

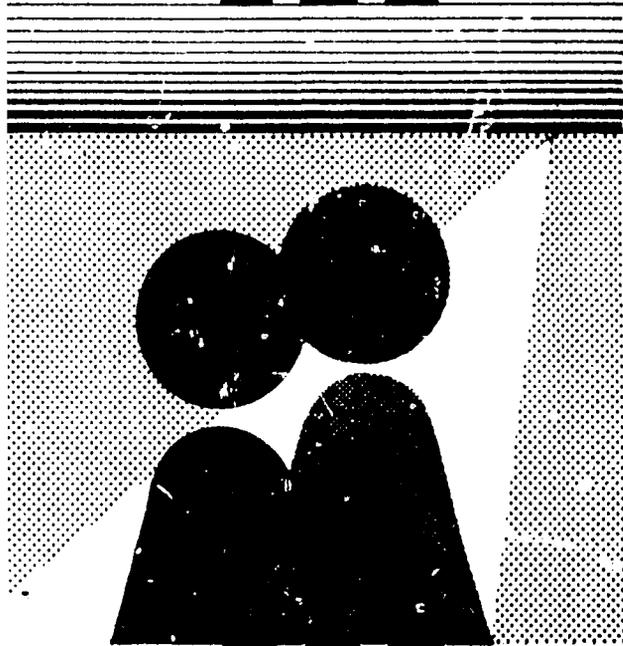
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Rural Roads Evaluation Report

492-T-035

**USAID/PHILIPPINES
PROVINCIAL DEVELOPMENT**

in cooperation with:

**DEPARTMENT OF LOCAL GOVERNMENT
AND COMMUNITY DEVELOPMENT - RURAL ROADS PROGRAM**

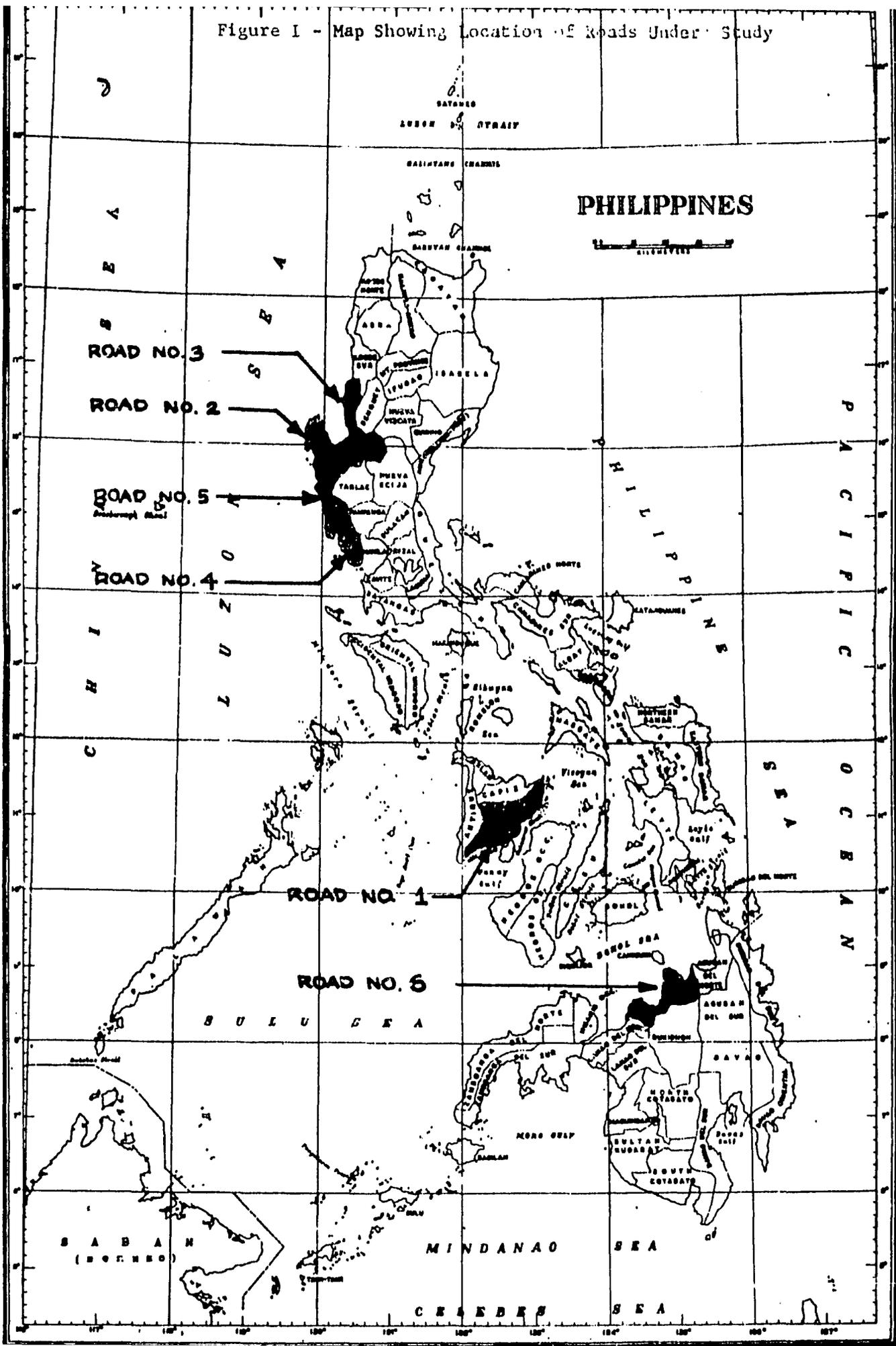
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RURAL ROADS EVALUATION REPORT

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P R E F A C E

This report provides background on the implementation of the Rural Roads Project—a joint undertaking between the U.S. Agency for International Development and the Government of the Philippines. Based on a rather detailed survey of six completed roads, it provides both a descriptive and statistical analysis on the initial outcomes produced by the project.

The survey was conducted by personnel of the Rural Roads Office of the Department of Local Government and Community Development (DLGCD/RRP), USAID's Provincial Development Division and the development staffs of the six provinces in which the roads are located. Special commendations to the USAID/PD engineering staff who organized the survey field work, Mr. Rick Arnaldo and Ms. Connie Cañoza (USAID/PD) for analysis, writing and secretarial services while special appreciation goes to Ms. Lucy Supleo, Director, Rural Roads Office for extending the cooperation of her staff in gathering the survey data upon which the report is based. Our thanks, too, are extended to the Governors of Iloilo, Pangasinan, La Union, Bataan, Zambales and Misamis Oriental, their provincial development coordinators and the development staffers who helped in the survey work.

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RURAL ROADS EVALUATION REPORT

I. Introduction

This report analyzes six roads completed under the Rural Roads I Loan (492-T-035) made to the Philippine Government by the U.S. Agency for International Development (USAID). The \$15,000,000 loan was signed on March 24, 1975. Construction actually began in October, 1975 and will be completed by December 31, 1978.

The roads evaluated in this interim report were completed within the first year and a half of the loan construction period and were especially chosen because they meet established selection criteria, represent integral road system and are representative of the roads built under the project.

The report is "interim" because the period of use of each road is one year or less, a period too short to gain a firm, consistent hold on benefit evaluation. Expert viewpoints on road benefit analysis and evaluation differ on the precise time lapse between usage and "settled" benefits but it varies from three to five years. However, the importance of the Rural Roads Project to the local government, the increased interest in the project from other agencies, including international lending organizations such as IBRD and ADB, and the follow-on Rural Roads II Loan of \$24 million, signed May 3, 1978, all emphasize the need for an interim evaluation.

Though not a specific object of this analysis, an important basis for the Rural Road Project is its cause and effect on the capacity of local government to assume substantial responsibility for its own development. Roads and bridges constructed under this project were chosen, planned, executed and financed by the participating provinces. In many cases successful completion came despite lack of coordination and sympathetic understanding of the central government. Not only were the provinces obliged to staff and train their own engineers, construct and man supporting equipment pools, acquire right-of-way and dig deep for front-end financing, they had also to battle the sometimes somnolent bureaucracy of the central agencies who hold the key to final project approval and with it the release of the reimbursements. When one reviews the data on economic and social benefits from the six roads as presented in the body of this report, the fact that accomplishments were made through the energy and project dedication of the provinces and their key staff ought to underline and enhance the results.

II. The Methodology

A. Road Selection

The road projects completed during the first one and a half years of implementation (1975-1977) of the Rural Roads Program were reviewed for inclusion in this study according to the following criteria.*

1. The projects were constructed or rehabilitated with local funds.
2. The project rights-of-way were titled to the province.
3. The projects were part of a continuous road system linking agricultural or fishing areas of predominantly small farmers or fishermen with the closest market town;
4. The projects linked up with a road of equal quality which in turn was connected to a good road leading to the nearest market town;
5. In the case of structures (bridges, culverts, etc.) all structures between the project and the nearest market town were of at least equal load capacity or were programmed for replacement under RRP.
6. The road system directly connected at least two barangays within its influence area.
7. The road system must have been completed long enough for its effects to be felt, but not to have been significantly influenced by inflation.

Six roads sections met the above-listed requirements and were subjected to a further in-depth evaluation study. The number chosen also reflected the limitations of personnel and time available for the evaluation since the complete report was done as a joint-in-house study by DLGCD, USAID/PD and assisting provincial staff, requiring the coordination of sometimes conflicting work schedules.

*These criteria are more carefully detailed in the RRP Administrative Procedures, Booklet No. 1, pp. 3-4, USAID/PD (Sept. 1977).

B. Data Generation and Analysis

Evaluation teams went to the road areas, gathering primary data through household surveys and interviews with local government officials while obtaining published secondary data from various government offices. Five hundred eighty-six households were interviewed. They were selected at random from a potential 4,684 within the roads' influence area.

The information collected was tabulated for each road and has been reproduced for each of the six roads in the Appendices A-F of this report. The statistics were then compared on a "before and after" basis and transformed into percentages to show the changes that occurred. The changes, expressed as percentages are shown in Table I and II. The former is confined to economic changes while the latter focuses on social and human service results, also expressed in percentages.

In the analysis which follows we have viewed the six roads as one unit. Previous studies on other RRP I Roads indicate that the results generally follow a predictable pattern*; thus considering all six roads as one unit should not distort results. However, Tables I & II break out the indices of change by individual roads while the appendix gives a summary description of each road along with a Table showing the statistics gathered for that particular road. The text, too, gives illustrative examples on individual roads where these seem appropriate.

III. The Setting

Before launching into a discussion of the "before and after" situation respecting the six roads, we have sketched out some background on the roads to give the analysis more meaning.

A. The Roads and Their Location

The six roads chosen for this evaluation are designated as follows:

Road No. 1 - Oton-San Jose Road, Province of Iloilo

Road No. 2 - Alcala-Moncada Road, Province of Pangasinan

*Refer to following publications. a) The Value of Rural Roads, by Patrocinio Villanueva, 1968, and b) Evaluation of RRP I subprojects which was submitted as Annex L of the RRP Project Paper.

Road No. 3 - Balaoan-Santol Road, Province of La Union

Road No. 4 - Culis-Pandatung-Sumalo-Sibul-Doña Superhighway Rd.,
Province of Bataan.

Road No. 5 - Castillejos-Nagbayan Road, Province of Zambales

Road No. 6 - El Salvador-Kalabaylabay Road, Province of Misamis
Oriental

A more detailed description of the Roads is contained in Annexes A to F. Reference to the roads as they appear in what follows will be by road numbers, e.g., Road 1 or Road 6.

They are located in each of six provinces which, in turn, represent three major geographic regions: Luzon, Panay and Mindanao Regions:

<u>Luzon</u>	<u>Panay</u>	<u>Mindanao</u>
La Union Pangasinan Zambales Bataan	Iloilo	Misamis Oriental

B. Characteristics of the Roads Under Study

The overall characteristics of the 6 roads, seen as a group, are as follows:

1. The total road length is 42.7 kilometers -- the shortest being 4.4 kilometers and the longest 8.9 kilometers. Four bridges (RCDG)* with a total length 62 linear meters were constructed along three of these roads.
2. The roads' influence areas includes 26 barangays with an area of 8,086 hectares, supporting 4,684 households with a total population of 27,953.
3. In the agricultural areas served by the Roads more than 90% of the households gain their living directly or indirectly from agriculture.

*Reinforced Concrete Deck Girder.

4. Before the advent of RRP, the roads were narrow, uneven, ungravelled, full of potholes, dusty during the dry season and slippery, often impassable, during the rainy season. Some roadbeds were often under water during most of the rainy season and in a number of cases the roadbed was lower than the surrounding area. River crossings consisted of old timber bridges or coconut trunks.
5. After the improvement of the road systems:
 - a. the right-of-way was widened to 15 meters;
 - b. a 6-meter travelled way was surfaced with gravel;
 - c. two 1.5 meter wide shoulders were provided on both sides of the road;
 - d. side ditches and culvert pipes were installed for better drainage; and
 - e. RCDG bridges were constructed over the river crossings.
6. The road systems were constructed or improved at a total cost of ₱7,800,000; ₱5,200,000 (66%) of which was reimbursed to the respective provincial governments upon completion and acceptance by the DLGCD and USAID; it took about 15 months to move from the drawing board to a completed road project.
7. The six roads appeared as priority projects in each of the Provincial Capital Improvement Programs (CIP), with well-documented socio-economic feasibility justification. Thus, when the provinces entered the RRP's operations these were the first group of roads to be built.

IV. The Findings

The positive economic effects of roads are fairly evident. Farmers particularly are dependent upon roads to carry their products to market or to food processing centers. Roads have equally important social relations, cultural exchange and serve as "highways for ideas". Roads, as well, increase the potential for extending human services like health care, education and general extension work.

Although it generally takes some time before the impact of a road project can be felt, prevailing conditions within the influence areas

studied were such that in a year's span very significant changes, directly and indirectly attributable to the road project, had already taken place. The changes, translated as benefits and presented in Table I & II are discussed under three headings: economic, social and general.

A. Economic Benefits

1. Reduction in transport cost and increased availability of reliable transportation services.

Transport costs generally are higher for poor roads than for good ones. Vehicle costs are abnormally high on the former, and, in most instances, only a few units service the route. The operators are able to dictate price because the user has no other choice. But with the improvement of the road, vehicle operating and maintenance costs are reduced, more transport operators begin to service the route and the resulting competition induces a price reduction.

In the six roads under study, passenger charges fell by 54% between 1975 and 1978. This was in the face of an 87% increase in the legal transport rate set by the Board of Transportation during the same period. An interview with a jeepney operator servicing Road 6 explains the decrease:

I used to charge my passengers ₱3.00 for the 7-kilometer ride from the junction of the national highway to barangay Kalaybaylabay. I had to-- when you change your gear oil weekly, operate in second and third gear most of the time, have mechanical breakdowns frequently and make only 2 trips daily and then only during the dry season at that, it would be a losing proposition to charge less than that. But after the improvement, I'm only charging my passengers ₱1.20 for the same trip. Now, it cost less to operate my jeepney and I make 4-5 trips daily throughout the year.

Cargo carried by passenger buses is charged the same rate as passengers, e.g., a 50 kilo sack of rice is equivalent to one passenger fare. Thus, the 54% decrease in passenger rates is applicable as well to 50 kilo cargo units. While freight charges on cargo trucks are not available for all roads, the example of Road 6 is illustrative: freight charges for shelled corn dropped from ₱70.00 to ₱30.00 per ton because of the improvement.

Transportation is now more reliable. While only 63 units (jeepneys, tricycles, buses, cargo trucks) owned by 33 operators plied the roads before improvement, 101 operators service the six roads with 242 units. The latter units operate year round, reducing the previous isolation of the villages during the rainy season. Roads 2 and 3 were avoided by long distance buses due to the prior condition of the road. Now, however, the buses are in full operation and have eliminated the burdensome transfer from one terminal point to another. Waiting time between rides has been reduced to practically zero, since there are many more vehicles now plying the route while travel time has been halved from 30 to 15 minutes per average trip.

2. Increase in Production of Major Crops

Good roads support agriculture. Roads assist the efficient flow of produce from the farms to the markets and consumers. Roads provide the access through which the necessary inputs to agriculture (e.g., technical know-how, fertilizers, pesticides, credit, etc.) are brought to the farmer.

In the surveyed area the production volume of seven major marketable crops raised within the roads' influence areas increased by nearly 40% during the last two years. Notable were vegetables and fruits which posted increases of 62% and 46% respectively.

The increases are due, at least partially, to improved accessibility of the communities and the consequent ease with which farm products now can be transported to the market. Before the improvement of these roads, surpluses in the barrios had a hard time reaching the market. Because transport costs were so high and because products like vegetables and fruit spoil easily it was usually impractical to go to

market on irregularly scheduled vehicles or in ox-drawn wagons or sleds. With a better road and with better and cheaper transport readily available people produce more, knowing their products can get to market. Roads 3 and 4 furnish a classic case. Before the improvement of these roads, fruits and vegetables were raised primarily as animal feed ; it was uneconomical to raise them for the market because of the reasons noted. But with the road improvement, production of vegetables in Road 3 rose 125% while in Road 4 fruit production jumped by 103%.

While road improvement is not the only factor inducing increased production, it has been significant by improving market access, inducing visits by extension workers, and affording easier and cheaper access to farm inputs. For example, during the period studied the price of chemical fertilizer, pesticides, seeds, etc., rose substantially, averaging about 20% overall. But for the farmers within the influence area of these six roads, the price increase was only about 12%. The difference is due largely to the drop in transport costs because of the road improvement.

3. Increase in Farmgate and Market Prices of Major Agriculture Crops.

For the seven major crops raised within the road influence areas, average farmgate prices increased by 59% while market prices increased 26%, a year after the completion of the project. Prices for vegetable and fruits had the highest increase. Moreover, farmgate prices increased more than market prices by 33 percentage points.

Ideally, if farmers bring their products direct to the market, the market price (the price farmers receive from the retailers) should be the same as the farmgate price (the price farmers receive from merchants at the farmsite) after allowance is made for transport costs. With reduction in transport cost, and assuming a fixed market price, the farmgate price will increase. This means that farmers receive higher prices when they sell produce to middlemen at the farmsite.

Based on the household interviews, it was found that before the road improvement, 69% of the agricultural products were

sold at the farm while only 31% were brought to the market. A year and a half after completion of the road projects an almost complete reversal occurred; nearly 60% of the produce were brought to market with 40% sold at the farm.

Market prices have also increased. Many factors contribute to these findings. First, a rise in farmgate price (induced here by the road improvement and the drop in transport costs) results in a similar rise in market prices. A second possible explanation is that the roads, having only recently come into effective use, have not yet induced sufficient production to satisfy demand. Thirdly, many farmers who carried their produce on foot or in carts before the road was improved didn't include transport costs in the selling price. Now, with the reliable transport, they do. Finally, inflation may have pushed market prices upward.

However, in terms of percentages, farmgate prices increased more than the market price. This may be a result of the influence the road improvement had on the middleman's bargaining power. Before, the middleman could set the price fairly low; his only competition was the farmer's effort to carry the produce to market on his back, by ox-cart or wagon. But with the present increase in vehicular transport, the farmer can easily pack his produce on a jeepney and head for the poblacion. The middleman, if he wants to stay in business, must bargain with the farmer as the competition goes driving by.

4. Increase in Gross Annual Household Income

The chart below summarizes changes in the Gross Annual Household Income for all the households living within the Roads' influence area.

	Gross Annual Household Income	% Increase
Before Road Improvement	P 5,706	////////
After Road Improvement	P 7,286	28%

Other indicators point to a general increase in farm income increased the influence area of nearly 40%, non-farm income increased by 20% for the same comparative period. The re-

sultant increases are due primarily to increased production within the area. Also contributing is the farmer's ability to sell at higher prices while paying lower transportation charges. Of interest, too, is the use of improved roads to decrease the scourge of under-employment especially prevalent in isolated rural areas. The rise in non-farm income points toward members of the hitherto restricted farm family branching out via regular scheduled bus and jeepney to seek employment as office workers, commercial employees, transport employees, etc. This is further accentuated by the rise in small business discussed below.

5. Entrepreneurial Increase

The movement of people, goods and services in and out of an area is greatly influenced by road conditions. A good road ensures that such movements are continuous, encouraging the small entrepreneur to do business within the area served by the road.

Data on the roads' influence area show that commercial enterprises have grown from 78 to 166 -- an increase of 113%. Growth is distributed among sari-sari (variety) stores, drug stores, tailoring and dress making shops, beauty shops, rice and corn mills, storage facilities, cottage industries and local markets. For example, sari-sari stores grew by 186% while rice and corn mills increased by nearly 40%.

While a variety of reasons can be marshalled to explain these increases, they are, in one way or another, tied to the road improvement. Sari-sari stores, for example, depend on regular and timely shipments of perishables while rice and corn mills grow in concert with increased agricultural production. Increases in household income attract tailor and dress shops, markets and bakeries where people go to sample the amenities of living as income rises.

B. Social Benefits

While roads have a singular effect on the economy they are significant as well in the social life of the people. Thus, the evaluation teams focused on social benefits and made efforts to quantify the "before and after" picture.

1. Increased Mobility

Road improvement, particularly the construction of permanent structures over rivers and creeks whose formerly impassable

TABLE I
SUMMARY SHEET
CHANGES IN ECONOMIC CHARACTERISTICS

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- PERENCE	PER- CENTAGE
1. Transportation Services				
a. Total number of units				
1) Jeepney	15	81	66	440
2) Tricycles	26	95	69	265
3) Buses	2	12	10	500
4) Cargo Trucks	20	55	35	175
5) Total (all vehicle types)	63	242	179	284
b. Number of Operators	33	101	68	206
c. Passenger charges (pesos/km)	0.26	0.12	0.14	54
2. Production				
a. Average Annual Production * Per Hectare				
1) Rice (Palay) - cavans	44	53	9	20
2) Corn - Cavans	20	26	6	30
3) Vegetables				
a) Mongo - cavans	161	274	113	70
b) Tomato - kilograms	199	304	105	53
4) Root crops - cavans	36	42	6	17
5) Tobacco - kilograms	560	701	141	25
6) Fruits (Banana & Mango)-kgms.	396	579	183	46
7) Coconut - kilograms	375	550	175	47
b. Farmgate/Market Prices *				
1) Rice (Palay) - per kilo	.74/.90	.94/1.05	.20/.15	27/17
2) Corn - per kilo	.29/.45	.44/.60	.15/.15	52/33
3) Vegetables				
a) Mongo - per ganta	6.75/9.75	10.00/11.75	3.25/2.00	48/20
b) Tomato - per kilo	.75/1.50	1.40/1.95	.65/.45	87/30
4) Root crops - per cavan	34/43.67	43.67/47.67	9.67/4.00	28/9
5) Tobacco - per kilo	2/2.38	3.25/3.62	1.25/1.24	62/52
6) Fruits				
a) Banana - per hundred	2.00/8.00	5/10	3/2	150/25
b) Mango - per hundred	23/30	31/37	9/7	39/23
7) Coconut - per kilo	1.63/2.05	2.22/2.48	.59/.43	36/21
c. Average Production Cost (Pesos/Ha.)	300	337	37	12

TABLE I

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- FERENCE	PER- CENTAGE
3. Marketing Practices - Percentage of Production Volume*				
a. Sold at Farm	69	41	(28)	
b. Sold at Market	31	59	28	
4. Average Gross Annual Household Income (Pesos) *				
a. Farming	3,418	4,099	681	20
b. Non-farming	2,288	3,187	899	39
c. Total	5,706	7,286	1,580	28
5. Economic Enterprises (No. of Units)				
a. Sari-sari stores	35	100	65	186
b. Drug Stores	5	6	1	20
c. Tailoring/Dress Shops	4	11	7	175
d. Beauty Shops	2	3	1	50
e. Rice/Corn Mills	22	34	12	38
f. Storage Facilities	2	3	1	50
g. Cottage Industries	1	1	0	0
h. Markets	7	8	1	14
i. Total	78	166	88	113

*Figures shown under asterisked headings reflect averages for all six roads surveyed. In all other cases the figures are based on arithmetic totals.

torrents often isolated the interior barrios during the rainy season, now provide year-round, all-weather access. People can now move more easily in and out of the area where they live. As a result of the improvements in the six roads, villagers have substantially increased their mobility as noted below:

	Outbound trips days/year	Percent Increase
Before Improvement	58	/////
After Improvement	123	114%

Before road improvements most of the trips took place during the dry season; now trips are rather evenly distributed throughout the year. This is due to better transportation which is, in turn, the direct result of a better road.

Why the people took these trips is also of interest. Before the road project, 74% of the trips were for economic reasons while 26% were for social reasons. A year and a half later, 58% of the trips were for economic reasons and 42% were for social reasons. This represents a 15 percent increase on the social side, a gain in social amenities for the farm population.

2. Accessibility to Health Services

Philippine rural dwellers rely heavily on the herbolarios for their medical needs. Public Health personnel (doctors, midwives, etc.) are not readily available in the barrios and through the years the herbolarios have become village confidants on matters of health and medicine. In addition private health professionals shun rural areas where business is not lucrative and where the problem of travel looms large.

But good roads make a difference because, given a chance, people will travel to service their health needs. In the survey area the householders consulted medical personnel and herbolarios an annual average of 13 and 18 times respectively; but after improvements, consultations rose to 25 times a year for medical personnel but dropped a bit to 12 annual visits for herbolarios.

Moreover, people now go directly to the poblacion for medical and health visits as compared to the predominate use of the barrio - site for visits before the road was improved. In other words village people are beginning to increase their efforts to get better health protection. The government has apparently recognized this fact since it has recently moved to increase the number of health facilities and programs within the influence areas of the improved roads. Fourteen new health facilities (rural health units, clinics, etc.), were inaugurated to which ten government health personnel were assigned. Moreover, nine new health programs (nutrition and family planning among them) were initiated throughout the study areas.

3. Improved Accessibility to Educational Facilities

Among the things that limit school enrollment is inaccessibility of the school to barrio folks. Parents understandably refrain from sending children to school where they must cross streams and creeks, and walk over rough terrain. Better roads usually raise attendance and cut truancy, and records from the district offices of the Department of Education and Culture in the road areas confirm this expectation.

Before improvement the total enrollment of the 12 schools within the road's influence areas was 3,154; school year 1977-78 reflected an enrollment of 3,455 in 13 schools within the same area (one school was established in Road 5 after the road completion) - a 10% increase in enrollment. The same records revealed a decrease of 55% in drop-outs and transferees to schools located outside the influence areas.

Results of the interviews conducted with the barangay captains reveal that the number of students boarding in private homes dropped after the building of the roads. This particularly affected high school and college students who formerly had to board or stay with relatives in town since barrio schools handle intermediate grades only. Better roads and the resultant growth in cheaper, faster and more reliable means of transportation enables students to commute, eliminating the expenses of board and lodging. Moreover, teachers, with handy bus service, are now more willing to work in schools outside the poblacion.

4. Increases in recreational activities

Recreational activities (fiestas, movies, sports competitions, etc.) are important to rural people. They add constraining gaiety to the hard work and break up the monotony of rural life. Since most recreational activities occur away from the barrios, good roads also open up the rural recreational scene.

In 1975 the average frequency with which the people engaged in recreational activities was 36 times per year, but towards the end of 1977 the frequency jumped to 72 times annually, or double the previous figure. Visits of relatives and friends have become very popular pastimes. Going to the movies in the poblacions and nearby urbanized cities and municipalities, has now become a usual form of recreation. Athletic and musical competitions have increased from an annual average of 4 in 1975 to nearly 10 in 1977. Barrio fiestas, considered as the primary recreational activity in the rural areas, also have been influenced by the road projects. In one barrio on Road 5, the fiesta has been "reintroduced" and in four barrios within Roads 2 and 4, two fiestas are now being held annually.

5. Increased Accessibility to Publications

Newspapers, magazines, paper books and related publications, are not only part of the entertainment background in the barrio, they are also the best means of getting to the people, serving an educational role too. And with better roads come more of the printed word on a regular schedule. The survey revealed that people in the six-road influence area came into contact with various publications, either through reading or casual perusal, about 45 times a year. After the roads were improved and publications increased both in numbers and in regularity, it was estimated the same type of contact had increased to about 260, a rise in incidence of just under 480 percent.

6. Improved Availability of Government Services

Poor government service on the barrio level is often aggravated by the lack of good roads. Government performs at the barrio by visitation, through variations on the extension worker. Thus, good roads are the sine qua non in the government's effort to get to the people.

This is exemplified by the farm management technicians (FMT) of the Bureau of Agricultural Extension. Their numbers increased from 14 to 29 during the "before and after" analysis while their annual frequency of client contract rose from 50 to 156. Though each FMT has a motor bike only the advent of road improvements made it possible to reach remote barrios, accounting for the majority of the reported increase in contact. During the same period government health personnel rose in number from ten to twenty one while increasing the frequency of their contacts in the rural communities from once to three-a-week visitations.

Other service improvements were also noted. For example, interviews reported a more reliable postal service. Previously it took weeks for mail to be delivered especially during the rainy season when some barrios were temporarily isolated from the poblacion. Now two days is the usual time wait for the mail. Many people also underscored improvements in peace and order that followed the improvements of the roads.

C. Other Benefits

Benefits of a more general nature are discussed in the following paragraphs:

1. Development of province's capability to implement infrastructure projects.

An important objective of the Rural Roads Project is to develop the capability of participating provinces to plan and implement road and bridges projects. That this objective has been closely approximated is evident in the successful completion of hundreds of road and bridge projects plus the high esteem in which this program is held by the local and central government agencies. More and more the procedures and systems developed in the Rural Roads project are being extended in whole or in part to other areas of governmental activity. Continuous staff development through training via seminars and workshops covering project feasibility studies, budget and accounting, road design, equipment management, quality control, road maintenance and project evaluation are

TABLE II
SUMMARY SHEET
CHANGES IN SOCIAL CHARACTERISTICS
ROADS NOS. 1-6

(Figures are totals for all six roads surveyed)

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- FERENCE	PER- CENTAGE
1. Mobility (Outbound trips)*				
a. Frequency of trips	58	123	65	114
b. Reason for trips - Percentage -				
1) Economic	74	58	(16)	
2) Social	26	42	16	
2. Educational Services				
a. Number of educational institutions	12	13	1	8
b. Enrollment	3,154	3,455	301	10
c. Drop-out/transferees to outside schools	137	61	(76)	(55)
d. Ave. number of household members enrolled*	2.2	2.7	0.5	23
3. Health Services				
a. Number of medical facilities	3	17	14	467
b. No. of health programs	5	14	9	180
c. Frequency of Consultation with medical personnel (by households)*				
1) Doctors/Nurses/Dentists	13	25	12	92
2) Herbolarios	18	12	6	33
d. Place of Consultation* - Percentage:				
1) At barrio/residence	69	52	(16)	
2) At poblacion	31	48	16	
4. Government Services Availability				
a. Farm Management Technicians				
1. Number	14	29	15	107
2. Frequency of Service	50	156	106	212
b. Medical Personnel				
1. Number	10	21	11	110
2. Frequency of Service	56	156	100	179
5. Recreation				
a. Frequency of Recreational Activities in the Area				
1. Fiestas	5	11	6	120
2. Dances	5	17	12	240

TABLE II

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- FERENCE	PER- CENTAGE
3. Athletic competitions	6	15	9	150
4. Musical competitions	6	13	7	117
5. Total	22	56	34	154
b. Number of Recreational Facilities	17	31	14	82
c. Frequency of household engagement in recreational activities*	36	72	36	100
b. Communications Media				
a. Number of Publications reaching the area	9	33	24	267
b. Frequency of availability*	45	260	215	478

* Figures shown under asterisked headings reflect averages for all six roads surveyed. In all other cases the figures are based on arithmetic totals.

Note: All data on frequencies are expressed in terms of number of times per year.

conducted through out the year to further enhance provincial capabilities.

2. Reduction in road maintenance cost.

As a result of the road improvement study an estimated annual savings in maintenance cost of P182,000 has been realized or an average savings of P4,300 per kilometer. Significant too are the savings on bridges. Road 1, 2 and 4 had timber bridges which had to be replaced every 4 years at a total cost of P113,700.

3. Increased employment opportunities for local labor.

Since much of the work done on the roads and bridges relies on labor intensive application, employment in the road areas rises for the period of construction. This is particularly true when the work is done by contract. Though bringing long time employees in the skilled crafts with him, the contractor hires anywhere from ten to forty additional workers directly from the area.

Applying data computed in a previous study*, to the six roads sections, we estimate that about 77% people were employed with a payroll of P530,000. Thus, for the construction period at least, a considerable input was afforded these communities by the employment of local hire labor adding significantly to the economy during the period.

4. Increase in Land Values

Land values tend to rise with the advent of road improvement since a good road opens the way for economic and social commerce and makes adjacent land more attractive for farming, settlement and commercial use. While no detailed analysis was made of area assessment and sales records since the improvements were so recent, interviews among residents in the Road 6 area for example indicates a rise in value from P500 per hectare before the improvement to a present P2000.

*Please refer to the "Rural Roads Project II Project Paper, Office of Provincial Development, USAID/Philippines, 1977 p. 58-60.

A P P E N D I C E S

NOTES ON THE APPENDIX

This appendix contains detailed descriptions of the six roads which formed the basis for this study. A description of each road, the expectations of the feasibility study and details of the construction are described in the narrative. Accompanying the description is a table showing the derivation of the benefit-cost ratio, a map locating the road and a table quantifying the results of the survey on before and after conditions.

In the text the word "barrio" and "barangay" are used interchangeably signifying the smallest organizational unit of local government in the Philippines, comparable to a neighborhood unit or a small hamlet. The term "poblacion" as used in the text refers to the more urbanized center of larger incorporated units such as the municipality or the province. The "poblacion" as such does not have corporate, governmental status.

Discussions on the road construction costs use the term "reimbursement" which grows out of the fixed amount reimbursement concept upon which these roads have been built. Before building the road an agreed upon cost figure is established. The province then builds the road and receives up to 75% of the fixed cost figure as reimbursement. However, the actual reimbursement may vary because the reimbursement is based on direct costs only, i.e., materials, construction labor, etc. If the province does not control its indirect costs, i.e., engineering supervision, gasoline, oil, equipment maintenance, etc., the actual reimbursement may be reduced.

The income figures used in accompanying tables are based on cash only and do not include imputed costs.

Although complete data on the derivation of the benefit-cost analysis has been included, the basis for the computation is contained in Administrative Booklet No. 2 which should be consulted for a better understanding of the process involved.

APPENDIX A

APPENDIX A

OTON-SAN JOSE ROAD
ILOILO PROVINCE
PROFILE OF ROAD NO. 1

The Oton-San Jose Road, as shown in Map A, lies north of the municipality of Oton, southeast of the municipality of San Miguel and northwest of Manduríao; all are market centers. The road is part of a system which circles the city of Iloilo running from the southwest coast at Oton to Leganes; the system covers a generally flat terrain of fertile, irrigated riceland in the municipality of Sta. Barbara and Pavia. Because of its circumferential location, the road can eventually serve as a significant bypass connecting the southern municipalities with those to the northeast, avoiding the congestion of Iloilo City.

The road starts at km 11.01 outside the poblacion of Oton and ends at km. 19.92 in Barrio San Jose in San Miguel, a total of 8.91 kilometers. Before improvement there were two timber bridges over the Mambog creek and an irrigation canal at Barangay Cabolo-an Sur.

Six Barangays lie within the road's influence: Rita Sur, Caboloan-Sur, Mambog, Tagboc I, Tuburan and San Jose encompassing 1,119 hectares. The area is settled by 969 households or 5374 people.

Rice is the primary crop and while vegetables and fruits are also raised, they are largely for home consumption. The adjoining towns of Oton, San Miguel and Iloilo City serve as centers for both marketing and socialization.

In proposing this road for improvement the province feasibility study anticipated the following benefits: reduction of transport cost, savings in road maintenance costs, increased volume and value of agricultural output, and related social benefits. The same report noted that "the present value of the projects' benefits and costs have been evaluated using a discount rate of 15 percent, an approximate measure of the opportunity cost of capital in the Philippine economy ... the benefit cost ratio is 3.42. The internal rate of return is 36.25%." The calculations for the B/C ratio and the IRR are shown in Table A-1.

The road system improvement was completed in 3 phases at a total cost of ₱1,369,702, of which 66.4% (₱909,870) was reimbursed to the province. Phase I involved the replacement of the Mambog Creek timber bridge by an 18-meter RCDG bridge at a cost of ₱306,000. Construction began on November 24, 1975 and ended on December 29, 1976. Phase II saw the construction from November 17, 1975 to December 16, 1976 of a 14-meter

pre-cast slab bridge over the irrigation canal at Caboloan Sur at a cost of ₱115,000. The last phase was the improvement of 8.9 kilometer roadway, costing ₱949,102 and done within the period of Dec. 15, 1976 to June 30, 1977.

In addition to the road map and the B/C computations in Table A-1, a third attachment, Table A-2, gives a summary of socio-economic data collected on this road for the present study.

TABLE A-1
B/C AND IRR CALCULATIONS
(IN THOUSAND OF PESOS)

YEAR	TOTAL IMPROVE- MENT COSTS	TOTAL ANNUAL BENEFITS	PRESENT VALUE FACTOR AT 15%	PRESENT VALUE OF IMPROVE COST AT 15%	PRESENT VALUE OF TOTAL ANNUAL BENEFITS AT 15%	PRESENT VALUE FACTOR AT 20%	PRESENT VALUE OF IMPROVE COST AT 20%	PRESENT VALUE OF TOTAL ANNUAL BENEFITS AT 20%
1975	585.0		1.00	585.0		1.000	585.00	554.13
1976	534.6	665.23	0.870	465.1	578.75	0.833	445.32	500.45
1977	-	721.12	0.756	-	545.16	0.694	-	418.46
1978	-	722.74	0.658	-	475.56	0.579	-	349.23
1979	-	724.55	0.572	-	414.44	0.482	-	291.99
1980	-	726.36	0.497	-	361.00	0.402	-	243.93
1981	-	728.17	0.432	-	314.56	0.335	-	203.66
1982	-	729.98	0.376	-	274.47	0.279	-	170.50
1983	-	731.79	0.327	-	239.29	0.231	-	142.34
1984	-	733.76	0.284	-	208.38	0.194	-	100.77
1985	-	735.55	0.247	-	1161.68	0.137	1,000.32	2,975.46

$$\begin{aligned}
 & \text{B/C at 15\%} \\
 & = \frac{B}{C_0} \\
 & = \frac{3,593.29}{1,050} \\
 & = 3.42
 \end{aligned}$$

TABLE A-2

Changes in Socio-Economic Characteristics
Road No. 1

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
1. <u>Transportation Services</u>				
a. <u>Number of Units</u>				
1) Jeepney	0	5	5	
2) Tricycles	0	20	20	
3) Cargo Trucks	5	25	20	400
4) Total (all vehicle types)	5	50	45	900
b. Number of Operators	5	30	25	500
c. Passenger Charges (P/Km.)	0.12	0.06	(0.06)	(50)
2. <u>Production</u>				
a. <u>Average Annual Production</u> (Cavans Per hectare)				
1) Rice (Palay)	64	73	9	14
b. <u>Farmgate Prices/Market Prices</u> (Pesos per kilogram)				
1) Rice (Palay)	0.75/0.95	0.95/1.05	0.20/0.10	27/10
c. Production Cost -(Peso Per Hectare)	527	505	(22)	(4)
3. <u>Marketing Practices - Percentage of Production Volume</u>				
a. Sold at Farm	68	30	(38)	
b. Sold at Market	32	70	38	
4. <u>Average Gross Annual Household Income</u>				
a. Farming	6461	7679	1218	19
b. Non-Farming	2429	3158	729	30
c. Total	8890	10837	1947	22
5. <u>Economic Enterprises</u>				
a. Sari-sari stores	5	12	7	140
b. Drugstore	1	1	0	0
c. Tailoring/Dress Shop	1	1	0	0
d. Rice/Corn Mills	8	10	2	25
e. Markets	1	1	0	0
f. Total	16	25	9	56
6. <u>Mobility</u>				
a. Frequency of trips (days per year)	56	98	42	75
b. Reason for trips - Percentage				
1. Economic	78	70	(8)	
2. Social	22	30	8	

Table A-2
Page 2

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
7. <u>Educational Services</u>				
a. Number of educational institutions	2	2	0	0
b. Enrollment	985	1042	57	6
c. Drop-out/transferees to outside schools	40	15	(25)	(62.5)
d. Average number of household members enrolled	2.6	2.8	0.2	7.7
8. <u>Health Services</u>				
a. Number of medical facilities	0	1	1	
b. No. of health programs	1	2	1	100
c. Frequency of consultation with medical personnel (by households per year)				
1. Doctors/nurses/dentists	6.3	9.2	2.9	46
2. Herbolarios	9	8	(1)	(11)
d. Place of consultation (before/after)				
1. At barrio/residence	60	52	(8)	
2. At Poblacion	40	48	8	
9. <u>Government Services Availability</u>				
a. <u>Farm Management Technicians</u>				
1. Number	1	3	2	200
2. Frequency of service (visits/year)	26	156	130	500
b. <u>Medical Personnel</u>				
1. Number	2	3	1	50
2. Frequency of Service (visits/year)	12	52	40	333
10. <u>Recreation</u>				
a. <u>Frequency of Recreational activities in the area</u>				
1. fiestas	1	2	1	100
2. dances	1	2	1	100
3. athletic competition	1	1	0	0
4. musical competitions	1	1	0	0
5. Total	4	6	2	50
b. Number of recreational facilities	2	5	3	150
c. Frequency of households' engagement in recreational activities (visits per year)	42	58	16	38

APPENDIX B

ALCALA-MONCADA ROAD
PANGASINAN PROVINCE
PROFILE OF ROAD NO. 2

The Alcala-Moncada Road is an inter-provincial road connecting two municipalities of the provinces of Pangasinan and Tarlac, namely; Alcala and Moncada, respectively. It is located, as shown in Map B, on the southern part of Pangasinan, traversing a relatively flat to rolling terrain. This road provides the shortest route to the municipality of Moncada from the towns of Alcala, Bautista and Bayambang.

The road starts at the junction with the Sto. Tomas-Bayambang provincial road (km. 182.075) near the poblacion of Alcala, crosses the Tarlac-Pangasinan boundary at km. 189.032 and ends at the poblacion of Moncada.* Along the road was a 12-meter timber bridge which badly needed replacement; ₱2,500 was spent annually to maintain the bridge and at least every fourth year it would have had to be rebuilt at about ₱22,000.

The area of influence of the road covers the 3 barrios of Bersamin, San Pedro Apartado and San Pedro Eli, with a combined total population of 6,912 (1,052 household) as of 1977. The 3 barangays have a total area of 1,530 hectares, of which 780 are devoted to rice, 350 to vegetables, 250 to other crops and 150 idle; rice, corn, tobacco, vegetables and fruits are the major marketable crops. Alcala town is the market center for the three barangays, linked to larger market centers like San Carlos and Dagupan City. Alcala also serves as the focal for the health, educational and recreational needs of the people.

The province feasibility study for this road, reported that: "The major benefits expected from the road improvement are user cost savings resulting from reduction in vehicle operating cost and as incremental production in palay and vegetable induced by the improved farm practice due to more frequent visits of farm technicians. The major social benefit expected from this project is easier access to health, education and market facilities in Alcala and Moncada. Additionally, the road improvement is likely to attract additional transport owners and operators who are not serving the area now due to the bad conditions". The project had a benefit-cost ratio of 2.43 and an IRR of 30%. Computations are shown in the attached Table B-1.

Implementation of this road improvement involved 3 phases: Phase I saw the upgrading of the 4.4 kilometer earth road to one of all-weather surface; the construction ran from 22 October 1975 to 6 October 1976, at a total cost of ₱565,404, of which ₱390,000 was reimbursed. Phase II

* The road section within the province of Pangasinan was implemented under the RRP since Tarlac was not a member of the Program in 1975; thus only the road section in Pangasinan is the subject of this evaluation study.

consisted of an additional 2.55 kilometer gravel road section, the work encompassed from 30 December 1976 to 24 March 1977 at a total cost of ₱468,350 with a ₱321,000 reimbursement. Replacement of the 12-meter timber bridge by an RCDG was the final touch, costing ₱249,768 (₱180,000 reimbursement). This last phase was begun on 30 December 1976 and completed 31 May 1977. The average daily traffic count during March 1978 was 349.

In addition to the road map and the B/C computations in Table B-1, a third attachment. Table B-2, gives a summary of socio-economic data collected on this road for the present study.

MAP B - showing the location of Road No. 2

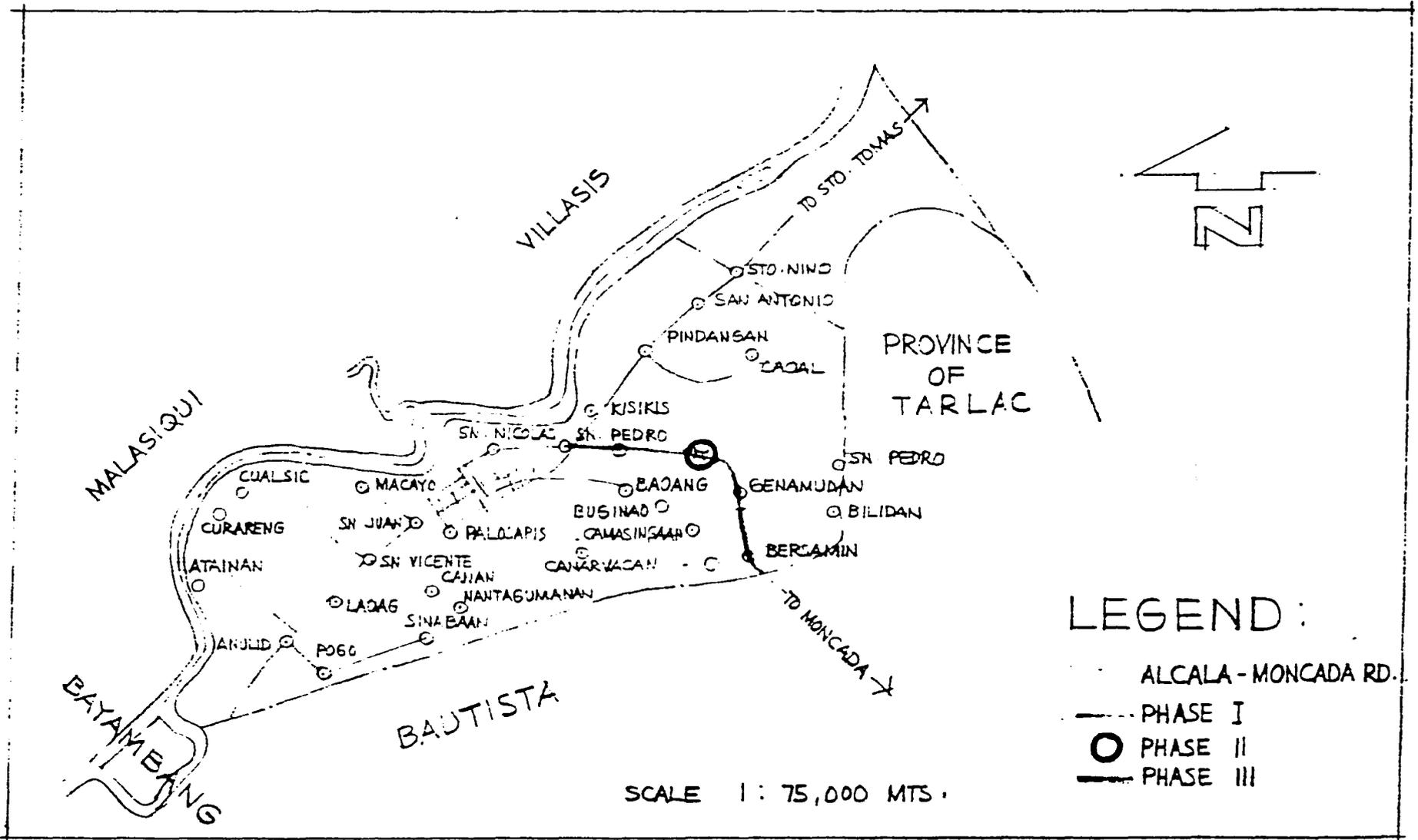


TABLE B-1
COMPUTATION WORKSHEET FOR B/C
(IN THOUSAND PESOS)

AICALA-MONCADA ROAD

	0	1	2	3	4	5	6	7	8	9	10	B	C	KC
Incremental Production	36	:218	:247	:312	:428	:514	:672	:840	:1055	:1310	:1616			
Transport Cost Savings		:21.0	:21.4	:21.7	:22.1	:22.4	:22.7	:23.1	:23.6	:23.9	:24.3			
Maintenance Savings on Bridge		:2.5	:2.5	:2.5	:22.0	:2.5	:2.5	:2.5	:22.0	:2.5	:2.5			
Remaining Utility Value (Bridge)	36													
Total Benefits	36	:241.5	:297.9	:366.2	:472.1	:568.9	:697.2	:865.6	:1100.6	:1336.4	:1672.8			
Discount Factor (15%)		:.87	:.77	:.66	:.57	:.50	:.43	:.36	:.33	:.25	:.21			
Discount Benefits	36	:210	:229	:242	:269	:284	:300	:329	:363	:334	:351	:327	:1062	
Maintenance Cost After Construction		:26	:26	:26	:26	:40	:40	:40	:44	:44	:44			
Discount Factor (15%)		:.87	:.77	:.66	:.57	:.50	:.43	:.36	:.33	:.25	:.21			
Discount Cost		:22.6	:20.9	:17.2	:14.8	:12.0	:12.0	:8.2	:14.5	:11.0	:7.8			:76

$$B/C = \frac{2047}{1662-145} = \frac{2047}{1517} = 1.35$$

Cost Benefits	36	:215.5	:271.9	:340.2	:446.1	:528.9	:677.2	:865.6	:1056.6	:1290.4	:1628.8			
Discount Factor (15%)		:.87	:.77	:.66	:.57	:.50	:.43	:.36	:.33	:.25	:.21			
Discounted Net Benefits (15%)		:187	:209	:225	:257	:264	:283	:314	:350	:323	:342	:351	:1062	:1689
Discounted Factor (40%)	1	:.72	:.51	:.36	:.26	:.19	:.13	:.095	:.68	:.428	:.274			
Discounted Net Benefits (40%)		:155	:139	:112	:166	:100	:85	:78	:72	:62	:55	:984	:1062	:78

$$IRR = 15 + (.40 - .15) \frac{(1689)}{1689+78}$$

$$= 15 + .25 (1689) = .40 (.955) = .3800 = 38\%$$

TABLE B-1
CHANGES IN SOCIO-ECONOMIC CHARACTERISTICS
ROAD NO. 2

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- FERENCE	PER- CENTAGE
1. Transportation Services				
a. Number of Units				
1) Jeepney	3	30	27	900
2) Tricycles	5	25	20	400
3) Buses	0	2	2	
4) Cargo Trucks	2	3	1	50
5) Total (all vehicle types)	10	59	49	490
b. Number of Operators	6	15	9	150
c. Passenger Charges (P/Km)	0.25	0.07	(0.18)	(72)
2. Production				
a. Average Annual Production -Per Hectare				
1) Rice (Palay) - cavans	43	64	21	49
2) Corn - cavans	17	23	6	35
3) Vegetables (Mungo) - cava.	217	367	150	69
4) Root Crops (Peanuts) cava.	19	23	4	21
5) Tobacco - kilograms	666	862	196	29
b. Farmgate Prices/Market Prices (Pesos)				
1) Rice (Palay) - per kilo	.70/.90	.95/1.05	.25/.15	36/17
2) Corn - per kilo	.30/.50	.42/.65	.12/.15	40/30
3) Vegetable (Mungo) per ganta	7.00/10.00	10.00/12.00	1/2	43/20
4) Root crops (peanuts) cavan	40/60	60/70	20/10	50/17
5) Tobacco - per kilogram	1.50/2.00	3.50/3.75	2.00/1.75	133/88
c. Production Cost (P/ha.)	283	420	137	48
3. Marketing Practices - Percentage of Production Vol.				
a. Sold at Farm	67	42	(25)	
b. Sold at Market	33	58	25	
4. Average Gross Annual House- hold Income				
a. Farming	2,985	4,100	1,118	37
b. Non-Farming	2,955	6,055	3,100	105
c. Total	5,940	10,158	4,218	71

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- PERENCE	PER- CENTAGE
5. Economic Enterprises				
a. Sari-sari stores	3	11	8	267
b. Drug Store	1	1	0	0
c. Tailoring/Dress Shop	0	1	1	
d. Rice/Corn Mills	1	2	1	100
e. Markets	1	1	0	0
f. Total	6	16	10	167
6. Mobility				
a. Frequency of Trips	53	242	189	357
b. Reason for trips (before/ after) - percentage				
1) Economic	88	75	(13)	
2) Social	12	25	13	
7. Educational Services				
a. Number of educational insti- tution	2	2	0	0
b. enrolment	426	461	35	8
c. Drop-out transferees to out- side schools	21	10	(11)	(52)
d. Ave. number of household members enrolled	2.0	3.0	1	50
8. Health Services				
a. Number of medical facilities	0	1	1	
b. No. of health programs	0	1	1	
c. Frequency of Consultation with medical personnel (by households)				
1) doctors/nurses/dentists	20	49	29	145
2) herbolarios	12	12	0	0
d. Place of consultation (before/ after)				
1) at barrio/residence	72	69	(3)	
2) at poblacion	28	31	3	
9. Government Services Availability				
a. Farm Management Technicians				
1) Number	2	4	2	100
2) Frequency of Service	12	52	40	333
b. Medical Personnel				
1) Number	1	2	1	100
2) Frequency of Service	12	104	92	767
10. Recreation				
a. Frequency of Recreational Activities in the area				
1) Fiestas	1	2	1	100
2) Dances	1	3	2	200

DESCRIPTION OF DATA	BEFORE	AFTER	DIF- FERENCE	PER- CENTAGE
3) athletic competition	1	2	1	100
4) musical competition	2	3	1	50
5) total	5	10	5	100
b. Number of Recreational Facilities	3	5	2	67
c. Frequency of Households Engagement in Recreational activities	28	51	23	82
11. Communications Media				
a. Number of Publications reaching the area	1	7	6	600
b. Frequency of availability	12	312	300	2,500

APPENDIX C

APPENDIX C

BALAOAN-SANTOL ROAD
LA UNION PROVINCE
PROFILE OF ROAD NO. 3

The Balaoan-Santol Road connects two northern municipalities of the province of La Union, namely: Balaoan and Santol. The road cut through an agricultural area featuring rolling terrain and runs in a general southeasterly direction. (See Map C for location of road). This road is the only access of the residents of Santol to the rest of the province.

The road begins at the junction with the Manila North Road (a national road) at kilometer 299.02, a few meters from the Balaoan Public Market and ends at km. 306.52 in barrio Coro-oy, Santol Municipality. This partly asphalted (3.5 kilometers of which was deteriorated) and partly gravel road entailed an annual maintenance cost of ₱56,000.

The road's influence area includes six barangays: Butubut Este, Butubut Weste, Butubut Sur and Pagieddogan in Balaoan and two more in Santol. It has an area of 1,125 hectares with a population of 8,415 (1,704 households). The economy of the influence area is based on agriculture. Rice is the staple crop while tobacco is considered the cash crop. Vegetables are raised primarily for household consumption with some small surplus being sold in the markets. Santol and Balaoan are market and human service centers for those living near the road. However a number of rural health units and elementary schools are located in barrios within the influence area of the road.

The road's soaring maintenance cost coupled with the road's importance as the only access to and from the area impelled improvement. In 1975, when this project was being considered for implementation under the Rural Roads Program the province feasibility study reported that:

"Expected outputs from the project will be reduced maintenance cost on the part of provincial government, and traffic cost savings on the part of populace in the influence area and transport owners and operators.

There will also be social benefits to be derived from the project, though unquantifiable. Some of the social benefits will be (a) increase in frequency of visits by the extension workers of the Bureau of Agricultural Extension in the influence area thereby increasing agricultural production; (b) improved health conditions of the inhabitants due to increased frequency of social

workers of the Department of Social Welfare and Department of Public Health, (c) increased literacy rate especially those from Santol as they will be able to communicate with ease to the municipality of Balaoan, considered a center of learning in the northern part of the province.

Other benefits will be the good impression among the populace of the highland municipalities on the eastern part of the province that the present provincial administration is concerned on their economic and social upliftment; and the pride of the PEO that the office can implement road building without the external aid from the other national engineering offices.*

Improvement involved widening and raising the road bed, installation of cross drainage, reparation of the previously constructed road and provision of 1.5 meter shoulders along both sides of the road. The project was implemented in two phases: Phase I (4.50 kilometer gravel surfacing) was started on 1 April 1975 and completed on 31 Dec. 1976 at a total cost of P896,000 (P587,000 reimbursed), while Phase II (3.00 kilometer gravel surfacing) was initiated on May 2, 1976 and completed on May 15, 1977, entailing a total cost of P572,000, P204,000 being reimbursed to the province.

In addition to the road map and the B/C computations in Table C-1, a third attachment, Table C-2, gives a summary of socio-economic data collected on this road for the present study.

* Taken from the Road Feasibility Study Report which was jointly prepared by La Union's Provincial Engineer's Office and the Provincial Development Staff.

MAP C - SHOWING THE LOCATION OF ROAD NO. 3

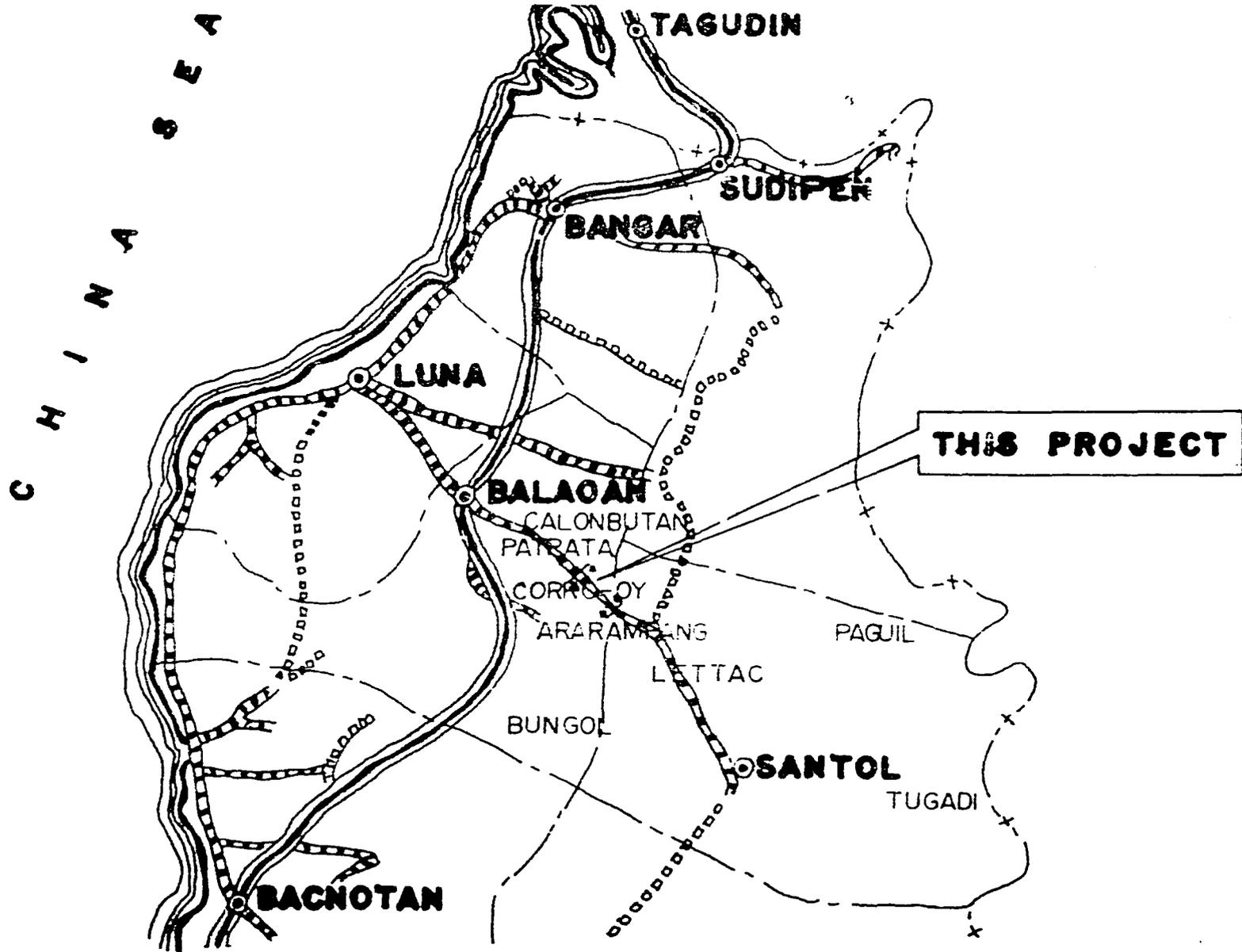


TABLE C

INTERNAL RATE OF RETURN
BENEFIT/COST RATIO

Year	COSTS (FOOD)		BENEFITS			INCREMENTAL NET BENEFIT			
	Improvement Cost	Cost Savings	Cost and savings	I Maint. Cost	Gross	'benefits	'Present Value	'Net present	'Net Present
	Cost	Pass. Traffic	Pop. and Av. red. rel.	Savings	Benefits	'cash flow	'at 15%	'value at 18%	'value at 16%
0	-								
1	-	69.36	25.84	34.32	130.02	130.02	173.12	110.18	112.08
2	-	71.29	26.33	34.32	131.94	131.94	99.12	94.76	98.05
3	-	72.23	26.85	34.32	135.37	135.37	89.07	82.39	86.72
4	-	75.58	27.37	34.32	137.27	137.27	78.52	70.80	75.81
5	-	78.00	27.91	34.32	140.23	140.23	69.69	61.29	66.76
6	-	80.36	28.47	34.32	143.15	143.15	61.82	53.01	58.75
7	-	82.80	29.02	34.32	146.14	146.14	54.96	45.88	51.71
8	-	85.28	29.63	34.32	148.96	148.96	48.71	39.62	45.43
9	-	87.70	30.24	34.32	152.26	152.26	43.37	34.32	40.03
10	-	90.52	30.87	34.32	155.71	155.71	38.26	29.76	35.29
11	-	92.90	31.52	34.32	158.74	158.74	34.13	25.70	31.02
12	-	95.30	32.15	34.32	162.31	162.31	30.35	22.27	27.34
13	-	98.70	32.87	34.32	165.19	165.19	26.76	19.20	24.04
14	-	102.12	33.58	34.32	170.02	170.02	23.97	16.75	21.28
15	-	104.92	34.30	34.32	173.54	173.54	21.17	14.49	18.74

Net Present Value = 13.18 (P99.57) (P26.87)

$$\text{Internal rate of return} = 15 + \frac{13.17}{13.17 + 26.87} (16 - 15) = 15.33\%$$

$$Pv^1 = NPV + K_c = 833.17$$

$$\frac{C}{C_0} = Pv^1 / K_0 = 833.17 / 820 = 1.02$$

TABLE C-2

Changes in Socio-Economic Characteristics
Road No. 3

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
1. <u>Transportation Services</u>				
a. <u>Number of Units</u>				
1) Jeepney	5	15	10	200
2) Tricycles	3	10	7	233
3) Buses	0	4	4	
4) Total (all vehicle types)	8	29	21	262
b. Number of Operators	3	9	6	200
c. Charges (₱/Km.)	0.33	0.18	0.15	(45)
2. <u>Production</u>				
a. <u>Average Annual Production Per Hectare</u>				
1) Rice (Palay) Cavans	34	38	4	11
2) Vegetables (Tomato) Kg.	40	90	50	125
3) Tobacco - Kilogram	453	540	87	19
4) Fruits (Banana)-Kilogram	491	549	58	12
b. <u>Farmgate Prices/Market Prices (Pesos)</u>				
1) Rice (Palay) - Per Kilo	0.80/0.85	1.00/1.10	0.20/0.25	25/29
2) Vegetable (Tomato) Kg.	0.70/1.50	1.40/2.00	0.70/0.50	100/33
3) Tobacco-Kilogram	2.50/2.75	3.00/3.50	1.00/0.75	40/27
4) Fruits (Banana) Per 100	2.00/8.00	5.00/10.00	3.00/2.00	150/25
c. Production Cost	152	161	9	6
3. <u>Marketing Practices - Percent of Production Volume</u>				
a. Sold at Farm	74	49	(25)	
b. Sold at Market	26	51	25	
4. <u>Average Gross Annual Household Income (Pesos)</u>				
a. Farming	3234	3328	94	3
b. Non-Farming	2826	3096	270	10
c. Total	6060	6424	364	6
5. <u>Economic Enterprises</u>				
a. Sari-sari stores	12	29	17	142
b. Drugstore	2	2	0	0
c. Tailoring/Dress Shop	2	3	1	50
d. Beauty Shop	1	1	0	0
e. Rice/Corn Mills	5	8	3	60
f. Markets	2	2	0	0
g. Total	24	45	21	88

Table C-2
Page 2

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
6. <u>Mobility</u>				
a. Frequency of trips	62	87	25	40
b. Reason for trips (before/after)				
1. Economic	66	56	(10)	
2. Social	34	44	10	
7. <u>Educational Services</u>				
a. Number of educational institutions	1	1	0	0
b. Enrollment	452	491	39	9
c. Drop-out transferees to outside schools	14	8	(6)	(43)
d. Average number of household members enrolled	1.6	1.7	0.1	6
8. <u>Health Services</u>				
a. number of medical facilities	1	5	4	400
b. No. of health programs	1	2	1	100
c. Frequency of consultation with medical personnel (by households)				
1. Doctors/Nurses/Dentists	15	23	8	53
2. Herbolarios	18	14	(4)	(22)
d. Place of consultation (before/after)				
1. At barrio/residence	59	46	(13)	
2. At poblacion	41	54	13	
9. <u>Government Services Availability</u>				
a. Farm Management Technicians				
1. Number	2	5	3	150
2. Frequency of service	52	156	104	200
b. Medical Personnel				
1. Number	2	3	1	50
2. Frequency of service	1	208	104	100
10. <u>Recreation</u>				
a. Frequency of Recreational Activities in the Area				
1. Fiestas	1	2	1	100
2. Dances	1	4	3	300
3. Athletic competition	1	3	2	200
4. Musical competitions	1	4	3	300
5. Total	4	13	9	225
b. Number of recreational facilities	4	5	1	25

Table C-2
Page 3

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
c. Frequency of Households' engagement in recreational activities	39	57	18	46
11. <u>Communications Media</u>				
a. Number of Publications	3	7	4	133
b. Frequency of availability	156	365	209	133

APPENDIX D

APPENDIX D

CULIS-PANDATUNG-SUMALO-SIBUL-DOÑA-SUPERHIGHWAY ROAD
BATAAN PROVINCE
PROFILE OF ROAD NO. 4

This is a major rural road of eight kilometers cutting across the recently completed four lane Bataan Superhighway, extending northwest to the Barangays of Pandatung, Sumalo and Sibul and gradually turning southward heading towards Barangay Doña. The road, completing an extended U shape, ends at the Bataan Superhighway. (See Map D for location of road).

Before improvement this earth road was in bad to very bad condition. It had no drainage system and was rough and dusty during the hot months. Alternately, it was muddy, slippery and almost impassable during the rainy season. An almost dilapidated 18 meter timber bridge grudgingly crossed the Doña river near the end of the road. Only a few vehicles serviced the area; farmers thus incurred very high transportation costs in bringing goods to the market, especially during the rainy months when vehicle operating costs became abnormally high and mechanical breakdowns were very frequent. When the road became impassable people either walked or used carabaos sleds as their means of transportation. But in most cases farmers let the perishable crops spoil.

The road's influence area covered five barangays: Culis, Pandatung and Sumalo in Hermosa, and Sibul and Doña in Orani with an area of 2,012 has. and a population of 1,738 comprising 348 households. The area is primarily agricultural with 55% planted to rootcrops, 15% to rice, 11% forest and idle lands; remaining hectarage is devoted to various crops, i.e., vegetables and fruits. Orani is the nearest market center; agricultural products eventually go to other coastal towns and ultimately to Manila.

The people's clamor for road improvement and the obvious deplorable condition placed this high on the province's priority list.* The project was completed in five phases as follows:

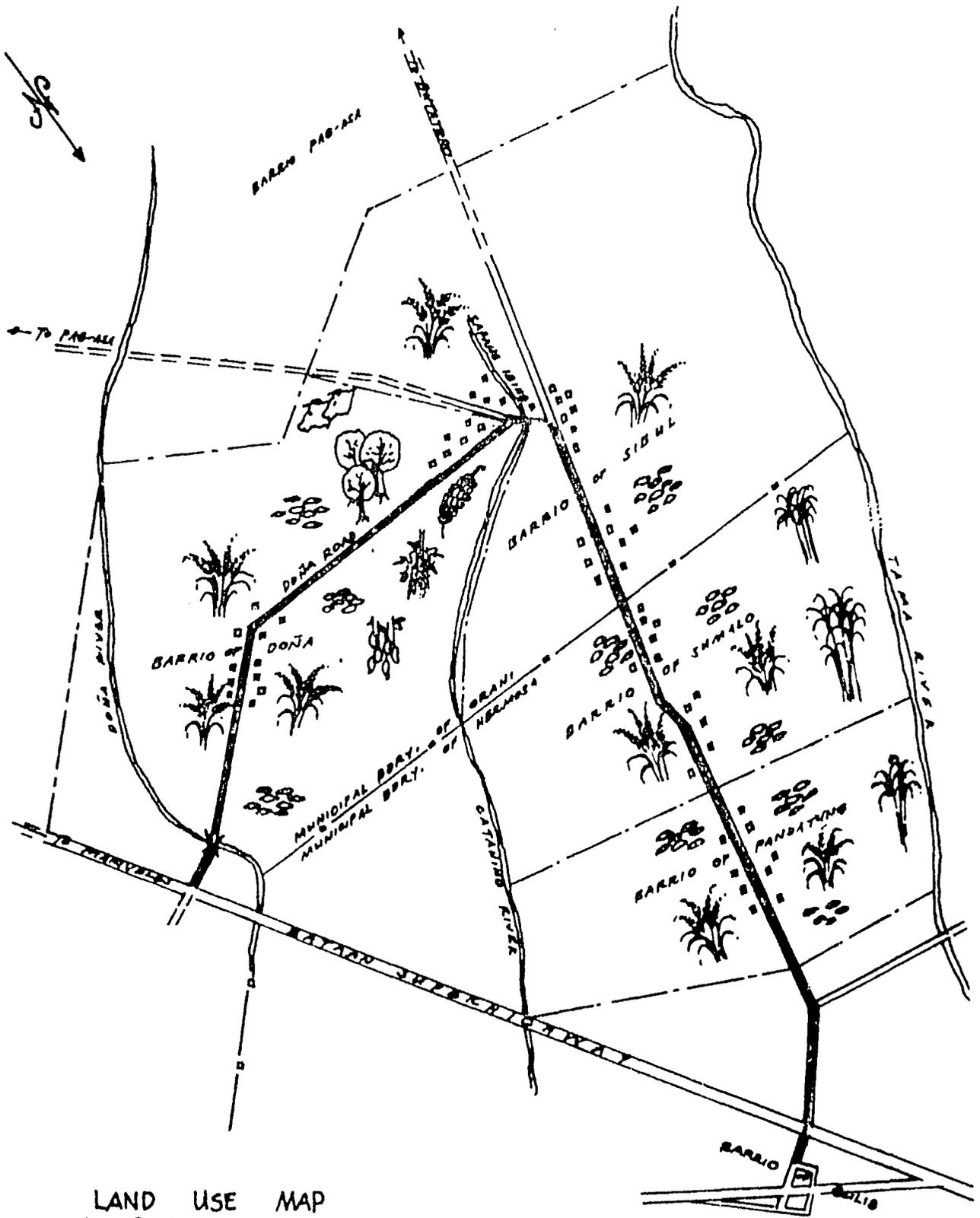
PHASE	SECTION	LENGTH	COST (P000)		DATE	
			TOTAL	FAR	STARTED	COMPLETED
1	Culis-Pandatung	2.26 Km.	362	253	11 Dec 75	28 Sep 76
2	Pandatung-Sumalo	2.00 Km.	358	238	15 Dec 75	31 Oct 76
3	Sumalo-Sibul-Doña	2.00 Km.	472	325	1 Mar 76	31 Dec 76
4	Doña-Highway	2.40 Km.	328.5	219	27 Dec 76	27 Jun 77
5	Doña Bridge	18.0 Km.	427.5	285	19 Jan 77	27 Jun 77

* This project has a B/C ratio of 1.7 and an IRR of 24.77%. Please refer to Table D-1 for a detailed analyses of these economic feasibility indicators.

The total cost of the project was ₱1,948,000 of which ₱1,320,000 (or 68%) was reimbursed to the province.

The completion of the project brought about a number of socio-economic as well as physical changes within the road's influence area. Table D-2 details these changes. One rather indirect effect of the project was the energization of the area by the Bataan Electric Cooperative (Batelco) towards the end of 1977 while a potable waterworks system was erected by the Bureau of Public Works in Barangay-Sumalo largely because the improved road increased the service area and induced more people to settle in the influence area of the road.

In addition to the road map and the B/C computations in Table D-1, a third attachment, Table D-2, gives a summary of socio-economic data collected on this road for the present study.



LAND USE MAP
CULIS - PANDATUNG - SUMALO
SIBUL - DOÑA - SUPERHIGHWAY
MULTI-PHASED PROJECT
NET LENGTH - 10.06 KM.
SCALE 1:40,000

TABLE D-1a
COMPUTATION FOR E/C
(In thousand pesos)

	PRESENT	1	2	3	4	5	6	7	8	9	10	B	C	So	E/C
Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986					
Gross Benefit															
1. Incremental Products		250	432	623	740	92	1116	1721	1961	1961	1961				
2. Savings in Transport cost		8	8.6	9	9.3	9.6	10	10.3	10.7	11	11.3				
3. Salvage value	106.6														
E. Total Gross Benefits	106.6	258	440.6	632	749.3	911.6	1256	1731.3	1971.7	1972	1972.3				
G. Discounting Factor @ 15%	-	.87	.76	.66	.57	.50	.43	.38	.33	.28	.23				
D. Discounted gross benefit	106.6	224	335	417	427	456	534	658	650	532	454				1905.4
B. Annual Maintenance Cost	-	21.4	42.8	64.2	85.6	107	107	107	107	107	107				
F. Discounting Factor @ 15%		.87	.76	.66	.57	.50	.43	.38	.33	.28	.23				
C. Discounted Cost		18.6	32.5	42.4	48.8	53.5	46	40.7	35.3	30	25			372.8	2501

TABLE D-1b
COMPUTATION FOR IRR
(In thousand pesos)

YEAR	PRESENT	1	2	3	4	5	6	7	8	9	10	PV	Ks	NPV	IRR
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986					
A. Gross Benefit															
1. Incremental Production		250	482	523	740	902	1446	1721	1961	1761	1961				
2. Savings in transport cost		8	8.6	9	5.3	9.6	10	10.3	10.7	11	11.3				
3. Salvage in value	106.6														
B. Total Gross Benefit	106.6	258	490.6	532	749.3	911.6	1456	1731.3	1971.7	1972	1972.3				
C. Annual Maintenance Cost	-	21.4	42.8	64.2	85.6	107	127	127	127	127	127				
D. Net Benefits	106.6	236.6	397.8	567.8	664.7	804.6	1329	1604.3	1844.7	1845	1845.3				
E. Discounting Factor at 15%	-	.87	.76	.66	.57	.50	.43	.38	.33	.28	.25				
F. Discounted Net Benefits at 15%	106.6	205.2	302.5	374.7	390.3	402.3	580	617	615	522	489	4545	1901	2044	
G. Discounted Factor at 25%		.8	.64	.51	.41	.33	.26	.21	.17	.15	.11				
H. Discounted Net Benefits at 25%		164.8	254.5	270	280.7	265.3	380.7	341.1	317	242.5	205.2	2431.0	2501	17.1	2044

TABLE D-2

Changes in Socio-Economic Characteristics
Road No. 4

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
1. <u>Transportation Services</u>				
a. <u>Number of Units</u>				
1) Jeepney	3	8	5	167
2) Tricycles	3	10	7	233
3) Cargo Trucks	2	5	3	150
4) Total (all vehicle types)	8	23	15	187
b. Number of Operators	5	14	9	180
c. Charges (₱/Km.)	0.17	0.12	(0.05)	(29)
2. <u>Production</u>				
a. <u>Average Annual Production Per Hectare</u>				
1) Rice (Palay) - Cavans	31	37	6	19
2) Corn - Cavans	18	22	4	22
3) Vegetable (Tomato)-Kgms.	358	518	160	45
4) Root Crops (Camote/Casava) Cavans	70	78	8	11
5) Fruits (Mango)-kilograms	300	609	309	103
6) Coconut - Kilograms	300	500	200	67
b. <u>Farmgate Prices/Market Prices (Pesos)</u>				
1) Rice (Palay) - Per Kilo	0.75/0.90	1.00/1.05	0.25/0.15	33/17
2) Corn - Per Kilo	0.40/0.50	0.55/0.60	0.15/0.10	38/17
3) Vegetable (Tomato)-Per Kilo	0.80/1.50	1.40/1.90	0.60/0.40	75/27
4) Root Crops - Per Cavan	15.00/18.00	18.00/21.00	3.00/3.00	20/17
5) Fruits (Mango)-Per Hundred	23.00/30.00	31.00/37.00	9.00/7.00	39/23
6) Coconut - Per Kilo	1.60/2.00	2.30/2.45	0.70/0.45	20/17
c. Production Cost	314	388	74	24
3. <u>Marketing Practices - Percentage of Production Volume</u>				
a. Sold at Farm	81	55	(26)	
b. Sold at Market	19	45	26	
4. <u>Average Gross Annual Household Income (Pesos)</u>				
a. Farming	2206	2675	469	21
b. Non-Farming	2860	3454	594	21
c. Total	5066	6129	1063	21

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE
5. <u>Economic Enterprises</u>				
a. Sari-sari stores	4	13	9	225
b. Drugstore	1	1	0	0
c. Tailoring/Dress Shop	1	3	2	200
d. Beauty Shop	0	1	1	
e. Rice/Corn Mills	3	5	2	67
f. Storage Facilities	1	1	0	0
g. Markets	1	1	0	0
h. Total	11	25	14	127
6. <u>Mobility</u>				
a. Frequency of trips	56	95	43	77
b. Reason fro trips				
1. Economic	63	46	(17)	
2. Social	37	54	17	
7. <u>Educational Services</u>				
a. Number of educational institutions	2	2	0	0
b. enrollment	412	442	30	7
c. Drop-out transferees to outside schools	9	5	(4)	(44)
d. Ave. number of household members enrolled	2.9	3.1	0.2	7
8. <u>Health Services</u>				
a. Number of medical facilities	1	5	4	400
b. No. of health programs	1	2	1	100
c. Frequency of consultation with medical personnel (by households)				
1. Doctors/nurses/dentists	11	23	12	109
2. Herbolarios	32	13	(19)	(59)
9. <u>Government Services Availability</u>				
a. <u>Farm Management Technicians</u>				
1. Number	1	1	0	0
2. Frequency of service	52	156	104	200
b. <u>Medical Personnel</u>				
1. Number	1	3	2	200
2. Frequency of service	104	208	104	100
10. <u>Recreation</u>				
a. <u>Frequency of Recreational Activities</u>				
1. fiestas	1	2	1	100
2. dances	1	3	2	200
3. athletic competitions	1	3	2	200
4. musical competitions	1	2	1	100
5. Total	4	10	6	150

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
b. Number of Recreational Facilities	2	5	3	150
c. Frequency of households' engagement in recreational activities	48	148	100	208
11. <u>Communications Media</u>				
a. Number of publications reaching the area	1	6	5	500
b. Frequency of availability	26	260	234	900

APPENDIX E

APPENDIX E

CASTILLEJOS-NAGBAYAN ROAD
ZAMBALES PROVINCE
PROFILE OF ROAD NO. 5

The Castillejos-Nagbayan Road starts at the junction with the Zambales-Pangasinan National Road (km. 146.26) and ends at barrio Nagbayan (km 152.00). This road serves as access for the barrios of Looc, San Agustin and Angeles to the rest of the coastal municipalities in Zambales. The road was in a very bad condition with a width of only 4 meters and a bad drainage system, which kept the roadbed under water during the rainy season.

The road's influence area covers two relatively heavily populated barrios: San Agustin and Nagbayan with a population of 3,501 (566 households). The area is agricultural with rice, root crops and vegetables as the major marketable crops. Agricultural produce is brought to the poblacion of Castillejos, the nearest market center. The produce is then brought to Olongapo and shipped to Manila. Middlemen usually purchased the produce at the farm and brought it to the market centers, depriving the farmers of a reasonable price. But poor road conditions offered no other choice. Two elementary schools provided the immediate educational needs of the people, while for health care, the people went to Castillejos, five kilometers away.

The project began at the poblacion of Castillejos at km. 147.26, ending at Nagbayan (km. 152.82) - a total length of 4.56 kilometers. Construction started on 1 October 1975 and was completed on 30 September 1976, entailing a cost of ₱748,000 with the province receiving a reimbursement of ₱322,822. The road was converted into an all-weather road by raising the roadbed 35 cm., installing side ditches and culvert pipes and surfacing the road with a gravel course. The road right of way was also widened to 15 meters anticipating possible future widening of the road to accommodate a larger volume of traffic.

The project feasibility study states: "...The improvement of the road is a must to avoid losses on the part of the farmers. Those losses are due to the absence of a reliable means of transport for bringing the produce to the market and the very low buying price dictated by the middlemen. Improved quality of produce is likewise anticipated due to the expected increase in visits of agriculture extension workers. Reduced transportation cost is to be expected since vehicle operating costs will be lower. The frequency agencies is also expected to increase..." Table E-2 shows how well the benefits expected were actually realized, reflecting the socio-

economic conditions before and after the implementation of the project. Further the same feasibility study computed the B/C ratio and IRR of this project as 1.22 and 19.6%, respectively. The detailed computation on B/C is reflected in Table E-1.

MAP F - SHOWING LOCATION OF ROAD NO. 5

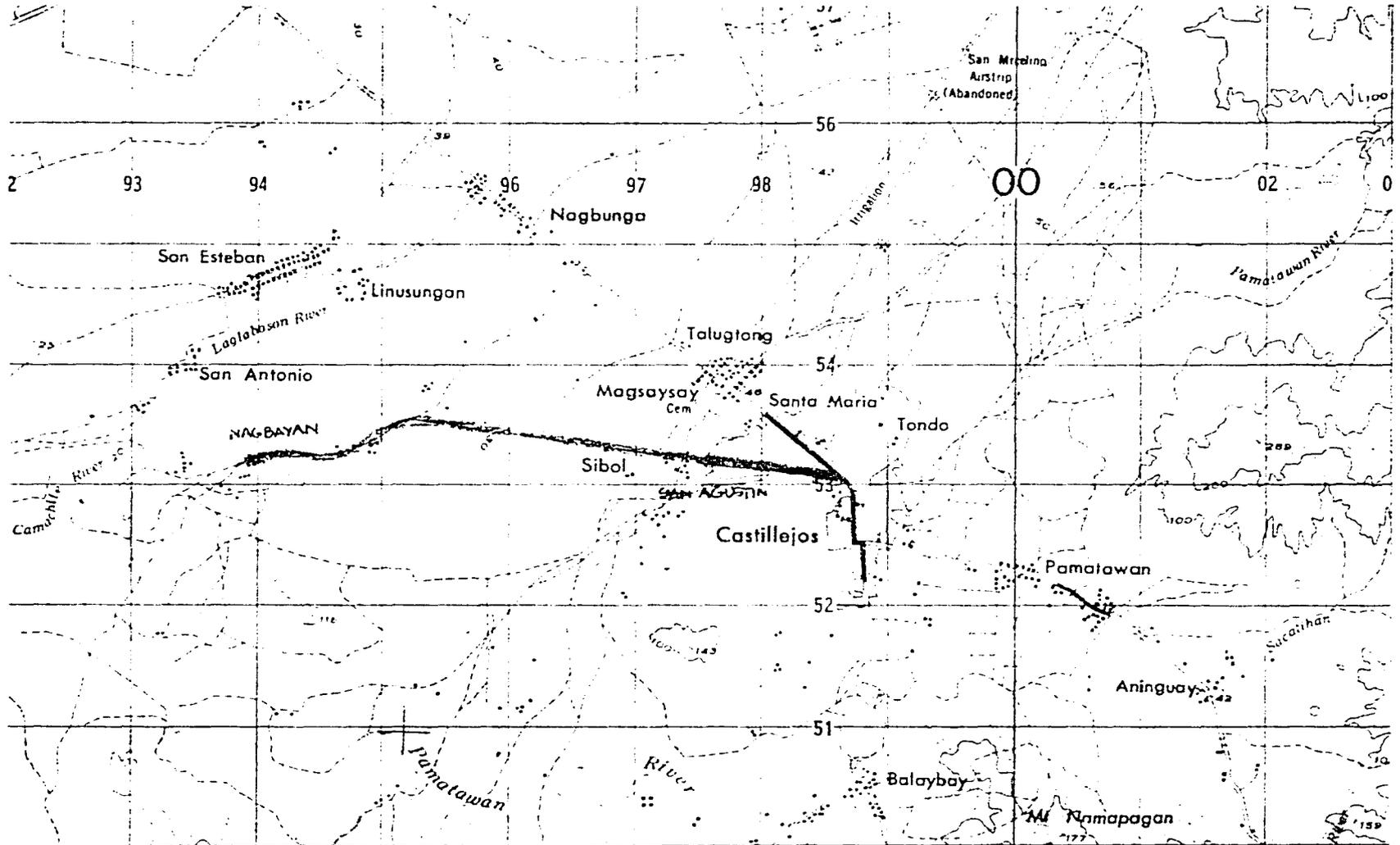


TABLE E

BENEFIT COST RATIO AND INTERNAL RATE OF RETURN

	1	2	3	4	5	6	7	8	9	10	B	C	ko	B/C	PV	F/
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985						
A. Annual Gross Benefits																
1. Incremental Production	-	-	75	94	177	146	183	183	183	183						
2. Savings in Transport COST	15.8	16.3	16.8	17.3	17.8	17.9	19.4	20	21							
a. Passenger																
b. Truck	4.0	4.2	4.4	4.5	4.6	4.7	4.9	5	5.1							
3. Maintenance	31	31														
B. TOTAL GROSS BENEFITS	50.8	51.5	96.1	155.7	139.3	168.9	205.6	207.3	268	209.1						
Discounting Factor 15%	.67	.76	.66	.57	.50	.43	.36	.33	.28	.25						
C. DISCOUNTED GROSS BENEFIT	46.2	39.14	65.9	59.6	72.6	74.4	68.4	58	63.7	619.3						
D. ANNUAL MAINTENANCE	0	0	31	31	31	31	31	31	31	31						
Discount Factor 15%	.187	.76	.66	.57	.50	.43	.36	.33	.38	.25						
E. Disc. MAINTENANCE COST	0	0	39.5	17.7	15.5	12.4	11.8	10.2	10.2	7.8			104	5405	1.32	2
F. NET BENEFITS	50.8	51.5	65.1	84.7	108.3	137.9	175.6	176.3	177	173.1						
Discount Factor at 15%	.87	.76	.66	.57	.50	.43	.36	.33	.28	.25						
G. DISC. BENEFIT AT 15%	44.2	.69	43	48.3	54.2	59.3	63.2	58.2	49.6	44.5					503	6
H. DISCOUNT BENEFIT AT 20%	42.83	35.5	37.88	40.78	43.40	45.53	49.28	40.5	31.19	28.5					195	8

TABLE E-2

Changes in Socio-Economic Characteristics
Road No. 5

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
1. <u>Transportation Services</u>				
a. <u>Number of Units</u>				
1) Jeepney	0	5	5	
2) Tricycles	6	19	13	217
3) Cargo Trucks	6	5	(1)	(17)
4) Total (all vehicle types)	12	29	17	142
b. Number of Operators	6	20	14	233
c. Charges (P/Km.)	0.23	0.14	(0.09)	(39)
2. <u>Production</u>				
a. <u>Average Annual Production</u> <u>- Per Hectare</u>				
1) Rice (Palay) - Cavans	50	55	5	10
2) Corn - Cavans	22	29	7	32
3) Vegetables (Mango) Kgs.	105	180	75	71
b. <u>Farmgate Prices/Market Prices</u> <u>(Pesos)</u>				
1) Rice (Palay) per kilo	0.70/0.90	0.80/1.00	0.10/0.20	14/22
2) Corn - Per Kilo	0.20/0.40	0.32/0.60	0.12/0.20	60/50
3) Vegetable (Mango) Per Ganta	6.50/9.50	10.00/11.50	3.50/2.00	54/21
c. Production Cost	196	230	34	17
3. <u>Marketing Practices - Percentage</u> <u>of Production Volume</u>				
a. Sold at Farm	53	15	(38)	
b. Sold at Market	47	85	38	
4. <u>Average Gross Annual Household</u> <u>Income</u>				
a. Farming	3229	4042	813	25
b. Non-Farming	769	1147	378	49
c. Total	3998	5189	1191	30
5. <u>Economic Enterprises</u>				
a. Sari-sari stores	2	12	10	500
b. Tailoring, Dress Shop	0	1	1	
c. Rice/Corn Mills	2	2	0	100
d. Markets	1	1	0	0
e. Total	5	18	13	260

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
6. <u>Mobility</u>				
a. Frequency of trips	48	77	29	60
b. Reason for trips - Percentage				
1. Economic	73	52	(21)	
2. Social	27	48	21	
7. <u>Educational Services</u>				
a. Number of educational institutions	2	3	1	50
b. Enrollment	515	577	62	12
c. Drop-out transferees to outside schools	30	15	(15)	(50)
d. Average number of household members enrolled	1.5	2.0	0.5	33
8. <u>Health Services</u>				
a. Number of medical facilities	0	2	2	
b. No. of health programs	0	2	2	
c. Frequency of consultation with medical personnel (by households)				
1. Doctors/nurses/dentists	15	27	12	80
2. Herbolarios	23	10	(13)	(56)
d. Place of consultation (before/after)				
1. At barrio/residence	73	56	(17)	
2. At poblacion	27	44	17	
9. <u>Government Services Availability</u>				
a. <u>Farm Management Technicians</u>				
1. Number	3	7	4	133
2. Frequency of service	52	208	156	300
b. <u>Medical Personnel</u>				
1. Number	2	5	3	150
2. Frequency of service	52	208	156	300
10. <u>Recreation</u>				
a. Frequency of Recreational Activities in the area				
1. Fiestas	0	1	1	
2. Dances	0	2	2	
3. Athletic competitions	1	3	2	200
4. Musical competitions	0	1	1	
5. Total	1	6	5	600

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
b. Number of recreational facilities	2	6	4	200
c. Frequency of households' engagement in recreational activities	28	49	21	75
11. <u>Communications Media</u>				
a. Number of publications reaching the area	1	3	2	200
b. Frequency of availability	12	208	196	1633

APPENDIX F

APPENDIX F

EL SALVADOR-KALABAYLABAY ROAD
MISAMIS ORIENTAL PROVINCE
PROFILE OF ROAD NO. 6

The El Salvador-Kalabaylabay Road is located in the municipality of El Salvador, province of Misamis Oriental. It is a part of a circumferential road from the municipality of Laguindingan passing through the barangays of Lourdes, Kalabaylabay, Cugon and finally ending at the poblacion of El Salvador. Traversing a generally flat terrain, this road section is 6.84 kilometers long with an earth surface.

The road begins at the poblacion of El Salvador near the junction - with the Iligan-Butuan Road (a 300 kilometer road project being undertaken through Asian Development Bank) at km. 109.54 and ends at the barrio Kalabaylabay, km. 116.38. The road was very narrow, full of pot-holes and exceedingly slippery during the rainy season.

Five barangays comprise the road's influence area: the poblacion (El Salvador) and the barangays of Cugon, Kibonbon, Balisong, and Kalabaylabay with land area of 1,360 hectares supporting 2,013 people (318 households). Agriculture is the main occupation with corn, copra, tobacco as the primary agricultural products. Cows and pigs are raised for both home consumption and commercial sale. Produce is brought to the poblacion of El Salvador then transferred to Cagayan de Oro City, the commercial and political capital of Misamis Oriental Province.

The implementation of the 6.84 kilometer road project was completed in two phases during the Special Infrastructure Program or Pre-RRP project.* The first phase was the concreting of a 2.64 kilometer section at a total cost of ₱304,191 of which ₱80,000 was reimbursed to the province. Started on 11 December 1974, this was completed on 10 May of the following year. Phase II was the upgrading of the 4.2 kilometer earth road to a gravel surfacing at a cost of ₱1,125,000 (with a ₱890,000 reimbursement) from 13 May 1975 to 29 February 1976.

The impact of this project two years after it was completed in Table F-1, showing the socio-economic conditions before and after the completion of the said project. One outstanding benefit of this road was erection of a sorghum processing center for animal feeds, providing employment to the people within the area. The road improvement also encourage the operation of an economically enriching livestock market at

* The Special Infrastructure Project was set up with PL 480 peso funds prior to the inaguration of the Rural Roads loan and was meant as a preparatory exercise to condition provinces to the rigor of the RRP standards. In almost all details the SIP was the same as the RRP. Thus it was thought advisable to include this road in the survey.

barangay Cogon. This action encouraged the people to raise more live-stock since buyers are now more or less assured, thus adding to their income.

Please Note:

Under the initial SIP projects the presentation of B/C data was in its infancy and relatively crude. Thus no B/C data is included for this road.

MAP F - SHOWING LOCATION OF ROAD NO. 6

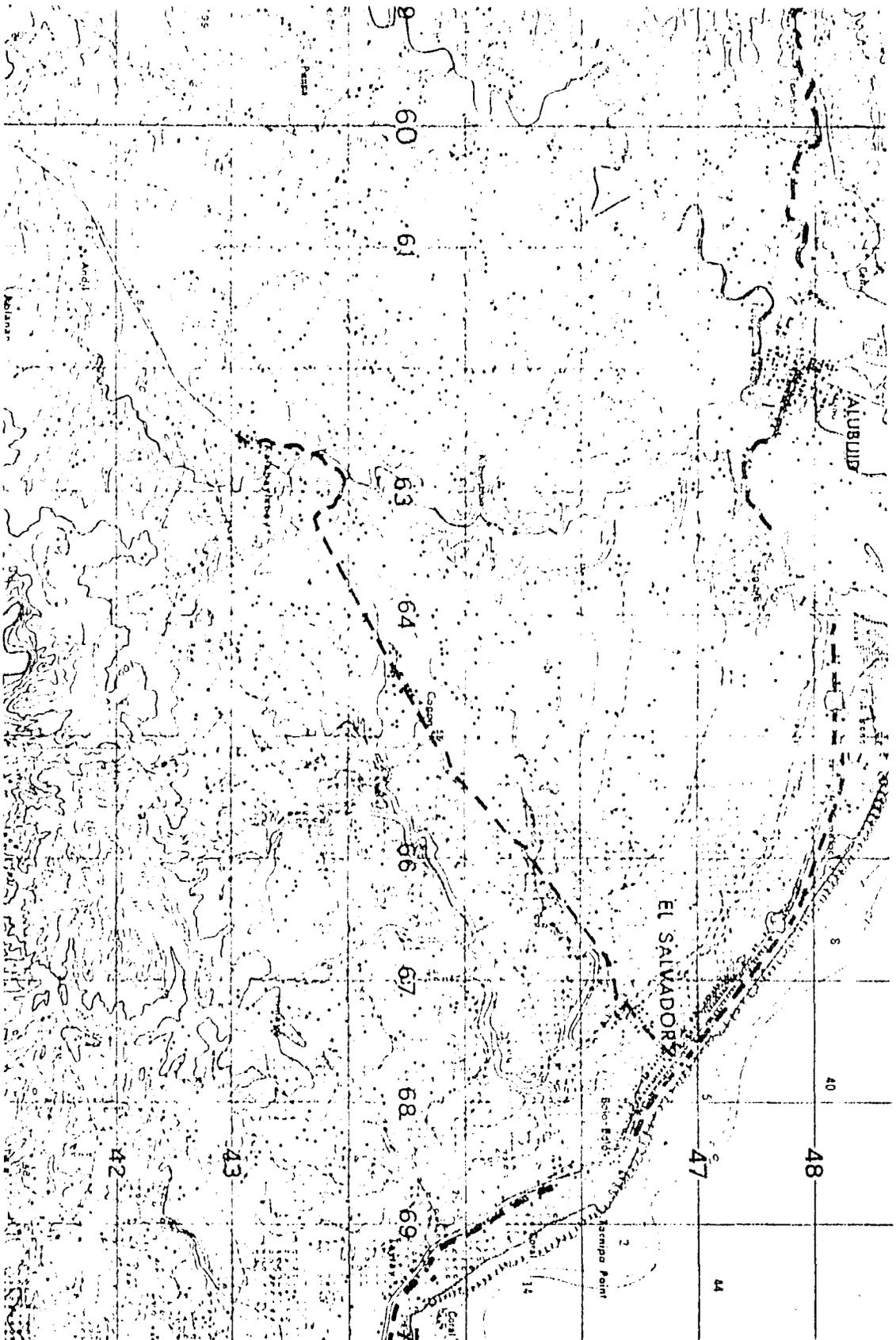


TABLE F-1

Changes in Socio-Economic Characteristics
Road No. 6

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
1. <u>Transportation Services</u>				
a. Number of Units				
1) Jeepney	4	18	14	350
2) Tricycles	9	11	2	22
3) Buses	2	6	4	200
4) Cargo Trucks	5	17	12	240
5) Total (all vehicle types)	20	52	32	160
b. Number of Operators	8	13	5	62
c. Charges (P/Km.)	0.43	0.17	(0.26)	(60)
2. <u>Production</u>				
a. <u>Average Annual Production (Per Hectare)</u>				
1) Corn-Cavans	24	31	7	29
2) Root Crops (Peanuts)-Cavans	18	25	7	39
3) Coconut-Kilograms	450	600	150	33
b. <u>Farmgate Prices/Market Prices (Pesos)</u>				
1) Corn - Per kilo	0.25/0.40	0.45/0.55	0.20/0.15	80/38
2) Root Crops (Peanuts)-Per Cavan	47.00/50.00	50.00/52.00	3.00/2.00	6/4
3) Coconut (copra)-per kilo	1.66/ 2.10	2.15/ 2.50	0.49/0.40	30/19
c. Production Cost	327	316	(11)	(3)
3. <u>Marketing Practices - Percent of Production Volume</u>				
a. Sold at Farm	71	57	(14)	
b. Sold at Market	29	43	14	
4. <u>Average Gross Annual Household Income (Pesos)</u>				
a. Farming	2390	2769	379	16
b. Non-Farming	1889	2214	325	17
c. Total	4279	4983	704	16
5. <u>Economic Enterprises</u>				
a. Sari-sari stores	9	23	14	156
b. Drugstore	0	1	1	
c. Tailoring/Dress Shop	0	2	2	
d. Beauty Shop	1	1	0	0
e. Rice/Corn Mills	3	5	2	67
f. Storage Facilities	1	2	1	100
g. Cottage Industries	1	1	0	0
h. Markets	1	2	1	100
i. Total	16	37	21	131

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
6. <u>Mobility</u>				
a. Frequency of trips	70	138	68	97
b. Reason for trips				
1. Economic	75	51	(24)	
2. Social	25	49	24	
7. <u>Educational Services</u>				
a. Number of educational institutions	3	3	0	0
b. Enrollment	562	640	78	14
c. Drop-out transferees to outside schools	23	8	(15)	(65)
d. Average number of household members enrolled	2.7	3.4	0.7	30
8. <u>Health Services</u>				
a. Number of medical facilities	1	5	4	400
b. No. of health programs	2	5	3	150
c. Frequency of consultation with medical personnel (by households)				
1. Doctors/nurses/dentists	9	16	7	78
2. Herbalarios	16	13	(3)	(19)
d. Place of consultation (before/after)				
1. At barrio/residence	78	49	(29)	
2. At poblacion	22	51	29	
9. <u>Government Services Availability</u>				
a. <u>Farm Management Technicians</u>				
1. Number	5	9	4	80
2. Frequency of service	104	208	104	100
b. <u>Medical Personnel</u>				
1. Number	2	5	3	150
2. Frequency of service	52	156	104	200
10. <u>Recreation</u>				
a. <u>Frequency of Recreational Activities in the Area</u>				
1. Fiestas	1	2	1	100
2. Dances	1	3	2	200
3. Athletic competition	1	3	2	200
4. Musical competition	1	2	1	100
5. Total	4	10	6	150

DESCRIPTION OF DATA	BEFORE	AFTER	DIFFERENCE	PERCENTAGE CHANGE
b. Number of Recreational Facilities	4	5	1	25
c. Frequency of households' engagement in recreational activities	34	70	36	106
11. <u>Communications Media</u>				
a. Number of publications reaching the area	1	3	2	200
b. Frequency of availability	52	208	156	300