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UNITED STATES GOVERNMENT

Memorandum

511-0641 - (4)

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511-0641 & 511-0442

TO : Mr. Marshall Brown - LA/DR, AID/W.

DATE: March 27, 1975

FROM : Parke D. Massey - Acting Deputy Director, USAID/Bolivia

SUBJECT: Loan Completion Review Report for 511-L-021, 511-L-021A, and 511-LCL-1013, CRL #4
Roads 1 and 4

BEST AVAILABLE DOCUMENT

I. LOAN INFORMATION:

Borrower: Government of Bolivia
Executing Agency: Ministry of Transportation and Communications, National Road Service (SNC).
USAID Management and Monitoring: Engineering & Transportation Div.
Date Signed and Amount:

511-L-021:	September 15, 1961	$ 33,200,000.00
511-L-021A:	August 2, 1967	9,500,000.00
511-LCL-1013:	August 2, 1967	2,600,000.00
CRL #4:	March 20, 1970	2,500,000.00
GOB Contribution:		3,227,378.00
	Sub-Total	$ 51,027,378.00
Amount deobligated from 021A		126,363.21
	TOTAL	$ 50,901,014.79

Final Disbursement Date: December 31, 1973

Financial Information:

$ Loan Amount Authorized:	$ 42,700,000.00
Amount Deobligated:	$ 126,363.21
Loan Balance:	$ 42,573,636.79
$b. Loan 511-LCL-1013 & CRL #4 ($ equiv.)	$ 5,100,000.00
GOB Contribution ($ equiv.)	$ 3,227,378.00
Total Project Cost:	$ 50,901,014.79

Contract Information:

Consultant: Tippetts-Abbett-McCarthy-Stratton

From AID Loan	$ 3,215,838.84
From $b. Loan 511-LCL-1013 & CRL #4 ($ equiv)	$ 437,205.00
From GOB Contribution ($ equiv.)	$ 115,933.00
TOTAL	$ 3,768,976.84

Contractor: Jones y Asociados		
From AID $ Loan		$ 39,357,797.95
From $b. Loan 511-LCL-1013 & ChL #4 ($ equiv.)		$ 4,662,795.00
From GOB Contribution ($ equiv.)		$ 3,111,446.00
	TOTAL	$ 47,132,037.95

II. ACHIEVEMENT OF LOAN PURPOSE:

a. Purpose:

As stated in the Loan Agreement the purpose of the loan was to assist the Borrower in the construction (including final design and supervisory engineering) of two major related highways in Bolivia, as follows:

a) Road 4, an all-weather, two-lane highway, approximately 206 kilometers in length, beginning at Cochabamba and extending northeastward across the Cordillera Real to Villa Tunari, and thence northwestward to the Isiboro River near Puerto Patiño, approximately 183 kilometers of which, from Cochabamba to Villa Tunari, to have been paved, and

b) Road 1, an all-weather, two-lane highway approximately 86 kilometers in length, beginning at Villa Tunari and extending eastward to the Ichilo River at Puerto Villarrbel.

These two roads and the 42 bridges that span the rivers and streams on their alignment were intended to open up the rich agricultural areas of the Chapare region and to serve as a vital link in Bolivia's transportation system by connecting the country's main trunk roads with its navigable rivers.

b. Background of Loan Activities:

The project was based upon feasibility studies conducted by the firm of Tippetts, Abbett, McCarthy, & Stratton (TAMS) in 1963 and 1964. Upon the termination of the design phase, however, it became obvious that funding available under the original loan ($33.2 million) was not adequate for the construction because of price escalation. Consequently, the original loan was amended by providing $9.5 million in loan funds and making available $2.6 million in local currency in August 1967. In addition, counterpart release letter CRL-4 made available $2.5 million to the project in March, 1970.

The GOB executed two major contracts to carry out the Project.

The first, dated June 29, 1965, was with Tippetts-Abbett-McCarthy-Stratton (TAMS) for engineering design and supervisory services at an estimated cost of US$ 2.4 million. The second, dated February 18, 1967, was with a consortium of five firms headed by J. S. Jones Construction Co. for construction services at an estimated cost of US$ 42.5 million. On February 23, 1970, both contracts were amended to US$3.7 million and US$ 47.0 million respectively.

Under the terms of the amended construction contract, the actual construction work was assigned to the Bolivian member of the consortium, Bartos y Cia., but the consortium retained the performance guarantee and responsibility for successful completion of the Project.

The project suffered cost overruns which were attributable to increased contract quantities especially for earth moving and sub-base construction. Consequently, it was decided to eliminate 22 kilometers of Road 4N from the construction contract. The GOB is committed to complete this segment by National Road Service (SNC) using force account methods at the earliest possible time. (See retained covenants).

Roads 1 & 4 were officially inaugurated by the President of Bolivia on September 14, 1972.

c. Conclusions:

Roads 1 & 4 was the largest and most difficult infrastructure project financed by AID in Latin America. Their physical completion was a major undertaking in itself, commencing at Cochabamba, rising to 15,000 feet to cross the eastern Cordillera of the Andes and then terminating in the lush tropical lands of the upper Amazona basin. Eighteen people lost their lives in the construction of the two roads, and both constructors and engineers faced many difficult problems.

The roads have opened for colonization and agricultural exploitation the rich Chapare region between Cochabamba and Santa Cruz,and have formed the backbone of a reliable surface transportation system for the area. Extensions from these two roads will lead to the connection of the cities of Cochabamba and Santa Cruz with an alternative to the existing highland route with a shorter distance, gentler alignment and lower transportation costs. Extensions to the north will connect the plains of the Beni and an estimated 750,000 head of cattle with the markets of La Paz, Cochabamba and Santa Cruz.

The roads have provided direct access to approximately 62,000 hectares of prime agriculture land, and have opened for exploitation much larger areas in the Chapare. It is estimated that 5,000 families will have settled on both sides of these roads by 1977 and many more in the future. Commercial and marketing activities in the area have doubled over the last ten years, the additional traffic consisting mostly of commercial trucks heavily loaded with lumber, rice and tropical fruits, and many carrying supplies and materials to Puerto Villarroel for shipment by river to the Beni.

The Mission undertook an evaluation of the influence of roads 1 and 4 on the colonization of the Chapare region and their impact on the general development of the area approximately one year after the completion of construction. This study is attached as Annex I to this report.

III. ELIMINATED COVENANTS:

Upon termination of the Project, the covenants which were written into the Agreement to insure completion of the Project according to A.I.D. criteria become unnecessary and are to be eliminated from the monitoring scope.

a. Under Article V, Procurement, all covenants and sections under this loan are to be eliminated since all procurement related to the Project has been completed. These sections are:

Section 5.1: Procurement
Section 5.2: Project Dollar Goods and Services
Section 5.3: Reasonable Cost
Section 5.4: Administration
Section 5.5: Eligibility Date
Section 5.6: Small Business Notification
Section 5.7: Contracts

b. Under Article VI, Additional Covenants and Warranties, the following sections are eliminated:

Section 6.1: Conduct of the Project, Sub-Sections (a), (b) and (c) in which the Borrower covenants to carry out the Project with diligence and efficiency, and in conformity with the plans, specifications, contracts schedules and other arrangements approved by A.I.D., except as it pertains to the delayed 22 kilometers of road 4 North. (See retained covenants).

Section 6.4: Utilization of Goods and Services: limiting the use of goods and services financed by the Loan exclusively for the Project.

Section 6.6: Rate of Exchange, which stipulates the rate of exchange to be used in all project - related transactions.

Section 6.7: Utilization of other Currencies, in which the Borrower agrees that pesos bolivianos made available in connection with other U. S. assistance to the Borrower may be used for the Project.

Section 6.8: Information, which stipulates that the Borrower should publicize the Loan as a program of American aid in furtherance of the Alliance for Progress.

Section 6.10: Commissions, Fees and other Payments, sub-sections (a), (b), (c) and (d) in which Borrower warrants and covenants that no commissions or fees were paid or would be paid in connection with the Loan.

Section 6.12: Use of Equipment, this requirement was cancelled by Joint Venture and GOB Agreement of February 23, 1970.

IV. MONITORED COVENANTS:

The following covenants will be retained and monitored by the Mission:

Section 6.1: Conduct of the Project, sub-sections (a), (b) and (c) in which the borrower covenants to carryout the Project with diligence and efficiency as it pertains to the remaining 22 kilometers of Road 4 North. This section will be monitored by the Engineering and Transportation Division through contact with the Ministry, SNC and through field inspection.

Section 6.2: Maintenance, where the Borrower agrees to maintain highways and structure of the Project in accordance with sound maintenance standards. This section will also be monitored by the ETD through field visits at least twice a year.

Section 6.3: Rural Development and Colonization, which states that the Borrower shall support programs in rural development. Monitoring will be limited to a check by the Engineering and Transportation Division and the Rural Development Division that GOB programs support rural development activities.

Section 6.5: Non-Taxation, which exempts the Loan, the principal and interest from any taxation or fees imposed by Bolivian Law. Monitoring will be limited to a check by the Office of the Controller that no taxes or fees have been applied.

Section 6.11: Maintenance of Records, Inspections, Reports, in which the Borrower covenants to maintain books and records relating to the Project for five years after the last disbursement (December, 1973) or until all sums due A.I.D. have been paid. Borrower will continue to submit Quarterly Reports on Road 4N (22 kilometers and 4 bridges) until completion of activity. The Mission, through ETD, will continue to inspect these activities and will inspect any new or improved road maintenance organization activities.

ANNEX I Date: October 4, 1973

Loan Completion Report - Loan 511-L-021

Roads 1 & 4, Bolivia

I. PURPOSE OF THIS REPORT

The purpose of this report was to establish whether the objectives of the projects as conceived in the feasibility reports and CAP were fulfilled. Officials of the GOB's National Institute of Colonization (INC) and National Roads Service (SNC) were contacted both in their central offices and in the project area. A field trip was made from September 4 through September 7, 1973 to the area of Highways 1 and 4, with special visits to the Colonization Center at Ivivigarsama, Km. 68 of Highway 1, and to Puerto Villarroel, the end of Highway 1. Interviews were also carried out with colonists.

II. BACKGROUND

Based on feasibility studies prepared upon request from the GOB in 1963 and 1964, Loan Agreement No. 511-L-021, in the amount of $33,200,000 was signed on September 16, 1964 between AID and the GOB. The purpose of the loan was to finance the design and construction of Roads 1 and 4. Roads 1 and 4 comprised one combined project constructed under a single construction contract. The two individual components of the project are identified as follows:

Road 1.

An all-weather, two-lane highway, approximately 86 kilometers in length, beginning at Villa Tunari and extending eastward to the Ichilo River at Puerto Villarroel. The section from Villa Tunari to the Chimoré River Bridge has been constructed with a high-type base and double bituminous surface treatment, the remainder of the road has compacted gravel surface. Two-lane prestressed concrete bridges were constructed for the whole route.

Road 4.

An all-weather, two-lane highway approximately 200 kilometers in length, beginning at Cochabamba and extending in a north-easterly direction to the Isiboro River near Puerto Patiño. The section from Cochabamba to Villa Tunari, approximately 158 kilometers, was paved with the exception of approximately 23 kilometers between

Km. 55 and Km. 120, a section where slopes have not yet stabilized with incidence of slides. The original Loan Agreement No. 511-L-021 was increased by $9.5 million by Loan Agreement No. 511-L-021A in August 2, 1967. In addition, local currency loan No. 511-LCL-1013. in the equivalent amount of $2.6 million ($b. 31.2 million), was made to the GOB in August 2, 1967 to provide funds for the project. Also, Counterpart Release Letter CRL-4, made available to the GOB in March 20, 1970, the equivalent amount of $ 2.5 million ($b. 30.0 million). The GOB contribution to the project was the equivalent of $ 3.4 million. The total approved amount for project was $ 51.2 million, making it the largest single project in Bolivia financed for the GOB by AID.

The GOB executed two major contracts to carry out the project. The first, dated June 29, 1965, was with Tippetts-Abbett-McCarthy-Stratton (TAMS), for engineering design and supervisory services at an estimated cost of $ 2.4 million. The second, dated February 18, 1967, was with a consortium of five firms headed by J. A. Jones Construction Co. for construction services at an estimated cost of $ 42.5 million. On February 23, 1970, both contracts were amended to $ 3.7 million and $ 47.0 million respectively.

Under terms of the amended construction contract, the actual construction work was assigned to the Bolivian member of the consortium, Bartos y Cia., but the consortium retained the performance guarantee and responsibility for successful completion of the project.

Roads 1 and 4 were officially inaugurated by the President of Bolivia on September 14, 1972.

III. OBJECTIVES OF THE PROJECTS

The principal objectives of the projects, according to Capital Assistance Paper were:

a) To reduce the excessive vehicle operation costs by replacing the old unsurfaced road from Cochabamba to Villa Tunari by a shorter paved highway on a better alignment.

b) To open the virgin lands in the Piedmont Belt for settlement by colonists from the highlands, by means of penetration roads from Villa Tunari to the Isiboro River and to Puerto Villarroel.

c) To provide a linkage of the highway system with the system of navigable rivers in the Beni, by means of a highway connection to Puerto Villarroel.

d) To serve as an important segment in a new trunk route from Cochabamba to the producing area north of Santa Cruz, with the important advantages of greatly reduced distance and superior alignment resulting in substantial road-user benefits.

IV. PROJECT ACCOMPLISHMENTS

A. Colonization Program.

Colonization of the rich Chapare area is one of the main objectives of roads 1 & 4. Following is a general evaluation of the colonization program approximately one year after the completion of roads 1 & 4.

1. Settlements in the Area.

Number of settlers in the tropical area of colonization under both spontaneous and directed colonization, is 7770 families, transplanted from different areas of the Altiplano and valleys, with a total of 90,780 hectares of land awarded. The estimated population in the area is 30,759 persons. 10% should be added to this figure, which constitutes more or less the floating population of the colonies, composed by traders, casual laborers, etc. With this percentage, the total population of the colonies would be approximately 35,000. 1/

2. Migrating Activity.

The following chart shows that in the 9 elapsed years, 1964-1972, a migrating activity of 2,235 families has been registered, (directed colonization) from which 1,308 have settled, and 927 have given up to settle in surrounding area under the spontaneous system of colonization.

1/ The directed colonization program of the GOB was initiated in 1954. During the ensuing 18 years, an average of 5,500 settlers per year registered for migration to the eastern plains, but not all settled. This number, however, is less than 10% of the estimated 3% annual increase (70,000 people) of the altiplano population.

TABLE No. 1 - MIGRATING ACTIVITY 1964 - 1972

Year	E	Ab	Se	Cum.	% Se.	% Ab
1964	159	79	80	80	50.31	49.69
1965	433	183	250	330	52.74	47.26
1966	122	19	103	433	84.43	15.57
1967	218	141	77	510	35.32	64.68
1968	508	209	299	809	58.86	41.14
1969	422	225	197	1006	46.68	53.32
1970	168	71	97	1103	57.74	42.26
1971 - 1972	205	--	205	1308	100.00	--
Totals	2235	927	1308	1308	58,52	41.48

Notes: E = Entering
Ab = Abandonments
Se = Settlements
Cum = Cumulative

No data available for 1973.
Source: I. N. C. - (Instituto Nacional de Colonización.)

3. Origin of the migrating Flow

The internal migrating flow to the colonization area of the Chapare is composed mainly of people from the valleys of Cochabamba, provinces of Sacaba, Tiraque, Arani, Totora, Quillacollo, Cercado, Capinota and Jordán, where an excessive number of small farmers exist with the consequent unemployment.

4. Adaptability of the Campesinos to the Changes

The belief that the campesinos from the Altiplano and valleys do not adapt themselves to the tropical climate, the change in feeding, sanitary problems and the systems of agricultural work, etc. has been proven untrue.

Observations and studies carried out on these aspects show the adaptability of persons coming from those areas and, although there is a percentage of colonists who leave the colonies, it was proved that several go back in a short time to their original colony or any other considered more conveniente for their settlement.

The results of a public poll by the Instituto Nacional de Colonización carried out in 1968 with the purpose of investigating the main causes for abandonment, established that it is not the change in climate, nor the insects bites, not even the tropical sicknesses, which are in the first place as causes for abandonment. It was proved instead, that when there are no access roads or these are unpassable, or it is not possible to get potable water, the colonists are likely to leave the place assigned for their settlement.

Illness and climate were on third and fourth place as prevailing causes for abandonment. Changes in feeding habit, with a few exceptions, did not cause big organic disorders and were not cause for abandonment.

New types of agriculture, systems of work and use of other types of tools, did not represent any significant obstacle in the adaptation of the campesinos.

In connection with the adaptation of the campesinos to the new economic conditions, the results have been positive. We can conclude that their change in attitude in this matter is radical. The colonists, within the limitations of their culture, are leaving the traditional economy of subsistence farming and are entering slowly and gradually into market economy; they are starting to make use of the agricultural and consumption credits; they are interested in the organization of cooperatives; they are facing all the problems of supplies, production and trade, etc.

An evident economic progress among the oldest colonists is observed as compared with the low standard of living they had at the time of settling, which has permitted them to improve their present standard of living, obtain tools and have appliances which they did not have before.

During the last couple of years, the Government has been establishing some institutions for the commercialization of sugar cane, rice, wood, coffee, and fruits, although some of them have not yet fulfilled their function satisfactorily. It also appears that the services of assistance from the Instituto Nacional de Colonización and the Ministry of Agriculture, are not sufficient to cover the big number of colonies already established in the areas of colonization.

5. Obstacles that Prevent the Economic and Social Improvement.

There are several obstacles that prevent a greater development of the land and the colonies; these are the following among others:

a) The low cultural level of the campesino, which does not permit him to assimilate in a short time the modern techniques of agriculture and livestock.

b) The lack of capital to obtain tools, and agricultural implements, seeds, fertilizers, insecticides, etc. It is well known that the agricultural credits have not reached the campesinos because high interests, short terms, and the lack of acceptable collateral.

c) The parcelling system used has been too scattered or inconvenient for the installation of assistance and supply services.

d) The cleared sections of parcels have been considered too small to permit long periods of rehabilitation of the land and rotation of crops.

e) The poor roads and lack of bridges makes it difficult or very expensive for colonists to ship products from the colonies to the principal markets with the subsequent decrease in production. This is specially true of colonies further away from the main roads.

f) The tropical illnesses such as parasitism principally, and tuberculosis.

g) The lack of well organized institutions to channel the trading of products exposes to the campesinos to exploitation by middlemen.

h) The still unstable condition of the colonists and the effect of different reasons such as family, health, religious festivities, etc. cause the colonists to abandon their parcels over long periods of time.

B. Vehicular Traffic

Increase in the A. D. T. (Average Daily Traffic), from 1964 to 1973 is short of what was projected. The following two tables illustrate the increase in the A. D. T., and the decrease in the operational costs of vehicles on the old and new roads between 1964 and 1973.

TABLE No. 2 - AVERAGE DAILY TRAFFIC

Segment	1964	1973 Actual	1973 Projected 1/
Cochabamba-Sacaba	350	900	970
Sacaba-Aguirre	70	330	420
Tiraque-Aguirre	5	5 *	40
Aguirre-Colomi	85	100	450
Colomi-Corani	70	90	410
Corani-Villa Tunari	-	80	390
Aguirre-Villa Tunari	30	80	390

* This segment was eliminated from the contract.
Conditions of the road is generally poor.
Source: Servicio Nacional de Caminos.

TABLE No. 3 - VHICLE OPERATING COSTS BETWEEN COCHABAMBA AND VILLA TUNARI (Dollars), & VILLA TUNARI-PUERTO VILLARROEL

Route	TYPE OF VEHICLE Light	Medium	Heavy
Old Road (1964)	17.30	37.00	83.60
New Road (1972	4.96 (29%)	8.10 (22%)	15.41 (18%)
Villa Tunari-Pto. Villarroel	2.53	4.70	7.42

Items considered in the calculations of operating costs are: gasoline, oil, tires, depreciation, interests, and maintenance.

Source: Servicio Nacional de Caminos.

TABLE No. 4 - GASOLINE CONSUMPTION (Lts.)

Route	TYPE OF VEHICLE Light	Medium	Heavy
Cochabamba-Villa Tunari	15	23	50
Villa Tunari-Pto. Villarroel	8	12	28

Source: Servicio Nacional de Caminos.

1/ Traffic Projections taken from the Capital Assistance Paper.

C. Work Accomplished in the Colonies

1. Infrastructure

a) Surveying

A total of 109,060 hectares were surveyed in the area of colonization, at a cost of 0.79 $/Hectare, or a total of $85,938.10

TABLE No. 5

b) Parcelling

Projected	1,200
Occupied	1,308
Not yet occupied	61
Discarded	269
Total	1,638
Additional Cost of Parcelling	8,505.69
$/lot	5.20

c) Roads

Projected	164.60 kilometers
Constructed	145.52 kilometers
Cost $	535,636.41 $
Cost $/Km.	3,680.84 $/Km.

These roads, are penetration roads to the parcels, built by the Instituto Nacional de Colonización with funds provided under the Loan from International Development Bank. The roads are only earth roads with no surfacing.

d) Communal Buildings

Buildings constructed for the community, specially at the headquarters of the Colonization National Institute at Ivivigarsama, Km. 68 Road 1, are the following:

TABLE No. 6

Sanitary Posts	3
Schools	8
Cooperative Buildings	3
Administration	1
Social Centers	1
Living Quarters	10
Total Buildings	26
Area Built (m2)	3,535.70
Total Cost $	203,071.89
$/Sq. Mt.	57.43

All the buildings are constructed with cyclopean concrete foundations, brick walls, metal roof, wood windows and doors, wire mesh, cement floors, and glassed iron and porcelain sanitary fixtures.

e) Potable Water Supply

Deep Wells

No. of Wells:	14
Total Meters;	202.69
Cost $	3,587.61
$/mt.	17.70
No. of wells projected	94

Shallow Wells

No. of Meters excavated:	6 (Contract)
Cost $	118.75
$/m.	19.78
No. of meters excavated by colonists	11.00

Water Tanks

Water Tanks	1
Cost $	1,402
Water Tanks projected	4

2. Agriculture and Cattle

a. Nurseries

Plants produced in the nurseries were distributed to the colonists as follows:

	Accomplished	Projected
Plants (No.)	270,072	1,145,000

Among the plants, rubber is the basic line of business for the economic development of the Chimoré area. The rubber plants are produced in the nurseries in the Chimoré area in the amount of 15,000 annually, with seeds and cuttings coming from the Beni area.

b. Cultivation in the Parcels

The cleared areas and cultivation of the two groups, annual and perpetual are the following:

Clearing: 2.493 Hectares

TABLE No. 7 - ANNUAL CULTIVATION BY ALL THE COLONISTS

Crops	Hectares/Area	Hectares/Parcel
Rice	1,730	1.57
Corn	183	0.17
Peanuts	21	0.02
Soya Beans	17	0.01
Yucca	318	0.29
Others	54	0.05
Totals	2,323	2.11

Source: Instituto Nacional de Colonización.

TABLE No. 8 - PERPETUAL CROPS BY GROUPS OF COLONISTS

Trees	Hectares/Area	Hectares/Parcel
Rubber	202.01	0.40
African Palm tree (coconuts)	4.07	0.013
Coconut tree	3.92	0.039
Cacao	69.70	0.069
Citrics	370.83	0.37
Banana	219.08	0.20
Other fruits	11.80	0.012

Source: Instituto Nacional de Colonización.

Economic Impact

The following tables indicate the economic situation of the colonists within the most important groups of exploitation.

TABLE No. 9 - AVERAGE CONSUMPTION BY COLONISTS & SALES

Crops	Has.	Tn/Ha	Total Tn.	Consumption Tn. 1/	Sales Tn.	Sales $b/Tn	Income
Rubber*	0.40	0.20	0.08				
Banana	0.20	6.40	1.28	1.28	-	-	-
Rice	1.57	1.15	1.80	0.40	1.40	2,500	3,500
Corn	0.17	1.50	0.25	0.25	-	-	-
Peanuts	0.02	0.70	0.01	0.01	-	-	-
Yucca	0.29	10.00	2.90	2.90	-	-	-
Total $b.							3.500
US$							175

An additional $8 for the selling of eggs should be added to this figure, giving a total of $183 as the annual income of each colonist.

Source: Instituto Nacional de Colonización.

D. Cost of Each Colonist

The information that follows about the cost of each colonist was provided by the Instituto Nacional de Colonización but only taking the costs through June 30, 1970. No new data are available form that date. However, it is considered that the same cost applies to the new colonists settled in that area during the period 1970-1973.

TABLE No. 10 - COST OF EACH COLONIST

Financing	$
I. D. B., USAID - GOB	1,929,706
World Feeding Program - GOB	114,938
Inst. Nacional de Coloniz. Share	134,430
Total Spent	2,179,074 **

1/ Includes food used for bartering.
* Production of Rubber will start in 1973.
** Direct costs, does not include highways etc.

No. of Families settled (thru 1970)	1,103
Cost of Each Colonist $	1,976

Consequently the cost of each colonist is of $1,976, equivalent to $b. 40,310.

E. Spontaneous Colonization

The spontaneous colonization is mostly settled in the area between the Chipiriri River in the west, Chapare River, east, and reaches Puerto San Francisco in the north. The southern limit of this area is Villa Tunari. Project 4N serves this area, although this branch is not completed yet. 22 kilometers of road 4N from Eteragama River Bridge to Puerto Patiño still have to be constructed. However, there are several penetration roads constructed, which serve all the colonies established in the area.

Data about production, cost of colonists, income, etc., etc., are not available. The spontaneous colonization is distributed in 68 colonies, with an estimated population of 15,535 persons. The following is a table used as a comparison between the oriented and the spontaneous colonization.

TABLE No. 11 - SUMMARY OF COLONIES SETTLED

No. of Colonies	System	No. of Families	Total Ha. Granted	Estimated Population
68	Spontaneous	6,462	64,620	25,535
1	Oriented	1,308	28,160	5,224

There is an average of 10 Hectares per family and the source of financing is the colonist's own funds. Facilities available in these colonies are the following: 1 Hospital, 1 Sanitary Post, 17 Schools, 10 Water Wells, several agricultural cooperatives.

The executing agency for these colonies used to be the Ministry of Agriculture, but starting 1973, all the responsibility will be on the hands of the Instituto Nacional de Colonización.

V. CONCLUSIONS

The different aspects stated in this report, show us that the colonization in the areas of Chapare and Chimoré, has reached some

of the objectives expected, but, most important, has clarified the way to be followed in future programs of colonization.

Among the objectives achieved are:

1. Opening of almost 100,000 Hectares for agriculture; construction of access roads to the parcels; construction of communal buildings for the support of the colonists; settlement of 1,308 families; establishment of production center of plants for the agricultural development of the parcels; increase in the standard of living of the campesinos, etc.

2. The contribution of roads 1 and 4 to the colonization program is evident. Although this road is only 22 kilometers shorter than the old road, the travel time and vehicle operation costs are considerably lower. Travel time through the old road was 8 hours between Cochabamba and Villa Tunari, whereas present travel time is only 2-1/2 hour. Decrease in the operation costs of all vehicles varies from 71% to 82% and is shown in Table 3. This significant decrease is due to the modern characteristics of roads 1 and 4: Good alignment, relatively small number of curves, good radii of curvature, low grades, etc. With the construction of these roads, it is possible now to go all the way to Puerto Villarroel, from Cochabamba (244 kilometers) and back in one day. This was impossible through the old road.

3. Excepting construction of Roads 1 & 4, the objectives of the colonization program have not been fulfilled as projected, especially in terms of vehicular traffic using the road.

4. The areas opened for agricultural purposes, as well as the penetration roads constructed, are still insufficient in proportion to the vast potential area of exploitaition. The colonists settled, including spontaneous, add only 30% to the increase of the rural population.

5. Although agricultural production has increased over the previous levels, it is still weak in the commercial aspect, which has a remarkable influence in the low standard of living of the colonists.

6. The contribution to the national income would be minimal in relation to the high investment required for the accomplishment of works in the colonies.

The negative aspects of the colonization projects are:

1. The system has been based on an exaggerated state paternalism, which diminishes the initiative of the colonist, and his interest in carrying out self-help programs.

2. The uncontrolled spontaneous colonization, is the cause for the chaotic occupation of land, the destruction of the natural resources, and the development of poor economy of the colonists.

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