS			
Percent				Hectares				Unimproved (qq/ha.)			
Corn	Beans	Coffee	Cardoncp	Corn	Beans	Coffee	Cardoncp	Corn	Beans	Coffee	Cardoncp
40	20	40	0	277	9	382	0	40.04	19.37	46.20	22.30
44	22	44	10	318	11	438	22	40.04	19.37	46.20	22.30
48	24	48	20	322	11	457	46	40.04	19.37	46.20	22.30
53	27	53	30	345	11	475	72	40.04	19.37	46.20	22.30
59	29	59	40	360	12	495	100	40.04	19.37	46.20	22.30
64	32	64	50	375	12	515	131	40.04	19.37	46.20	22.30
64	32	64	50	375	12	515	136	40.04	19.37	46.20	22.30
64	32	64	50	375	12	515	142	40.04	19.37	46.20	22.30
64	32	64	50	375	12	515	148	40.04	19.37	46.20	22.30
64	20	64	50	375	12	515	154	40.04	19.37	46.20	22.30

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TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

YIELDS								AGRICULTURAL PRODUCTION			
Improved (qq/ha.)				Unimproved (qq)				Improved (qq)			
Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom
48.06	23.25	55.44	26.76	16,649	728	26,473	4,728	13,323	219	21,178	0
48.06	23.25	55.44	26.76	16,207	731	25,759	4,443	15,255	246	24,237	592
48.06	23.25	55.44	26.76	16,895	753	26,543	4,121	15,934	255	25,309	1,236
48.06	23.25	55.44	26.76	17,603	776	27,956	3,751	16,602	263	26,351	1,934
48.06	23.25	55.44	26.76	18,333	799	29,108	3,351	17,291	271	27,444	2,623
48.06	23.25	55.44	26.76	19,085	823	30,291	2,918	18,000	279	28,560	3,501
48.06	23.25	55.44	26.76	20,468	855	32,459	3,039	18,000	279	28,560	3,547
48.06	23.25	55.44	26.76	21,892	887	34,711	3,163	18,000	279	28,560	3,796
48.06	23.25	55.44	26.76	23,359	921	37,021	3,292	18,000	279	28,560	3,950
48.06	23.25	55.44	26.76	24,870	956	39,400	3,424	18,000	279	28,560	4,109

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TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

Total (qq)				POPULATION	Per Capita				Total (qq)				LOCAL CON
Corn	Beans	Coffee	Cardoon		Corn	Beans	Coffee	Cardoon	Corn	Beans	Coffee	Cardoon	
29,971	947	47,651	4,728	2,931	5.01	0.11	5.36	0.53	14,686	322	15,725	1,087	
31,492	979	50,047	5,035	3,019	5.11	0.11	5.47	0.55	15,431	333	16,515	1,158	
32,829	1,008	52,152	5,337	3,109	5.17	0.11	5.53	0.57	16,086	343	17,210	1,222	
34,206	1,039	54,319	5,695	3,203	5.23	0.11	5.60	0.59	16,761	353	17,925	1,310	
35,624	1,070	56,552	6,049	3,299	5.29	0.11	5.66	0.61	17,456	364	18,662	1,391	
37,085	1,102	58,852	6,419	3,398	5.35	0.11	5.72	0.62	18,172	375	19,421	1,474	
38,589	1,134	61,039	6,486	3,500	5.39	0.11	5.75	0.63	18,849	385	20,140	1,533	
39,892	1,166	63,271	6,960	3,605	5.42	0.11	5.79	0.64	19,547	396	20,880	1,601	
41,359	1,200	65,581	7,242	3,713	5.46	0.11	5.83	0.64	20,266	408	21,642	1,665	
42,870	1,234	67,960	7,533	3,824	5.49	0.11	5.86	0.65	21,006	420	22,427	1,733	

TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

SUMPTION

Price (S/qq)				Value (000 S's)				Quantity (qq)			
Corn	Beans	Coffee	Cardoon	Corn	Beans	Coffee	Cardoon	Corn	Beans	Coffee	Cardoon
20.00	34.80	46.51	86.15	293.72	11.20	731.36	93.68	15,285.42	624.93	31,925.96	3,640.25
20.00	34.80	46.51	86.15	308.62	11.58	768.14	99.77	16,050.75	646.16	33,531.45	3,876.99
20.00	34.80	46.51	86.15	321.72	11.93	800.44	106.15	16,742.59	665.54	34,941.53	4,125.19
20.00	34.80	46.51	86.15	335.21	12.29	833.71	112.65	17,444.85	685.51	36,393.91	4,395.24
20.00	34.80	46.51	86.15	349.11	12.66	867.98	119.86	18,168.15	706.07	37,889.97	4,657.66
20.00	34.80	46.51	86.15	363.43	13.04	903.27	127.20	18,913.21	727.25	39,430.70	4,942.89
20.00	34.80	46.51	86.15	376.98	13.41	936.69	132.47	19,618.43	748.15	40,889.39	5,147.54
20.00	34.80	46.51	86.15	390.94	13.80	971.11	137.90	20,344.80	769.67	42,391.84	5,358.94
20.00	34.80	46.51	86.15	405.32	14.20	1,006.56	143.50	21,092.96	791.84	43,939.37	5,576.38
20.00	34.80	46.51	86.15	420.12	14.60	1,043.07	149.25	21,863.57	814.68	45,533.32	5,800.33

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TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

EXPORTABLE SURPLUS Price (Q/qq)				Value (000 Q's)				TOTAL VALUE O PRODUCTION (000 Q's)
Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom	
20.00	34.80	46.51	86.15	305.71	21.75	1,484.88	313.61	3,255.90
20.00	34.80	46.51	86.15	321,22	22.49	1,559.55	334.00	3,425.36
20.00	34.80	46.51	86.15	334.85	23.16	1,625.13	355.38	3,578.77
20.00	34.80	46.51	86.15	348.90	23.86	1,692.65	377.79	3,737.22
20.00	34.80	46.51	86.15	363.36	24.57	1,762.26	401.26	3,901.06
20.00	34.80	46.51	86.15	379.26	25.31	1,833.92	425.83	4,070.26
20.00	34.80	46.51	86.15	392.37	26.04	1,901.77	447.49	4,223.21
20.00	34.80	46.51	86.15	406.90	26.78	1,971.64	471.67	4,380.75
20.00	34.80	46.51	86.15	421.86	27.56	2,043.62	480.40	4,543.01
20.00	34.80	46.51	86.15	437.27	28.35	2,117.75	499.70	4,710.14

TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

PRODUCTION COST OF OLD LAND (Q/ha.)				Total (000 Q's)			
Corn	Beans	Coffee	Cardamom	Corn	Beans	Coffee	Cardamom
649.00	304.24	887.70	870.80	449.76	14.30	847.75	184.61
649.00	304.24	887.70	870.80	459.09	14.73	893.94	192.76
649.00	304.24	887.70	870.80	489.00	15.17	921.01	201.16
649.00	304.24	887.70	870.80	509.52	15.63	959.29	209.80
649.00	304.24	887.70	870.80	530.64	16.09	998.72	218.71
649.00	304.24	887.70	870.80	552.40	16.58	1,039.33	227.88
649.00	304.24	887.70	870.80	574.82	17.07	1,081.17	237.33
649.00	304.24	887.70	870.80	597.90	17.59	1,124.25	247.06
649.00	304.24	887.70	870.80	621.68	18.11	1,168.63	257.09
649.00	304.24	887.70	870.80	646.17	18.66	1,214.34	267.41

TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

PRODUCTION COST OF NEW LAND (Q/ha.)				PRODUCTION COST OF NEW LAND Total (000 Q's)				CLEARING COST OF NEW LAND		TOTAL PROD. COST	AVERAGE TRANSPORT PRICE	
Corn	Beans	Coffee	Cardomon	Corn	Beans	Coffee	Cardomon	Q/ha	Total (000 Q's)	(000 Q's)	Q/qq-km	Revenue (000 Q's)
681.45	319.45	932.09	914.34	0.00	0.00	0.00	0.00	92.16	0.00	1,496.42	0.2083	10.72
681.45	319.45	932.09	914.34	20.30	0.45	37.89	8.56	92.16	7.48	1,635.10	0.2041	11.05
681.45	319.45	932.09	914.34	41.21	0.91	76.92	17.37	92.16	7.71	1,770.46	0.2000	11.29
681.45	319.45	932.09	914.34	62.75	1.39	117.11	26.45	92.16	7.94	1,905.88	0.1958	11.54
681.45	319.45	932.09	914.34	84.93	1.88	158.51	35.80	92.16	8.18	2,053.48	0.1917	11.77
681.45	319.45	932.09	914.34	107.78	2.39	201.16	45.44	92.16	8.42	2,201.38	0.1875	12.00
681.45	319.45	932.09	914.34	131.31	2.91	245.08	55.36	92.16	8.68	2,353.73	0.1833	12.17
681.45	319.45	932.09	914.34	155.55	3.45	290.32	65.58	92.16	8.94	2,510.65	0.1792	12.34
681.45	319.45	932.09	914.34	180.52	4.01	336.92	76.10	92.16	9.20	2,672.27	0.1750	12.50
681.45	319.45	932.09	914.34	206.23	4.58	384.92	86.94	92.16	9.48	2,838.74	0.1709	12.65

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TABLE 2
(CONT.)
AGRICULTURAL PRODUCTION COSTS, PRODUCTION VALUE, AND
TRANSPORT COSTS "WITH" PROJECT

AVERAGE TRANSPORT COST	
B/qq-km	Total (000 B's)
0.1667	8.58
0.1634	8.84
0.1600	9.04
0.1567	9.23
0.1533	9.42
0.1500	9.60
0.1467	9.74
0.1433	9.87
0.1400	9.99
0.1366	10.11

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TABLE 3

SUMMARY OF PROJECT COSTS, BENEFITS AND NET PRESENT WORTH

YEAR	AGRIC. PROD. COSTS WITH PROJ.(000 Q's)	AGRIC. PROD. COSTS WITHOUT PROJ.(000 Q's)	NET INCREM. PROD. COST (000 Q's)	AGRIC. CORN TRANS. COST WITH PROJ.	AGRIC. BEANS TRANS. COST WITH PROJ.	AGRIC. COFFEE TRANS. COST WITH PROJ.	AGRIC. CARDOMON TRANS. COST WITH PROJ.	AGRIC. CORN TRANS. COST WITHOUT PROJ.	AGRIC. BEANS TRANS. COST WITHOUT PROJ.	AGRIC. COFFEE TRANS. COST WITHOUT PROJ.	AGRIC. CARDOMON TRANS. COST WITHOUT PROJ.	NET INCREM. Corn TRANSPORTATION	NET INCREM. Beans TRANSPORTATION	NET INCREM. Coffee TRANSPORTATION
1	1,495	1,495	0	2,548	104	5,322	607	2,548	104	5,322	607	0	0	0
2	1,675	1,594	41	2,624	106	5,478	633	2,625	107	5,392	625	(1)	(2)	86
3	1,770	1,689	82	2,679	106	5,591	660	2,703	111	5,553	644	(24)	(4)	38
4	1,910	1,786	123	2,733	107	5,792	687	2,784	114	5,810	663	(51)	(6)	(128)
5	2,053	1,887	166	2,786	108	5,810	714	2,868	117	5,984	683	(82)	(9)	(174)
6	2,201	1,991	210	2,837	109	5,915	741	2,954	121	6,165	703	(117)	(12)	(249)
7	2,354	2,098	256	2,877	110	5,997	755	3,043	124	6,349	725	(165)	(15)	(352)
8	2,511	2,208	303	2,916	110	6,076	768	3,134	128	6,539	746	(219)	(18)	(464)
9	2,672	2,321	351	2,953	111	6,151	781	3,228	132	6,735	769	(275)	(21)	(585)
10	2,839	2,438	401	2,987	111	6,222	793	3,325	136	6,938	792	(337)	(25)	(716)

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TABLE 3
(CONT.)
SUMMARY OF PROJECT COSTS, BENEFITS AND NET PRESENT WORTH

NET INCREM. Cardoso TRANSPORTATION	ROAD CONSTR. COST (000 Q's)	ROAD MAIN. COSTS (000 Q's)	NET COST STREAM	TOTAL VALUE PROD. WITH PROJ (000 Q's)	TOTAL VALUE PROD. WITHOUT (000 Q's)	INCREASE PROD. VALUE (000 Q's)	NET AGRIC. TRANSP. REV. (000 Q's)	NON-AG. VEH. OPER. COST SAVINGS	TOTAL BENEFITS OPER. COSTS SAVINGS (Q's)	NET BENEFITS	DISCOUNT FACTOR 15%	NET PRESENT VALUE 15%
0	416	0	416	3,256	3,256	0	0	0	0	(416)	1.0000	(416.3)
8	0	24	157	3,425	3,316	109	0	0	109	(48)	0.8696	(41.5)
16	0	24	132	3,579	3,416	163	0	0	163	31	0.7561	23.7
24	0	24	6	3,737	3,556	182	(0)	0	182	176	0.6575	115.4
31	0	24	(44)	3,901	3,662	239	(0)	0	239	282	0.5718	161.4
38	0	24	(105)	4,070	3,772	298	(0)	0	298	403	0.4972	200.5
39	0	24	(222)	4,223	3,885	338	(1)	0	337	559	0.4323	241.7
22	0	24	(351)	4,381	4,002	379	(1)	0	378	729	0.3759	274.1
12	0	24	(494)	4,543	4,122	421	(1)	0	420	914	0.3269	298.9
1	0	24	(652)	4,710	4,245	465	(1)	0	463	1,116	0.2843	317.1
									internal rate o	0.4199202909		1,175.08

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TABLE 4

EMPLOYMENT GENERATION

(Person-Years of Employment)

COMPONENT	1988	1989	1990	1991	TOTAL PERSON YEARS
ACCESS ROADS					
Unskilled	1,129	1,291	5,243	5,243	12,906
Skilled	188	215	874	874	2,151
Subtotal	1,318	1,506	6,117	6,117	15,058
TERTIARY ROADS					
Unskilled	489	489	489	489	1,956
Skilled	86	86	86	86	345
Subtotal	575	575	575	575	2,302
MAINTENANCE					
Unskilled	115	235	358	481	1,189
Skilled	19	39	60	80	198
Subtotal	135	274	417	561	1,387
TOTAL	2,028	2,355	7,110	7,254	18,746

Note: Numbers are based on a 240 day work year.

ANNEX 6

RURAL ACCESS ROADS PROJECT:

A SOCIAL SOUNDNESS ANALYSIS

Document prepared by:

Stephen O. Stewart

August 20, 1987

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I. INTRODUCTION AND METHODOLOGY

A. Introduction

The USAID/Guatemala on-going Access Roads Project is being amended to increase the number of access roads constructed and put them under a maintenance system. It also contains a component to upgrade and maintain tertiary roads. The overall purpose of the project is to improve small farmer access to services, markets, and inputs necessary for agricultural production.

The original $10.0 million project was designed to expand the network of all-weather farm-to-market roads in the Guatemalan Highlands and to institutionalize a national program to construct and maintain these roads using low-cost, labor intensive methods. The current project provides for a total of 1,705 kms of access road to be built or upgraded and for repair of 240 kms of tertiary roads.

The actual construction of the roads is carried out by the Dirección General de Caminos (DGC), a dependency of the Ministry of Public Works. In order to assure a maximizing of impact on agricultural production, a mechanism is being developed under this project to formalize coordination between the DGC and dependencies of the Ministry of Agriculture, specifically the Dirección General de Servicios Agropecuarios (DIGESA) and the Instituto Nacional Forestal (INAFOR).

The scope of the project is being expanded along with its funding. Currently roads are being built solely in the Highlands, but under the amendment road-building activities will take place in the Eastern region as well.

B. Methodology

The methodology used in carrying out this Social Soundness Analysis is threefold, beginning with an examination of relevant documents. It will also focus on the computerized database at the Departament de Caminos Rurales (DCR), which is the section at the DGC formed to carry out the original project. This database provides both relevant data on the potential impact and benefits of the present project as well as a potential baseline for future evaluations. Finally, the methodology includes interviews with key personnel in USAID/Guatemala, the DGC, and the DCR, as well as with selected groups of typical potential beneficiaries of the roads themselves.

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II. BENEFICIARIES

A. Historical context

By way of introduction to the beneficiary group, a short history and analysis of ethnic differences is presented below. The population of Guatemala at the time of the Spanish Conquest has been estimated at about one million people divided into several ethnic groups, mostly varied groups of Highland Mayan in speech and heritage. The native population of Guatemala dropped to perhaps ten or twenty percent of what it had been in the years just after the Conquest as the European diseases decimated the people, and estimates for the year 1650 put the total population of Guatemala at no more than 200,000, still nearly all Indian. By 1778, this figure had increased to just about 380,000. The present population is estimated to be about 8 million, about half of whom are Indian.

In most cases, the Indians continued to occupy the same areas after the Conquest as they had previously. Because of the low and very slowly growing population, the Indian situation changed little in the centuries of the Spanish colony and not much more in the first hundred years of Guatemala's independence. The Spanish presence in much of the Indian area was token, usually a priest and a small detachment of soldiers, with the priest wielding the greatest influence. Under these circumstances a Guatemalan Indian culture grew up which represented the confluence of three basic elements: the autochthonous preconquest Mayan culture with roots in the general Mesoamerican civilization, the Spanish Catholic culture of the 16th to 18th centuries, and the subsistence base of the Indians.

This subsistence agricultural base of corn, beans, and other crops grown on plentiful land was ample enough to comfortably maintain the Indian populace, produce grain surpluses, and incidentally, maintain civil tranquility for the most part among the colonized Indians. The Spanish colonial contribution was found primarily in a religio-civic social organization based on obligatory service in the cofradias, religious brotherhoods taken from the Spanish but elaborated to fulfill the civic needs of a town's population. The religious forms which grew up in this context represented a syncretism of Spanish Catholicism and autochthonous religious beliefs and practices. At the same time the Indian population maintained and developed their own cultural traits through the stubborn retention of elements of their own cultural heritage, although at times it was at the insistence of the Spanish that distinguishing cultural traits were established and conserved. In sum, the Mayan Indians acquired an ethnic identity both then and now that distinguishes them from the Ladinos, the ethnic group represented by the descendants of the Spanish colonizers.

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Ladinos are the cultural descendants of the Spanish colonialists and today share a common heritage. The Ladino population, however, is anything but racially homogeneous, as there has been considerable mixture of European and Indian populations for centuries, and the offspring of most of these unions have opted for a non-Indian identity. In addition, there have been cases of racially pure Indians converting ethnically to Ladino, either individually or occasionally as whole villages or towns. The result is a racially heterogenous Ladino population whose common bond is cultural, not racial. This cultural identity, though occasionally colored by reference to an Indian heritage, is basically Hispanic and Latin, in most ways little different from the rest of the general Latin American people.

Ladino society is complex, including modern urban elements as well as traditional rural ways of life. As regards the rural agricultural Ladino society, it resembles the Indian society in that many of the same circumstances have operated in both areas. The traditional Ladino farmer was dedicated in general to susbsistence agricultural and to many of the same crops as the Indian. Corn and beans supplemented by a variety of other cultigens characterized the Ladino farmer as it did the Indian. Population growth and the subdivision of land into smaller and smaller plots has forced some farmers to look to new, more productive crops and others to leave their home areas in search of new opportunities.

B. Ethnic context

Ethnic groups can be defined and described using a variety of criteria, such as beliefs, rituals, economic base, dress, food, and so forth, and the Indian-Ladino situation in Guatemala is no exception. One of the more obvious and important elements of this ethnic culture in Guatemala is language. Nearly all Indians speak languages of the Mayan family as their first and sometimes only language, and very few Ladinos can speak or understand these languages. Thus, speaking a Mayan language is a strong factor in the ethnic identity of Indians. Dress is another indicator of Indian identity. Nearly all Indian women wear distinctive Indian dress, while Ladino women use current Euro-American clothing styles.

World-view is another cultural area in which the Indian culture differs strongly from that of the Ladinos. The traditional Indian orientation toward the world is one of adjustment, adaptation, and coming to terms with the physical and human reality found there. On the other hand, the Ladino approach is agressive in an effort to control and dominate his universe, and destructive force is a legitimate means to this control.

One of the most important aspects of Indian culture is

the relation of the individual to the group. In contrast to the Ladino emphasis on individualism, the Indian culture stresses that the individual exists as a member of the group and that the individual prospers as the group prospers. The function of the individual is thus to promote the group and not his own personal interests. This tends to produce communities with less social conflict than the those in which the individual is supreme. The traditional Indian society is usually unstratified, while the Ladino society is stratified.

Leadership is considered in Indian culture, usually within the confines of the cofradia, obligatory but temporary and open to all who follow the patterns and precepts which regulate Indian society. Leadership in Ladino society stems from individual and personal leadership qualities. Group decisions in Indian society are arrived at through consensus rather than fiat or majority vote. This contrasts with the strong individual leadership of Ladino culture based on personal characteristics coupled with loyal, subordinate followers. If decisions are taken by the group, it will more likely be through majority vote than by consensus.

These and other cultural characteristics combine to define the boundary between the two ethnic groups. This boundary is well established, much of the cultural content is firmly set and subject only to limited change, and the identity of members of both groups is well understood and accepted by both.

C. Economic context

The economic situation of the target population is a difficult one. The centuries old agricultural economic base of both Indians and Ladinos, while still important, cannot sustain the present population on their existing landholdings. The average farmer has seen his real income reduced constantly and has been forced to make up the difference either by working as a laborer part of the year on the agribusiness plantations on the south coast plains, by engaging in some sort of small scale business or industry in or near his home, or by engaging in itinerant commerce away from home.

One of the responses to this situation has been the introduction of new crops and technology in both Indian and Ladino areas. Both have found that by turning to high-paying cash crops they can make many times the value of their traditional crops. However, their traditional crops and technology provided them with their needs with little need for motorized access to the outside world, whereas with these new crops, such access becomes essential to be able to transport their new crops to market.

Thus, the lack of access roads can represent a serious barrier to changing over to high-value cash crops. Conversely, the arrival of such an access road provides the stimulus for switching crops. For example, many Highland Indians have been taking advantage of the vegetable agroexport industry's interest in broccoli, cauliflower, and brussel sprouts, where the industry contracts whole crops with village farmers, sends an agronomist to oversee some aspects of the growing process, and finally sends a truck and other necessary equipment to buy the crop right out of the field. Non-existent or poor access roads have meant that the farmers were required to bring the crop out to a road, which represents extra expenditure of time, personnel, alternative transport, and so on, and the extra expense often makes the new crops not worth the trouble.

Agricultural labor as a source of income is precarious, as it depends on the vagaries of the international market for the plantation products, and it is dangerous, due to the climate, living conditions, and biocide use on these plantations. In addition, it is extremely low paying, seasonal work through which the laborer can expect at best to survive at a minimal level and pay his debts but never be comfortable or secure with. The ostensible minimum wage of $3.20 per day has not always been paid in recent years as plantation owners have been hit with falling demand and lowered world market prices.

Other economic activities have been sought which would allow them to remain closer to home. The highland area of Guatemala, where the different Indian groups are contiguous, has been linked through trade for centuries as individual towns have come to specialize in the production ofcertain articles, such as pottery, baskets, wool, mats, furniture, candles, charcoal, and other articles. This craft production, now often oriented to the tourist trade, can supplement the income of selected groups or individuals. But these too are subject to the fluctuations of the world economy: during the recent recession few tourists came to Guatemala and their purchases were smaller. Also, the devaluation of the Mexican peso caused similar crafts from that country to compete much more favorably in the international markets. In addition, craft production is capable of supportinn or helping to support only selected portions of the population, such as those who produce the more sought after craft articles or those dedicated to selling selected articles from a variety of towns.

Part of the problem in making crafts more economically viable is easy access to raw materials, technical and/or market expertise, and markets. Handcrafts competitive on the market today are not the traditional blouses and so on, but rather items with design, materials, dying, and other input from individuals with access to the demands of today's international market. Traditional crafts are giving way to cottage industries and the

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production in small villages to items destined for sale in fine shops in Los Angeles or New York. The entrepreneurs in this business require ready access to village artesans, and they often provide them with all raw materials, check regularly on quality and design, and then provide all transport from the village to the foreign markets. Villages without access by road are shut out of this possibility.

Another area of Indian economic activity has been small scale commerce where products, usually craft or agricultural, are purchased wholesale and transported for resale elsewhere. Fifty years goods and foodstuffs was carried on foot to be traded in large regional markets as far as 11 days journey from one's home. Now, of course, transport is by truck or bus, and many traditional articles, such as pottery, have been replaced by plastic articles made in Guatemala City. The goods are sold in markets, in plazas, on street corners, or even door to door. The returns on this type of economic activity are low but may represent enough income for the individual's family to get through the year.

Still, Indian culture in the Highlands, especially in the larger towns but not limited to them, has been characterized by an entrepreneurial spirit which seems to contrast with the more traditional attitudes of the peasant agriculturalist. The Indian population in a few cases has also competed directly and successfully at economic levels usually dominated by Ladinos, such as larger scale manufacturing and transport. In some areas, such as San Pedro Sacatepequez, San Marcos, this change has been sweeping. Modern trucks have replaced the traditional mule teams to transport the textiles made in San Pedro, and the goods now are destined for international as well as regional or national markets. The close-knit family structure and the avoidance of conspicuous consumption have often made these Indian industrialists and traders more competitive when compared with their Ladino counterparts.

However, the San Pedro case is exceptional in the Guatemalan Highlands. Some of the major problems in entering this market include the lack of sufficient start-up capital, sophistication in the management of larger scale commercial operations, and the difficulties of attempting to operate in an environment dominated by Ladinos. Where the Indian has been successful in operating succesfully in competition with Ladinos certain preconditions have been present, such as access to an urban environment and the existence of good educational facilities, the latter often a result of the former.

Access is obviously furthered by roads. In many cases, the first primary schools arrive at the village level only after an access road is built. More importantly, three or even six years of primary school are often not enough to provide Indians with

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enough awareness of sophisticated agricultural or non-agricultural pursuits for them to take advantage of new economic pursuits. Access roads and the establishment of regular transport from village allows them to take advantage of post-primary educational opportunities which will permit them access to new economic opportunities.

D. Definition of Project beneficiaries

The beneficiaries in this project are Indian and Ladino farm families in rural areas in Guatemala. The actual beneficiary populations will be determined, as they are at present, through a complex process of selection aimed at locating new access roads where they will achieve an optimum effect.

1. Beneficiary selection process

An access road begins to be considered upon receipt of a request for a road by a local-level community committee, often called something like Comité Pro-Construcción del Camino (Committee for the Construction of the Road), which has been organized at the local level and usually is registered at the offices of the Departmental government. No road is ever considered unless this first step is taken. The request may come directly to the DGC central offices, the DGC regional offices, or through some other channel such as a member of Congress.

The second step involves carrying out a technical and social survey of the area by personnel from the DGC regional office, using the Boleta para Primer Nivel de Selección (Initial Level Selection Questionaire). The questionaire contains a summary page with 17 elements, including length, grade, bridges needed, available labor, existence of transport, disposition of local authorities, and so on. A negative in any one of these elements removes the proposed road from further consideration.

If the proposed is still elegible, a more intensive socioeconomic study is initiated using the Boleta de Investigación Socioeconómica (Socioeconomic Research Questionaire). The previous questionaire provides data which determines how many questionaires will be necessary to complete in order to have a representative sample of the community, which will range from 10% to 20% of the total population. The regional office social worker then visits the community and surveys the required sample of the population, and these data are then tabulated (Tabulador de Información Socioeconómica - Tabulation of Socioeconomic Information) to arrive at a socioeconomic projection for the community as a whole.

These data then provide the basis for setting the priorities for road construction. For example, demographic data may provide a total of 150 points, from population density, cost per

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inhabitant, percentage of family heads engaged in agriculture, and percentage of women engaged in handcrafts or small industry. Other categories are community organization (number and type of organizations, number of community improvement committees, existence of a road construction committee), public services (school type, electrification projects, potable water projects, drainage projects, health services, and others), economics (existence of agriculture projects, technical assistance, credit assistance, percentage of area cultivated, non-agricultural production, employment opportunities), cooperation (percentages of those willing to work on the road, willing to cede land for right of way without payment, willing to provide road building materials from their property free), state of connecting road, and total cost of construction. A total of 1000 points is possible.

The Project then selects the roads with the highest point totals for construction by region up to the amount of road for which there are funds. For example, in 1988 (see Annex 5) a total of 46 separate roads will be built in the seven regions participating in the Project, a total of 235.2 kms averaging 33.6 kms per region. The selection was made from a total of 775.5 kms and 126 separate road projects which had met the initial selection criteria in the seven regions.

2. Beneficiary population profile

A brief profile of the typical beneficiary population was abstracted from the tabulated data at the Project computer center on the populations to be served by the Project in 1988 but which should not vary greatly from the populations to be served by the Project extension. The data come from 13 of the 46 road projects, or 28.2% of the total to be constructed in 1988, and they are taken from three regions: eastern, central highlands, and western highlands (see Annex 4).

The first item of note in these data is the fact that virtually all of these farmers maintain a certain level of subsistence agriculture in that all plant at least a moderate amount of corn, much of which is consumed by the farmers and their families, and most plant beans as well. In all cases the farmers are able to sell some corn, but in only one case, which involves the Xaabaj-Chuacacay road with the lowest average income in the sample, was corn the principle producer of cash income.

Besides corn and beans, virtually all other crops mentioned are produced for cash income according to the tabulated data. However, many homes undoubtably contain small vegetable gardens cared for by the women of the family. It is probable that these are not mentioned by the men interviewed, because vegetable gardens are often not considered culturally in the same category as corn, beans, and the cash crops. In Comalapa, for example, it

is up to the wife to provide the non-corn complement for family meals, either through gardening or through craft production or other small business activity, while the men provide the corn and income for other expenses. It may be that the men interviewed in some cases ignored or 'forgot' about their wives' contribution in this area, since the data have almost no references to it.

The importance of cattle, principally cows but also including goats, sheep, and horses, is notable as a source of income, both for the poorer villages as well as the more well off communities. In the three poorest villages income from cattle represented 14.6%, 39.3%, and 18.4% of the total average income. In the three richest villages cattle represented the principle source of income in one village and the second most important source in the other two. As regards this Project, it might be imagined that a road providing motorized transport would be less important for farmers whose principle source of income is cattle, since they can obviously be driven to market, but it must be also noted that the main cattle market may not be the nearest market town but one much further away. For example, the beneficiaries of the Parajbey-Xepanil road mostly attend the markets in Poaquil or Tecpán between eight and 12 kms away, but the cattle market is in the town of Chimaltenango at a distance of 60 kms.

The other really productive cash crop is coffee, which is by far the principle source of income for two of the three most well-off villages, the beneficiaries of the Río Ocho-Agua Blanca and Caserío Esquipulas-Los Planes roads, both in Huehuetenango. In these cases coffee represents 86.7% and 76.9% respectively of the total cash income of the two villages. It is difficult to underestimate the importance of roads in coffee-growing areas. Newly harvested coffee must be brought to processing within about 24 hours or the quality of the coffee and thus its value is greatly diminished.

As regards total average income, there are startling differences between these 13 villages, as will be noted from the table below.

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	Planned Road	Average Income
1)	Xaabaj-Chuacacay	Q.393.00
2)	Parajbey-Xepanil	468.04
3)	Interamericana-Pueblo Viejo	556.27
4)	Los Magueyes-Los Lavaderos	643.40
5)	Malacatancito-Chocal	687.10
6)	Cushapa-Granada	692.69
7)	Los Magueyes-Sn. J. Las Canoas	916.06
8)	Interamerican-La Cumbre	1271.25
9)	Los Magueyes-Canajal	2169.48
10)	Llano Las Tejas-Piaché	4818.54
11)	Rio Ocho-Agua Blanca	5438.95
12)	Jalapa-La Ventura	5469.55
13)	Caserio Esquipulas-Los Planes	5494.55

In the first six villages, two each from the eastern, central, and western regions, the incomes are extremely modest. It is to be understood that this income is used to by very little food, since they consume corn that they themselves have grown. It should also be emphasized, particularly in the central and western regions, that corn represents a very high percentage of their diet. For example, the Parajbey-Xepanil beneficiary population sample of 14 families included 72 persons of all ages, which consumed 41,400 lbs. of their own corn, or 1.6 lbs. per person per day. This figure appears reasonable in that other studies have estimated from 1.4 to 2.0 lbs per person per day (see, for example, William Carter, New Lands and Old Traditions: Kekchi Cultivators in the Guatemalan Lowlands, U Florida Press, 1969).

Another observation as regards incomes is that the new roads have important implications for both the relatively poor villages as well as the more well off ones. For the poorer villages the roads represent the beginning of opportunities for improvement. Interviews with regional social workers revealed that extension workers in agriculture or forestry simply do not visit inaccessible villages, even when they are requested by the villagers and ordered to make visits by their superiors, and the reason most often lies in the lack of roads. Thus the extension of a road to a previously isolated low-income community should represent the opening up of new opportunities for the villagers as regards new crops and agricultural technology.

The more well off villages also benefit in that they can boost their already high productivity, thus contributing more to the general productivity of the country. Their problem is that of simply getting production to market, which in many cases consists of export crops such as coffee or vegetables.

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III. SOCIOCULTURAL FEASIBILITY

A. Description of current situation

A 1976 estimate stated that there were some 15,000 kms of foot paths and seasonable trails or roads which needed to be upgraded to all-weather roads to provide adequate transportation for all of the rural population. Between 1978 and 1984, 900 kms of thes roads were built, 800 kms of which were accomplished through AID Project 520-0233. In 1985, a new AID Project (520-0332) including a 1986 amendment projected the completion of another 905 kms of new all-weather roads, so that altogether a total of 1,805 kms of the estimated 15,000 kms, or 12%, will have been constructed (exclusive of roads built by other agencies) before this new Project begins. Broadly speaking, then, 88% of the needed rural all-weather roads in Guatemala are still to be constructed.

The lack of roads means that the majority of the small agriculturalists in Guatemala do not have reliable access on a year-round basis to markets for their crops and to important agricultural technical assistance and material needs. As a result, these farmers continue to be forced to use human or animal transport to get their produce to market and to acquire needed inputs of fertilizer, pesticides, and tools. These difficulties are obstacles to farmers expanding their holdings and/or getting involved in new crops and technology. Poor, non-seasonal roads also increase total production costs, since poor roads lengthen transportation time for trucks and buses using the roads as well as increasing maintenance costs for the transporters. Trucks and buses seldom run, and they charge the farmers more for their services.

B. Improvements resulting from Project

During the life of the Project, 1,705 kms of all-weather farm-to-market roads will be constructed, which will nearly double the extension of such roads to 3,510 kms of the estimated 15,000 kms needed, or 23.4% of the total. In addition, 240 kms of tertiary roads will be upgraded. It is estimated that at the end of the Project, 682,000 rural inhabitants will enjoy all-weather access to marketing centers.

As a result of the new roads, farmers will enjoy higher prices for their products, since they will be able to more easily get them to market. They will produce more, both due to their ability to acquire needed inputs as well as due to improved access to more productive crops and technology. Their incomes will also increase due to placing more land under cultivation, since they will be able to more readily benefit from doing so.

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The beneficiarys' general quality of life should improve as well, since they will enjoy better access to government services. These include new schools in the community and the possibility of studying in higher grades in schools outside the community; the establishment of health facilities, access to the community of government health programs, and vehicle transport of the patients from the community to pertinent health facilities elsewhere; the possibility of further improvements to the community infrastructure, such as potable water or electricity, which require the existence of a road; and many others..

C. Problems/solutions in implementing the Project

1. Sense of ownership of roads by beneficiaries

Concern has been expressed in USAID/Guatemala (see Annex I, Scope of Work) that the project should maximize a sense of ownership of the roads on the part of the beneficiaries. It should be clear that the formation of an improvement committee at the village level with the express purpose of getting a road built is in itself a solid indication of the interest of the community in the road. It is hard to imagine how, once their aspirations are realized and the road is built, they will not feel a sense of ownership of the road at least as much as anyone in Guatemala feels a sense of ownership of public roads.

The concern about ownership seems to stem from the idea that such a sense of ownership would help to impel the beneficiaries to take the initiative in maintaining the road, perhaps to the extent of establishing a system of voluntary labor to that end. It does appear likely in many cases that as the road deteriorates the community might well attempt to work communally on the road, although it will undoubtably do so because it is to their benefit and not through the creation of a proprietary feeling about the road, any more than would be the case of other roads in Guatemala.

There are aspects of the Project which should contribute to the sense of ownership of the beneficiaries and the carrying out of maintenance. First, when the road is turned over to the beneficiaries, they are officially charged with minor maintenance of the road to be carried out on a voluntary basis.

Second, the Department of Rural Roads sets up a maintenance committee on a permanent basis which is to collaborate in the following ways (taken from the document forming the committee, Acta Constitutiva del Comité Pro-Mantenimiento del Camino Rural):

- Provide sufficient labor for maintenance to be carried out opportunely and in the least possible time;

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- Provide without cost permission to extract natural materials found in the community, such as rock, wood, water, sand, road surfacing material, etc.

- Seek and obtain right of way on private lands affected should the roadway need changing to improve the movement of vehicles on the road;

- Permanent vigilance as to the physical state and rational use of the road;

- Provide minor maintenance (clean drains and pipe, remove obstacles and small landslides from the road, fill small potholes) freely and spontaneously when the Rural Roads Program is unable to do so;

- Collaborate with the Rural Roads Program in resolving whatever problems exist in the carrying out of works with civil and military authorities;

- Notify the Regional office of the Rural Roads Program of major damage on the road so that the Program can carry out repairs.

In order to do the above, the project through the DGC, and relying in particular on the Regional office social worker, maintains contact with the road committee at regular intervals. It should be emphasized that the existence of the social worker is essential to the smooth functioning of the maintenance program since he or she both acts as a watchdog over maintenance functions as well as helping to provide advice on any problems the committee might have as regards community cooperation.

Just how active a local committee can be may be seen from the example of Xecoxol in Chimaltenango. This community is connected directly with the Pan American highway, and roads from Xecoxol connect eight other villages with the outside world. The original road was built in 1981, but since many owners did not cede right of way along the best available line, the road contains three steep stretches which become easily damaged as well as being dangerous.

The Xecoxol committee has worked to bring together committees from the other eight villages, plus one village closer to the highway, in order to attempt to resolve the problem of the right of way and change the line of the road. They have managed to get signatures of 22 of the 30 individuals owning land on the desired right of way and are engaged in lobbying the other eight for this right. All these activities have taken up considerable time and effort on the part of the members of the Xecoxol and other committees, and this in spite of the fact that they already have a road.

2. Material needs for minor maintenance

Minor maintenance, which is to be provided by the local community free of charge, nonetheless requires organization. Nearly all rural farmers possess hoes for agricultural use which can be used in road maintenance as well, but they usually do not have their own shovels, picks, or wheelbarrows, all of which are necessary implements for carrying out minor maintenance. Shovels are needed to load dirt and rock from landslides so that it can be removed, and wheelbarrows are often needed to transport this material some distance from the landslide site. Picks are needed to remove rock either for repair of walls or to effectuate minor improvements in the roadway.

During the regular annual maintenance, the Rural Roads Programs provides work gangs with these implements, but the Program does not have sufficient tools to leave tools in each community for use on a year round basis. Although the community is expected to provide maintenance free of charge, it is not reasonable to require individual beneficiaries to purchase on their own picks, shovels, and wheelbarrows, especially when this latter costs nearly Q.100 and the annual farmer income is just Q.400-500. An engineer in Chimaltenango estimated that tool needs for minor maintenance are three shovels, three picks, and one wheelbarrow (in addition to hoes) per kilometer of road.

This problem could be solved through the management of maintenance funds by the maintenance committee. At present, these committees are not "legalized," meaning they have not been registered at the departmental government offices and authorized to handle funds. In some cases, such as a community in Jalapa where a road is presently being constructed, funds are raised and managed informally by the local community without bothering to go through the formal legalizing or registering process. But such communities run the risk of legal problems should the funds be mismanaged and a complaint filed.

It is suggested that the committees be legalized and registered with the help of the social worker, so that they can collect and manage internal community funds to carry out minor maintenance. The Rural Roads Program will have no contact with this activity except allowing the social worker to help in the organizing process, so that it will be a truly community effort carried out within the community for the benefit of the community as regards their road. The funds will be collected through some sort of communal solicitation by the committee, by asking road users for contributions, or through other, community-based activities appropriate to the cultural setting. The funds will be used for purchase of tools or for other necessary activities, which might include reimbursement to an individual farmer for land lost for a right of way or purchase of a right of way.

It should be mentioned that funds provided for manual labor by the Rural Roads Program for regular annual maintenance are managed by the Program itself, which is as it should be. Work gangs are organized, the maintenance program provides supervision, and payment is made on the basis of work done according to a set price list for particular units of work. Payment is by check drawn on a bank in the town where the regional office is located. All of these activities are and will be separate from the locally managed funds of the maintenance committee.

3. Programming construction and maintenance activities

One problem that occurs regularly is that construction and maintenance activities are planned, the Rural Roads Program crews arrive at the road, and there is not a sufficient number of workers to carry out programmed activities in a timely fashion. Almost invariably, this occurs because the local farmers are engaged in agricultural work and are unavailable to work on the road and not because they are not concerned about the road.

For example, at Plan La Cruz, a road construction site in Jalapa, many local farmers were processing the bean harvest at the time a visit was made. It was learned that there were occasionally as few as 10 workers during a given two-week period on the road, due to similar agricultural activities, and also that local farmers are usually able to find work year-round between their crops on their own land and through renting land or through agricultural labor in the nearby valley. Among those present, it was learned, most had worked for a time on the road, had left to work elsewhere, and had come back recently to work some more on the road. In the highlands, maintenance activities occasionally met with a similar problem in that the pre-rain maintenance coincides with crop planting.

Several solutions to this problem appear to present themselves. First, whenever possible, the maintenance program for rural roads should communicate with the local maintenance committee to determine when the optimum moment for annual maintenance should take place. It might be the case that by reprogramming maintenance a month or two earlier or later would allow the community to participate as fully as it would like in these activities.

Second, construction projects which have difficulty in filling the work gang quotas should not hesitate to look for manual labor outside the community. This labor is paid labor at all event, and delaying construction endlessly just because the local farmers are gainfully employed in other activities does not seem advisable. It should be noted at the same time that work on the road does not pay as well, at least in the Jalapa case, as

other day labor in the area. The average salary of Q.3/day paid by work on rural roads in much below the Q.5/day they can make elsewhere. This places the local farmers in a bind: they need the extra money they can make working elsewhere, but they also need the road. The impression left from this visit is that the farmers have attempted a balance, working part of the time for lower wages on the road they need and part of the time elsewhere for the money they need.

Third, needed minor maintenance may go unattended due to the lack of men available for it. One suggestion was the establishment of a small paid group of permanent maintenance workers, particularly during the rainy season when maintenance is required almost daily. The idea has some merit, but it is unclear how it could be made to operate or whether it would be economically feasible under the present project.

Fourth, it may be possible at times for minor maintenance to be carried out, or even major maintenance when the Rural Roads Program is unavailable, through concerted effort. A problem on the Xecoxol road was attacked through an intensive one-day effort in which 400 volunteers and 18 trucks were organized to attempt to solve the problem. Similar efforts may work elsewhere when the normal procedures are inadquate. The Rural Roads Program could assist the local committees by informing them of all of the variety of initiatives they have encountered in other communities and which might be attempted in their own, if circumstances permit.

4. Payment problems

A common complaint in the local communities, both as regards maintenance activities as well as construction, is that payment is late. Checks for work carried out in the last two weeks of July come out in the last two weeks of August. This situation is particularly difficult for people whose total yearly income may be no more than Q.400, since they very often need the income from the previous two weeks to live on during the present two week period.

This situation has not always been so problematical. It was learned that complaints by USAID or the establishment of some alternative payment scheme has temporarily improved this situation. It is something which should be remedied permanently if at all possible.

Payment problems such as this may affect the desire of people to work on the road. If they urgently need the Q.40-45 they can make in two weeks, they may be forced to work elsewhere where they will be paid at the end of the two-week period and not a month later.

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Another problem is payment by check on a bank in the departmental capital. If it will cost Q.4 in transport to cash a Q.40 check, it may not seem worth it. It might be possible to make arrangements to cash the checks in a nearby municipality or make payments in cash.

IV. IMPACT

A. Short-term and medium-term impact

The clearest short-term impact of the construction of an access road comes in the form of payment to the beneficiaries for manual labor in construction. Probably very few of the beneficiaries work full-time on the road from beginning to end, since they have their own agricultural activities to attend to. Still, these activities are irregular, and a farmer might work intensively for two weeks or a month preparing his fields for planting, but then he might have several weeks of free time before weeding. During this time he will be able to work for pay on the road construction, whereas he might normally not be able to find a source for extra income. It is difficult to estimate the extent of this gain, since the roads vary widely in length and difficulty of construction. But for a farmer who normally has an annual income of Q.400, a month or two of work on the construction of the road may bring in Q.100-200, which represents a hefty supplement to his income.

Road maintenance will have a continual medium-term impact, since annual maintenance by the Rural Roads Program provides a yearly opportunity for additional income. In region 1 in 1987, for example (see Annex 6), 1725 men had made an average of Q.50.62 working on annual road maintenance. The total amount of income in this region was Q.146,687.87 divided among 42 communities for an average income per community of Q.3,492.57. This income will continue to have an impact on the beneficiary communities for the life of the project.

B. Long-term impact

The positive impact of rural access roads should be evident, and the pilot access roads project provided concrete examples of this impact. The impacts were observed as a result of construction of access roads between Chichicastenango-Tzaminam, Tecpán-Xecoxol, San Pedro Necta-Santiago Chimaltenango, La Capellania-El Suj, Arenal-Sashico, Los Izotes-El Carrizal, Chuicaxtún-Rancho de Teja, and other sites in the Departments of Quetzaltenango, San Marcos, and Guatemala. Construction took place between 1980 and 1984.

The most notable impacts had to do with agricultural production and marketing. In general, agricultural production

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increased. Farmers had greater access to extension agents and services, and the new technologies provided by them were viewed as important factors in increased production. Although not mentioned specifically, one important impact of the roads in relation to new technology must have included fertilizer and pesticide use, since the roads have facilitated dramatically the importation of fertilizer to formerly isolated villages.

In many cases the introduction of new technologies has meant the introduction of new crops. In one sample, 70% of the farmers indicated that they were growing new crops, and they are doing so nearly always because of the new crops' higher value. Also increasing farm income is the fact that the farmers can now get their crops to market themselves, thus avoiding middlemen and enabling them to command higher prices for their crops. One estimate indicated that the amount of produce the farmers were able to get to market increased by 20 to 30 per cent.

The new roads also seem to have had an impact on the amount of land under production. In more than one case it was observed that more land was under cultivation after the road had been built than before, and in at least one case, the increase included abandoned land brought back into cultivation.

New roads have made possible the establishment of regular bus and truck transportation systems between village and market town. In several cases there is now daily truck and/or bus service. In one case, a cooperative purchased a truck to provide transportation of produce. Economic benefits can also be seen in the fact that mechanized transport reduces the obligation of people to invest as much time in getting to and from market. In one case it was estimated that the road represented a savings of one labor day per week per household.

The roads also provide access to other services. The road provides an important emergency service in allowing the transport of the very sick to health centers and hospitals. The existence of the road has also facilitated the arrival of services in the villages, such as the construction of schools and the establishment of rural electrification, for which a passable road was a prerequisite. In some case, school attendance was considered to have increased with the completion of the road, particularly for children attending higher primary grades or secondary schools outside the local community.

The roads have also provided non-agricultural economic benefits. In several cases the roads stimulated the establishment of roadside stores. More importantly, the roads have begun to stimulate local village enterprises, such as the production of locally made wood furniture, the production and transport of charcoal, and handcraft industry.

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The penetration of roads into rural areas may have negative impacts and well as positive ones, although in this case the positive benefits appear to far outweigh the negative aspects. In one case, it was noted that the production of charcoal was stimulated due to increased ease of transport, which in turn has meant increased deforestation. Also noted among the negative impacts of the road was increased outmigration, where the road was seen as stimulating people to leave the village. However, another case in the same group of studies stated just the opposite, in that the road had represented enough of an economic stimulus to the local community that it was seen to reduce emigration.

C. Impact on women

Women, in particular, benefit from the rural roads. Access by bus or truck into a nearby town allows them to take their vegetables and other products to market. As a result, the women are able to produce more cash for the household and overcome the rural isolation of their household family responsibilities.

As was mentioned earlier, women are often responsible for providing the non-corn part of the family diet, while men are responsible for producing corn and the rest of the family income. Women do their part principally in two ways: by producing food in garden plots and raising yard animals, and through small-scale commerce. The introduction of a road means that women as well as men can take advantage of extension service personnel and the technology they offer to improve their in-home production. Improved seed, fertilizers, and the like can increase family income through sales of more abundant production and improve family diet through the opportunity to consume more of what is produced.

Equally important to women is that fact that the road opens and increases opportunities for small-scale commerce. In Comalapa, for example, a housewife has been slowly establishing a business transporting comals for making tortillas from Comalapa to the distant market town of Huehuetenango. She makes the trip every couple of weeks, sells her wares there, and returns with enough profit to make the trip worthwhile. Transport by road makes the trip possible, since without it she would lose several days in getting to the highway and would have the additional problem of transporting the heavy and fragile clay comals. Similar examples could be found in virtually every village and town with a road.

Roads have an especially high impact on women in caring for children. The existence of a road means that health personnel will arrive in the village for inoculation campaigns, the villagers will have more ready access to medicines and other aspects of primary health care, and perhaps it will become

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possible to build a health post staffed by a nurse. It will be possible to transport seriously ill children to outside health care facilities.

V. FUTURE EVALUATIONS

A mechanism for carrying out future evaluations of the Project already exists in the data base of the Rural Roads Program computer center, where baseline data from the Socioeconomic Questionaire have been collected and processed. This questionaire, though its intent is to establish priorities among the various candidates for rural roads, represents a baseline of data which can be used for future evaluations of project impact.

However, both the questionaire itself as well as the tabulation program require technical refinements to make it a truly responsive evaluation instrument, and it should be relatively easy to do so. It requires two basic activities which an evaluation expert should carry out. First, it must decided which impact parameters should be focused on, and both the questionaire and the data processing component provide usable data on each item. Second, the questionaire itself needs to be critiqued with the social workers in the field to detect problem areas and to take steps to correct them, so that the field process is able to easily and accurately collect the necessary data.

The observations section of the questionaire has been little used, although it might shed considerable light on points not touched by the questionaire items. What is necessary is to establish what sorts of information the field social workers should include in this section which would be useful in the evaluation process.

ANNEX 1: Scope of Work

I. Background

Our on-going Access Roads Project is being amended to increase the number of access roads constructed and put under a maintenance program, as well as to include a component for the upgrading and maintaining of tertiary roads.

The overall project's purpose is to improve small farmer's access to services, markets and inputs necessary for agricultural production.

The original $10.0 million project was designed to expand the network of all-weather farm-to-market roads in the Guatemalan Highlands and to institutionalize a national program to construct and maintain these roads using low-cost, labor intensive methods.

The current project provides for a total of 1,705 kms of access road to be built or upgraded and for repair to 240 kms of tertiary roads.

The actual construction of the roads is carried out by the Dirección General de Caminos, a dependency of the Ministry of Public Works. In order to assure a maximizing of impact on agricultural production a mechanism is being developed under this project to formalize coordination between the DGC and dependencies of the Ministry of Agriculture (DIGESA, INAFOR).

The scope of the project is being expanded along with its funding. Currently roads are being built solely in the altiplano, but under the amendment road activities will take place in the Eastern Region as well.

II. Product Desired

1. A social soundness analysis as described below.

2. The analysis should encompass the geographic area to be covered under this amendment, and should contain sections on:

   - a detailed description of the ladino and Indian populations to be served in the project's target area by the new or upgraded roads. Include: income levels, type of agriculture, current access to services, inputs and markets.

   - the impact, both positive and negative, that the upgrading of tertiary roads, or the introduction of access roads may have.

- recommendations for maximizing a sense of ownership of the roads on the part of the beneficiaries.

- identification of benefits of the project, quantified to the extent possible.

- attitudes of potential beneficiaries towards new access roads and upgraded tertiary roads.

- the attitudes toward and potential impact of the use of paid community labor for road construction and upgrading.

- the impact on women.

3. The consultant should be guided by AID Handbook 3 Chapter 3, Appendix 3F in preparation of the Social Soundness Analysis (SSA).

4. He/she should read the SSA in the original roads PP and update it as required to accurately reflect the amendment.

5. The consultant should also recommend a methodology to be used to evaluate the impact our roads have on the target group.

6. The contractor should have: 1) at least a Masters degree in sociology or anthropology; 2) five years experience in Guatemala; 3) a solid knowledge of the mores of the Guatemalan Indians, and; 4) excellent command of English (FSI 4).

7. A final report, 20-30 pages long with a one or two page executive summary, in English in both form and content acceptable to AID should be submitted 14 calendar days after the signature of the purchase order.

ANNEX 2: PERSONS INTERVIEWED

USAID/Guatemala

Ing. Roberto Figueroa, Project Development and Support
Ing. Ricardo Pérez, Private Sector Office

Departament of Rural Roads

Ing. Miguel Angel Guzmán, Chief of Computer Center
Ing. Inf. Joaquin Haroldo Flores A., Calculations
Edgar René Díaz L., Programmer I
José Fernando Jurado D., Operator

Regional Office 1, Chimaltenango

Ing. Hector Juárez Arias, Assistant Road Engineer/Maintenance
T.S. Gudelio Pérez Elías, Social Worker

Community level road maintenance committee, Xecoxol, Chimal.

Hilario Elías Ajset, President
Tránsito Rucuch Morales, Secretary
Tereso Lix Batz, Treasurer

Regional Office 2, Jalapa

Ing. Byron René Paiz, Road Engineer/Construction
Ana Marroquín, Social Worker

Community level road construction committee, Plan La Cruz, Jal.

Juan Rafael García Jiménez, school teacher

ANNEX 3: DOCUMENTS REVIEWED

USAID Regional Development Mission Report, 1982, pp.45-54.

USAID Project Paper, Guatemala Farm-to-Market Roads, Project Number 520-0332.

DGC Programa de Caminos Rurales, Priorización de Proyectos, Marzo, 1987. Contains priority projects approved for construction in 1988.

Sistema de Priorización de Proyectos Nuevos. Contains the weighted scale to determine project priorities.

Boleta para Primer Nivel de Selección. Used to determine whether a requested project fits minimum selection criteria.

Boleta de Investigación Socioeconómica. Used to gather baseline data for determing priorities from a sample of population in communities.

Tabulador de Información Socioeconómica. Tabulated data from sample population which will determine priority.

Computer tabulations from 147 road projects for 1988.

ANNEX 4: CASE STUDIES OF COMMUNITIES PARTICIPATING IN THE PREVIOUS ACCESS ROADS PROJECT

1) Xaabaj-Chuacacay. Families interviewed: 19
Average income per family: Q.393.00
Sources of income:

Corn	3391.50
Beans	2131.60
Cabbages	16.00
Cattle	1091.00
Poultry	959.00
Textiles	278.00
Pigs	100.00
Handicrafts	500.00
Total income, 19 fms.	7467.10

Distance to market (Tecpán): 10 km
New road length: 3 km

2) Parajbey-Xepanil. Families interviewed: 14
Average income per family: 468.04
Sources of income:

Corn	1558.48
Beans	75.00
Wheat	199.16
Fruit	399.00
Potatos	550.00
Cattle, etc.	2575.00
Fowls	590.00
Handicraft	196.00
Pigs	410.00
Total income, 14 fms.	6552.64

Distance to market (Tecpán): 12 km
New road length: 3 km

3) Interamericana-Pueblo Viejo. Families interviewed: 42
Average income per family: 556.27
Sources of income:

Corn	4740.00
Beans	6737.70
Vegetables	3424.86
Coffee	2000.00
Cattle	4301.00
Poultry	2160.00
Total income, 42 fms.	23363.56

Distance to market (Huehuetenango): 24 km
New road length: 1.6 km

4) Los Magueyes-Los Lavaderos. Families interviewed: 90
Average income per family: 643.4
Sources of income:

Corn	8040.00
Beans	1466.00
Vegetables	320.00
Fruit	592.00
Coffee	47487.00
Total income, 90 fms.	57905.00

Distance to market (Mataquescuintla): 12 km
New road length: 4 km

5) Malacatancito-Chocal. Families interviewed: 47
Average income per family: 687.10
Sources of income:

Corn	6925.92
Beans	6150.90
Cattle	17115.00
Poultry	2012.00
Pigs	90.00
Total income, 47 fms.	32293.82

Distance to market (Huehuetenango): 15 km
New road length: 5.3 km

5) Cushapa-Granada. Families interviewed: 10
Average income per family: 692.69
Sources of income:

Corn	2305.52
Beans	4161.39
Maicillo	210.00
Pigs	250.00
Total income, 10 fms.	6926.91

Distance to market (S. Luis Jil.): 4.5 km
New road length: 2 km

7) Los Magueyes-Sn J. Las Canoas. Families interviewed: 17
Average income per family: 916.06
Sources of income:

Corn	3524.40
Beans	899.00
Cattle	8057.00
Poultry	1947.00
Textiles	680.00
Pigs	465.00
Total income, 17 fms.	15573.04

Distance to market (S.Martín Jil.):24 km
New road length: 7.1 km

8) Interamericana-La Cumbre. Families interviewed: 12
Average income per family: 1271.25
Sources of income:

Corn	3180.41
Beans	2120.65
Peanuts	40.00
Cattle	9200.00
Poultry	534.00
Pigs	180.00
Total income, 12 fms.	15255.06

Distance to market (Huehuetenango):16 km
New road length: 2.1 km

9) Los Magueyes-Canajal. Families interviewed: 25
Average income per family: 2169.48
Sources of income:

Corn	6855.70
Beans	3434.34
Vegetables	2245.55
Fruit	1152.00
Potatos	3550.40
Cattle	24307.00
Poultry	8682.00
Textiles	929.00
Pigs	2789.00
Total income, 25 fms.	54236.99

Distance to market (S.Martín Jil.): 27 km
New road length: 10 km

10) Llano de Las Tejas-Piaché. Families interviewed: 41
Average income per family: 4818.54
Sources of income:

Corn	32413.48
Beans	20249.75
Vegetables	189.00
Chili	8470.00
Cattle	131442.00
Poultry	4003.00
Pigs	793.00
Total income, 41 fms.	197560.23

Distance to market (Huehuetenango): 16 km
New road length: 5.3 km

11) Río Ocho-Agua Blanca. Families interviewed: 22
Average income per family: 5435.98
Sources of income:

Corn	4725.00
Beans	1601.25
Coffee	103643.28
Cattle	8400.00
Poultry	1132.00
Pigs	90.00
Total income, 22 fms.	119591.53

Distance to market (S. Pedro Necta): 21.5 km
New road length: 4.2 km

12) Jalapa-La Ventura. Families interviewed: 29
Average income per family: 5469.55
Sources of income:

Corn	68861.00
Beans	780.00
Maicillo	250.00
Potatos	252.00
Cattle	86023.00
Pigs	4004.00
	160170.00
Bees	- 1553.00
Total income, 29 fms.	158617.00

Distance to market (Jalapa): 9 km
New road length: 8.9 km

13) Caserio Esquipulas-Los Planes. Families interviewed: 25

Average income per family: 5494.55

Sources of income:

Corn	6536.46
Beans	1708.90
Vegetables	1028.50
Fruit	700.00
Coffee	105699.93
Cattle	19800.00
Poultry	700.00
Pigs	1190.00
Total income, 25 fms.	137363.79

Distance to market (Huehuetenango): 68 km

New road length: 3.4 km

ANNEX 5: ROADS TO BE BUILT IN 1988 WITH POINT PRIORITIES

ROAD PLANNED	MUNICIPALITY/DEPARTAMENT	POINTS	LENGTH	COST ESTIMATE	COST/Km.	POPULATION
REGION 1						
Los Magueyes-Canajal	Sn. Martín Jil./Chimalt.	683.00	10.0 kms.	279,215.41	27,921.54	1,230
Xeabaj-Chuacajay	Santa Apolonia/Chimalt.	639.34	3.0 kms.	92,942.29	30,980.76	405
Parajbey-Panatzán	Santa Apolonia/Chimalt.	628.00	5.6 kms.	149,065.64	26,618.86	
Los Magueyes-Sn. José Las Canoas	Sn. Martín Jil./Chimalt.	617.34	7.1 kms.	243,326.49	34,271.34	694
Parajbey-Xepanil	Santa Apolonia/Chimalt.	616.34	3.0 kms.	108,973.92	36,324.64	482
Patzacsun-Xejavi	Tecpán/Chimalt.	616.00	7.7 kms.	147,111.30	19,105.36	
REGION 2						
Los Magueyes-Los Lavaderos	Mataquescuintla/Jalapa	734.00	4.0 kms.	118,898.84	29,724.71	5,223
Morazán-Piedras de Fuego	Monjas/Jalapa	649.00	4.5 kms.	60,861.94	13,524.88	576
Jalapa-La Ventura	Jalapa/Jalapa	638.34	8.9 kms.	346,554.48	38,938.71	1,667
San Juan Caro-Piedras Blancas	Monjas/Jalapa	637.00	2.0 kms.	24,617.10	12,308.55	352
Estancia-Achiotillos	Monjas/Jalapa	634.00	6.5 kms.	90,032.42	13,851.14	2,099
Cushapa-Granada	Sn. Luis Jil./Jalapa	630.00	2.0 kms.	66,574.15	33,287.08	1,883
Mojarritas-San Juancito	Monjas/Jalapa	629.34	4.5 kms.	59,963.85	13,325.30	1,850
REGION 3						
Llano de Las Tejas-Piaché	Malacatancito/Huehuet.	724.34	5.3 kms.	140,474.07	26,504.54	2,020
CA-1 - Pueblo Viejo	San Sebastián/Huehuet.	684.00	1.6 kms.	66,382.17	41,488.86	3,802
CA-1 - La Cumbre	Malacatancito/Huehuet.	667.00	2.1 kms.	52,712.26	24,864.27	851
Caserío Esquipulas-Los Planes	Chiantla/Huehuet.	622.34	3.4 kms.	134,667.77	40,259.04	1,651
Río Ocho-Agua Blanca	San Pedro Necta/Huehuet.	604.84	4.2 kms.	284,516.05	67,420.86	1,676
Malacatancito-Chocal	Malacatancito/Huehuet.	603.00	5.3 kms.	168,517.01	31,795.66	3,542
El Rancho-Caserío El Rosario	Aguacatán/Huehuet.	593.00	3.0 kms.	102,568.31	34,189.44	1,709
Todos Santos-Mash	Todos Santos Cuch./Huehuet.	589.34	4.6 kms.	203,546.73	44,249.29	2,020
REGION 4						
Santa Teresa-El Duraznal	Comitancillo/San Marcos	778.00	3.0 kms.	88,905.64	29,635.21	905
Cabricán-Los Corrales	Cabricán/Quetzaltenango	742.34	2.0 kms.	46,615.19	23,307.60	2,100
El Horizonte-Arsenia	Tejutla/San Marcos	699.34	6.2 kms.	129,440.99	20,877.58	1,862
Tejutla-Tuizacaja	Tejutla/San Marcos	691.34	9.0 kms.	317,189.18	35,243.24	2,204
RN-1 - Tizate	Sn. Juan Ostuncalco/Quetzalt.	688.34	4.0 kms.	116,981.41	29,245.35	1,604
Tuichilupe-Piedra de Fuego	Comitancillo/San Marcos	687.34	3.3 kms.	105,443.65	31,952.62	1,752
Piedra Grande-Esquipulas Seque	San Carlos Sija/Quetzalt.	656.34	2.5 kms.	53,678.52	21,471.41	1,200
Santa Irene-San Lorenzo	San Lorenzo/San Marcos	652.34	12.5 kms.	246,436.50	19,714.92	1,525
REGION 5						
Aldea Pericón-Las Flores Pajales	Cunén/El Quiché	631.00	5.0 kms.	133,967.55	26,793.51	1,211
Xelbaquiej-Mactzul I-Mactzul VI	Chichicastenango/El Quiché	611.00	12.0 kms.	264,389.50	22,032.46	2,246
San Bartolomé-Los Cimientos	San Bartolomé/El Quiché	581.34	10.0 kms.	312,623.64	31,262.36	5,403
Uspancán Jacubi-Chijan	Uspantán/El Quiché	573.34	6.0 kms.	133,593.40	22,265.57	484
REGION 6						
CA-1Chivarreto-Sn. Antonio Buenabaj	Momostenango/Totonicapán	818.34	3.5 kms.	100,299.44	28,656.98	2,767
Sta. Clara La Laguna-Pasajquim	San Juan La Laguna/Sololá	710.34	12.0 kms.	272,097.47	22,674.79	2,931
Rancho de Teja-Cocales	Totonicapán/Totonicapán	710.00	3.5 kms.	103,349.19	29,528.34	1,029
Pacoxlaj-Chojonacruz	Momostenango/Totonicapán	680.34	5.5 kms.	109,543.02	19,916.91	1,981
Tzantzete-Patzalá	Sta. Ma.Chiquimula/ Tot.	663.34	2.2 kms.	47,425.34	21,556.97	482
San José-Chuihuitán	Momostenango/Totonicapán	644.34	4.2 kms.	77,588.76	18,473.51	1,107
Las Cruces-Xejujú	Godínez/Sololá	625.34	3.0 kms.	95,800.56	31,933.52	1,200
Sta. María Chiquimula-Chuiaj	Sta. Ma.Chiquimula/ Tot.	619.34	5.5 kms.	148,547.35	26,813.60	2,716
REGION 7						
El Monjón-El Nance	Salamá/Baja Verapaz	758.00	10.0 kms.	267,074.76	26,707.48	29,279
El Chol-Los Amates	El Chol/Baja Verapaz	638.34	7.0 kms.	286,839.38	40,977.05	3,847
Rabinal-Chiac	Rabinal/Baja Verapaz	614.34	6.0 kms.	119,782.37	19,963.73	819
Rabinal-Concul	Rabinal/Baja Verapaz	573.34	14.0 kms.	347,542.47	24,824.46	822
La Paz II-San Vicente	Salamá/Baja Verapaz	532.34	8.0 kms.	370,709.83	46,338.73	8,173

Annex 6: Maintenance manual labor costs, Region 1, 1987. Payments came from two separate budget sections. Where no persons appear, maintenance was budgeted but had not yet been carried out at time of writing.

REGION 1	Kms.	PERSONS		PAYMENT		AVERAGE
		Budget 1	Budget 2	Budget 1	Budget 2	PAY
039 Chimaltenango-San Marcos Pacoc	7.00	56	64	2,492.10	2,856.45	44.57
040 San José Poaquil-Panul (Patio Bolas)	8.70			3,113.90	2,895.40	
041 San Martin Jilotepeque-Estancia de la Virgen	10.00	74	76	3,132.35	3,626.05	45.06
042 San Martin Jilotepeque-Los Magueyes	7.00	10	22	461.00	1,068.60	47.80
043 Comalapa-Simajuleu	10.00	70	100	3,114.00	4,681.65	45.86
044 Simajuleu-Agua Caliente	4.00	23	30	1,022.00	1,494.00	47.47
045 Tecpán Guatemala-Chuatzunuj	9.20	36	43	1,551.60	1,886.10	43.52
046 Chichavac-Xeconol	10.00	72	71	3,100.00	3,462.30	45.89
047 Tecpán Guatemala-Chivarabal	9.00	40	24	11,773.10	1,067.50	200.63
048 La Cumbre-Paraxquín	9.00	48	52	2,066.40	2,340.30	44.07
049 Panimatzalán-Caliaj	8.00			2,863.30	2,662.40	
050 Xeconol-La Cumbre	5.00	33	23	1,452.15	1,073.70	45.10
051 Xeconol-Paquip	8.00	12	6	516.90	309.45	45.90
052 Xepatán-Xejolón	4.00	20	23	855.75	996.18	43.07
053 La Vega-Pachimulín	11.00	35	43	1,558.00	1,844.95	43.63
054 El Sitio-La Trompeta	2.60	20	11	848.74	492.45	43.26
055 San Andrés Itzapa-Xeparquiy	4.00	22	22	944.35	1,048.50	45.29
056 Xeparquiy-Panimaquín	4.00	21	18	927.30	804.90	44.42
057 Parramos-Parrojas	3.80	10	56	422.10	998.10	21.82
058 San Juan Sacatepéquez-Los Yax	4.60			1,646.40	1,530.90	
059 Cerro Alto-Los Ajvix	2.98			1,066.60	991.80	
060 Cerro Alto-Los Patzanes	3.50	27	34	1,190.56	1,470.66	43.63
061 Montúfar-Los Pirir	2.30			823.20	765.40	
062 Pachalí-Pasajoc	6.90			2,469.60	2,296.30	
063 Cerro Alto-Realguitz	5.50	33	42	1,438.80	3,221.04	62.13
064 San Juan Sacatepéquez-Cruz Blanca	4.00			1,431.70	1,331.20	
065 San Martín Jilotepeque-Choatalum	7.50			2,684.40	2,496.00	
066 Suacité-Los Guates	6.00	27	41	1,167.12	1,758.72	43.03
067 Camanibal-Xabillaguach	6.70	21	23	943.50	1,074.00	45.85
068 Chichicastenango-Saquiyá	5.60			2,004.30	1,863.70	
069 Chichicastenango-Xeabaj II	12.70			4,545.50	4,226.60	
070 Chuchipacá-Chumanzana	4.70	24	30	1,034.40	1,461.10	46.21
071 Chumanzana - CA-1	1.80	10	15	430.75	797.40	49.13
072 Saquiyá-Saquiyá II	2.00			715.80	665.60	
073 Saquiyá-Xealbaquiej	4.00			1,431.70	1,331.20	
074 Saquiyá-Xepocol	3.20			1,145.30	1,065.00	
075 Xealbaquiej-Paxot-Tzamixnam	10.00			3,579.20	3,328.00	
076 Xabillaguach-Chuchipacá	2.20	6	11	271.50	558.00	47.62
077 Entronque (Xabillaguach-Chuchipacá)-Lacamá	3.50			1,252.70	1,164.80	
078 Los Yaxones-Chaquijyá	3.20	6	10	258.60	430.60	43.07
079 San Pablo-San Marcos	3.00	15	10	641.50	429.50	42.84
080 San Marcos-Tzununá	3.00	27	26	1,204.90	1,228.30	45.91
098 Granados-Llano Grande	7.00	No data		No data		
	250.18			75,593.07	71,094.80	1,366.78

TOTAL VILLAGES = 42

AVERAGE PAY/TOWN = 3,492.57

TOTAL PAID 146,687.87

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ANNEX 7

CERTIFICATION PURSUANT TO SECTION 611 (e)

OF THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Anthony J. Cauterucci, the principal officer of the Agency for International Development in Guatemala, CERTIFY that to the best of my knowledge and belief Guatemala possesses both the financial capability and human resources to effectively maintain and utilize the access and tertiary roads to be built under the Farm-to-Market Roads Project. The construction and upgrading of these roads will stimulate the growth of farm-related activities in the Guatemalan Highlands.

This judgement is based on the fact that the 315 kms. per year of access roads constructed within this $30.0 million loan/grant project will enter directly into the access roads maintenance program established within the AID/GOG Highlands Agricultural Development Project (520-0274) which has been designed to accept up to 315 kms. of new roads annually into its road maintenance program.

(signed) Anthony J. Cauterucci
Director
USAID/Guatemala

(date) 9/09/87

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5 C (2) - PROJECT CHECKLIST

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A includes criteria applicable to all projects. Part B applies to projects funded from specific sources only: B.1 applies to all projects funded with Development Assistance Funds, B.2 applies to projects funded with Development Assistance loans, and B.3 applies to projects funded from ESF

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1985 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees 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 amount)?	a) Congressional notification was submitted to Congress and expired on August 7, 1985 b) Yes
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be: (a) engineering, financial or 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?	Not applicable.
4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.)	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 and Regional Assistant Administrator taken into consideration the country's capability to maintain and utilize the project effectively?	Yes.
6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral projects? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.	Not applicable.
7. FAA Sec. 601(a). 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; and	Improved access to Guatemala's rural agriculturally productive Highlands will encourage trade, both internally and internationally, as well as stimulate private initiative and competition. As the previously

(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.	isolated regions become more involved in Guatemala's economic mainstream, the demand for and use of cooperatives, credit unions, savings and loan associations will discourage monopolistic practices through increased competition, thereby providing incentives for technical efficiencies. Labor unions will also have greater access to potential members.
8. FAA Sec. 601(b). Information and conclusions 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 service of U.S. private enterprise).	Increased access to rural areas will make potential investments more attractive.
9. FAA Sec. 612(b), 636(h); Fy 1982 Appropriation Act Sec. 507. 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 in lieu of dollars.	The Government of Guatemala has consistently supported all A.I.D. financed development projects with counterpart necessary to achieve project objectives.
10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?	No.
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.

12. FY 1982 Appropriation Act Sec. 522. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	Not applicable.
13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? Does the project or program take into consideration the problem of the destruction of tropical forests?	Yes. The focus of the project is on Guatemala's Highlands; as such no tropical forests will be destroyed.
14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (dollars or local currency generated therefrom)?	Not applicable.
15. FY 1985 Continuing Resolution Sec. 536. Is disbursement of the assistance conditioned solely on the basis of the policies of any multilateral institution?	No.
B. FUNDING CRITERIA FOR PROJECT	
1. Development Assistance Project Criteria	
a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (1) effectively involve the poor in development, by extending access to economy at local level, increasing	(1) The access roads construction program will provide direct payment to laborers for labor-intensive work utilizing local appropriate technologies; (2) access roads construction

labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (2) 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; (3) support the self-help efforts of developing countries; (4) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (5) utilize and encourage regional cooperation by developing countries?

committees will be established to assist the rural poor help themselves; (3) rural Guatemalans will build their own access roads all with the assistance of GOG implementing agencies; (4) rural women will provide logistical support to the construction crews as well as use the completed roads to take farm produce to markets where in many cases the women themselves do the selling; (5) the anticipated increased farm production caused by improved access may encourage more active regional trade and cooperation within the Central American Common Market (CACM).

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

Yes.

c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?

Yes.

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

Yes.

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Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion of capacity of the country to repay the loan, at a reasonable rate of interest.	Guatemala has demonstrated its capacity to repay on a timely basis all AID loans.
b. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete with U.S. enterprises, 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.
c. ISDCA of 1981, Sec. 724(c) and (d). If for Nicaragua, does the loan agreement require that the funds be used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624 (g)?	Not applicable.

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102?	Not applicable.
b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?	Not applicable.
c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for, a nuclear facility?	Not applicable.

If so, has the President certified that such use of funds is indispensable to non-proliferation objectives?

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

Not applicable.

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