

THE IMPACT OF RURAL ROADS

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I. INTRODUCTION

The construction of penetration roads is an important element in the growth of rural areas. Such roads possibly have greater impact on small farmers than any other type of roads. In May 1980, a survey was conducted by a United States Agency for International Development (USAID) Evaluation Team on the impact of Rural Roads Program (RRP) projects. A penetration road constructed under the said program in the province of Sorsogon demonstrates such impact.

Where before only an occasionally hardy jeep entered, there is now regular daily service by jeepney and mini buses. Crops like banana and vegetables, previously grown for home consumption only, can more readily be sold either to the increased number of buyers regularly arriving or at nearby towns. As a result, a number of farmers are growing more crops or raising more livestock; homes are being built or improved with materials which could not readily be brought in before; farmers are now shipping palay (unhusked rice) to town for milling instead of pounding it themselves; coconuts are now transported to market by jeeps rather than by carabaos or infrequent boats as before.

More sari-sari stores have opened as soft drinks and other dealers come in now to offer goods. The agricultural extension agents visit more frequently, as do public health officials, and visits to the local town for medical attention and marketing have increased substantially. (USAID 1981)

Roads are a must in moving agricultural surpluses from the farm to local or regional markets. Existing networks of footpaths are often not sufficient for the scale of transportation that is required. The inadequate development of farm-to-market roads limits the amount of products sold, raises the consumer prices, and isolates the farm from technical assistance and an optimum level of input use. For

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these reasons, the construction of feeder roads and a low cost transportation network have been emphasized in many places as a necessary means of improving year-round farm-to-market access.

There are however, other views. Some say that roads and transport are necessary for development but are by themselves seldom a sufficient condition. For the degree of change along roads can vary dramatically depending on soil quality, climate, flooding and drainage, credit, markets and extension services. One evaluation of a road project in Honduras concludes:

In some cases one or more factors constrained output increases after the road was completed, especially where small farmers were involved. This finding is inconsistent with the view that roads by providing access to inputs, services and markets and by making input/output price relationship more advantageous, can stimulate production (USAID 1981).

A road, therefore, should not necessarily be viewed as the trigger in development. Rather, "its role in every case should be verified empirically" (Cariño and Albano 1979).

II. PROJECT BACKGROUND

The Philippine Rural Roads Program is the sequel of the Flood Rehabilitation Project of 1972, which later became more popularly known as the Special Infrastructure Project (SIP) of the Provincial Development Assistance Project (PDAP). PDAP was established primarily to develop and institutionalize the capability of local governments to plan and implement infrastructure projects, and to help improve the economic and social conditions of people in rural areas by providing them with all-weather roads for agricultural transport.

The Rural Roads Program was established under a USAID-GOP Loan Agreement dated 25 March 1975 with the Ministry of Local Government and Community Development as the implementing agency. The sum of \$15 million was made available to the Philippine Government on a "reimbursement scheme" basis, and the fund was used for the implementation of Phase I of the Rural Roads Program (RRP), which started in 1975 and ended in 1978. Some 415 kilometers of rural roads and 4,368 linear meters of bridges were constructed during Phase I in thirty-one participating provinces, each of which contributed its own planning, engineering and financial capability. Under the Loan, the Government of the Philippines was to reimburse 75 percent of the cost of each subpro-

ject undertaken and completed by the province. The remaining 25 percent was to be the share of the participating local government unit.

Encouraged by the high degree of success in the implementation of RRP I, a second loan of \$24 million was made available to the Philippines by USAID in 1978 for RRP Phase II. The program involved the construction of approximately 600 kilometers of roads and 6,000 linear meters of bridges.

RRP II was supposed to terminate in December 1981. However, because of the fast pace of project implementation, project proceeds were consumed one year and eight months before the termination of the program, so that an additional loan of \$10.177 million had to be negotiated in 1980 for RRP operations in calendar year 1981.

Project Implementation, Monitoring and Evaluation

Participating local government units (LGUs), which are the project implementors, identify, plan, and undertake the construction of projects using their own financial resources, either by force account or by contract. Before implementation starts, the LGUs are required to submit a number of eligibility requirements. Foremost of these is the Annual Implementation Plan (AIP) which includes the list of priority projects scheduled for implementation within the calendar year. Once this document is approved, the province prepares and submits detailed plans, specifications and cost estimates, with accompanying feasibility studies for individual projects. Projects found to be economically feasible are approved for implementation under the program. The determination of the economic feasibility of project proposals is made by computing Internal Rates of Return (IRR) or Benefit-Cost Ratios (BCR). The underlying concept of the detailed project evaluation is the "with" or "without" project criterion. It seeks to increase the anticipated benefits relative to costs without road improvement/construction or to costs with road improvement.

The monitoring and evaluation phase of the program requires each LGU to subject one major, minor and penetration road to an in-depth study (see Appendix I for the definition of rural roads). A study of the changes that take place in the road influence areas is to be made annually for the purpose of monitoring actual changes and, hence, the accuracy of the projections and assumptions used in the feasibility studies. This means that the province conducts socio-

economic surveys of the sample households within the road influence area before and after the road construction and every year thereafter for the next five years for a major road or the next three years in the case of minor/penetration roads. These road projects are designated as In-Depth Evaluation (IDE) road. Before the completion of the road project, the province submits the annual data requirements of an Evaluation Control Road (ECR) that serves as the counterpart of the IDE road.

III. OBJECTIVES OF THE STUDY

Since 1978, participating local government units have compiled and submitted the yearly data requirements of their designated evaluation projects. However, from that time to the present, the data submitted have not been analyzed. It is then the purpose of this study to –

1. compare and analyze the changes in the socioeconomic status of the population within the influence areas of the experimental and control group before and after the project construction.
2. find out whether or not rural road construction has had an impact on the income level of the population within the road influence area.

One of the Rural Roads Program's objectives is to provide roads and bridges which would have a significant impact on the economic opportunities of the small farmers. The latter represent the majority of the rural population of the participating government units. Studies show that the positive effects of roads are fairly evident. Farmers are particularly dependent on roads to transport their products to markets or food processing centers.

Although it takes some time before the impact of a road projects could be felt, prevailing conditions within the influence areas studied were such that in a year's span, significant changes directly or indirectly attributable to the road project have already taken place.

In line with the eleven areas of development concerns of the ESIA/WID Research Project and in view of the increasing participation of the provinces/cities in the Rural Roads Program, this study aims to specifically present the impact of a road project on income level. In passing, however, it also discusses the project bearing on other areas of concern like health and education.

The linkages of variables, as shown in Figure 1, describe the impact of the road on household income, health and education. The logic of the relationships in Figure 1 is explained as follows. With the road project, people, goods and services will be mobile. As a consequence, there will be an improvement in the execution of extension services and training in farm management, delivery of production materials, and processing and marketing of agricultural production. Farmers will be motivated to produce more and idle lands will be developed, thereby increasing farm sizes. The application of technology and innovation in farming techniques will increase their productivity per hectare. These will result in an increased volume of production. With a better mode of transport due to the road project, people will seek more lucrative employment opportunities in and outside the influence area. Through the increased volume of production and the assurance of a regular market for their produce plus additional sources of income brought about by new employment opportunities, it is hypothesized that there will be an increase in the income level of the people living within the influence area. This will improve the people's living patterns.

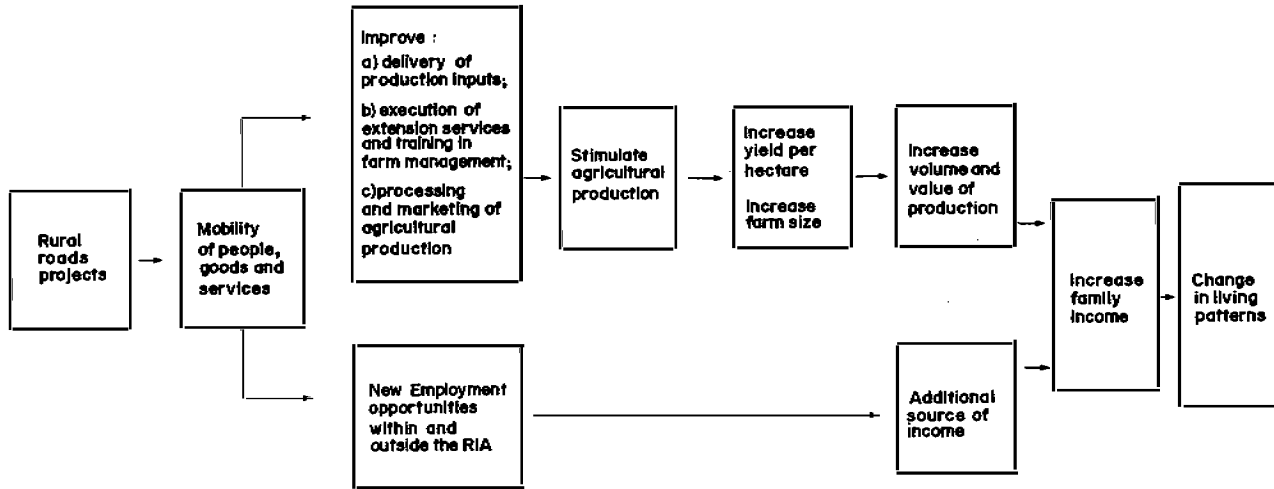
IV. RESEARCH METHODOLOGY

Research Design

For the purpose of the study, two penetration roads of Laguna province were selected. These are the Dingin-Calasuchi and the Liliw-Novaliches roads. Dingin-Calasuchi is the experimental road. It was constructed in 1978. The Liliw-Novaliches road, meanwhile, is the example for the control and the without-road construction project. Originally, six barangays were expected to benefit from the experimental project. Due to the construction of a barangay road parallel to the project, however, two barangays, Lambac and Anibong, were excluded after the post-survey was conducted. Hence, the study was limited only to four barangays.

The socioeconomic status of the population for the experimental and control group influence areas before and after the project was monitored to measure the impact of the road projects. In quantifying the impact, the following economic indicators were used: traffic generation data, frequency of trips, farm size, yield per hectare of crops, volume and value of production, employment and income of households.

FIGURE 1
 THE IMPACT OF RURAL ROAD PROJECTS ON HOUSEHOLD'S GROSS INCOME



The survey technique was the principal process used in gathering data. Before the road construction, a complete census was conducted in 1978 by the Provincial Development Staff of Laguna for both road influence areas. From these census surveys, 15 percent of the total number of households were selected at random for interview for this study. Similarly, 15 percent of the total influence area households were interviewed in 1982. The conduct of the postsurvey was supplemented by in-depth interviews of knowledgeable persons at the barangay level such as the barrio captains, the council of leaders, and other government officials operating within the areas covered. A series of field/site visits were also made by the researcher and her assistant to the influence areas to gather additional insights on socio-economic conditions. In addition, secondary data from various agencies and offices were used.

Survey Procedures

The enumerators for the survey were selected staff of the RRP who were already exposed to survey activities. The survey lasted for eight days. Four days were devoted to Dingin-Calasuchi and four days to the Liliw-Novaliches road.

In the interview process, two problems were encountered. First, the enumerators encountered uncooperative respondents in the experimental group influence area. Though several explanations of the purpose of the survey were made in addition to announcements made by the barangay captains before the survey, the "I don't care" attitude of some respondents was strong. A common comment was: "anyway, the road has been constructed". Second, there were also instances when interviewers were mistaken for revenue agents, giving rise to defensive answers such as: "we don't have enough income" or "we don't have anything to do with any government projects."

Description of the Study Areas Before the Project (1978)

The Dingin-Calasuchi road, the experimental road project, is situated in the municipality of Pagsanjan. It is 98.5 kilometers from Manila via Calamba. Its distance from the town of Sta. Cruz, the provincial capital, is 2.5 kilometers. The road influence area (RIA) consists of four barangays, namely: Sampalucan, Dingin, Calasuchi, and Sabang.

The control road is the Liliw-Novaliches road located in the municipality of Liliw, 12.5 kilometers from the capital town of Sta. Cruz. It is about 4 kilometers in length, starting at barangay Kanlurang Bukal, passing through San Roque and Loquin and ending at Barangay Novaliches. These four barangays comprise the control road influence area.

The estimated population within the experimental area in 1978 was 3,310, comprising 574 households. Barangay Sampaloc had 65 percent of the experimental RIA population. The rest of the population meanwhile, were more or less evenly distributed in the remaining three barangays. A population of 2,000 persons comprising 335 households constituted the control RIA in 1978.

In terms of land use, both areas are predominantly agricultural. The major crops are rice, coconut and bananas. Fifty-six percent of the respondents from the experimental group in 1978 were engaged in farming. The average farm size was about 2.0 hectares. Some farmers planted bananas, fruit trees, and vegetables mainly for home consumption. Coconut farms yielded an average of 3,541 nuts per harvest while palay farms yielded an average of 44 cavans per hectare per cropping.

The same farming characteristics existed in the control areas. Fifty-eight percent were farmers cultivating almost the same crops, — coconut, rice and bananas. The average farm size cultivated was 1.7 hectares. In terms of productivity, the average yield of palay per hectare was 43 cavans per harvest and 3,032 for coconut farms.

Observations with regard to the social aspects of the two populations revealed no significant differences between the two groups in 1978 in educational attainment, health services used in case of illness, and access to recreational facilities and print media.

Description of the Two Areas after the Project (1982)

As discussed previously, the before — project situations that existed in both areas were comparable. In 1982, two years after the project completion, the data revealed some notable changes.

On Mobility

A three-day traffic count conducted in February 1982 in the experimental area showed an increased daily traffic from 3 to 45

(see Table 1). No changes in the traffic count were noted for the control group.

Consistent with the traffic count are data on the frequency of trips of household respondents in and outside the influence area. Data show that residents of the experimental area tend to move out of their residences more frequently than those in the control group (Table 2).

TABLE 1
TRAFFIC COUNT BEFORE AND AFTER ROAD CONSTRUCTION
IN THE EXPERIMENTAL AREA

<i>Type of vehicle</i>	<i>1978</i>	<i>1982</i>
	<i>(Before)</i>	<i>(After)</i>
	<i>Total traffic count</i>	<i>Total traffic count</i>
Motorcycles	3	6
Tricycles	4	49
Cars/Jeeps	0	9
Jeepneys	3	5
Buses	0	0
Trucks	0	66
Total	11	135
Daily Average	3	45

TABLE 2
DATA ON FREQUENCY OF TRIPS, 1982

<i>Frequency</i>	<i>Experimental</i>		<i>Control</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
High	23	25.00	6	11.11
Medium	53	57.61	21	38.89
Low	16	17.39	27	50.00
Total	92	100.00	54	100.00

On Agricultural Production

As a consequence of improved transport, extension services have improved in the project site. Barrio captains and farmers claimed that they have acquired new agricultural techniques from the visiting farm technicians. New varieties of palay were also introduced, increasing palay yields in the experimental area from 44 to 77 cavans per hectare. Coconut yield also increased by 10 percent because farmers learned something about the control of pests and diseases affecting coconut trees. Control group farmers were essentially unchanged (Table 3).

With improved transport, too, farmers have been motivated to plant more since they could now count on effective and prompt delivery of their produce at a good price. As a consequence, about 30 hectares of formerly idle land have been cultivated within the experimental area. This increased the average farm size of farmers in the experimental area from 2 to 3.06 hectares. Thus, with the increase in yield of crops plus the increase in farm size, the volume of production generally improved.

In terms of marketing, respondents from the experimental area told the researcher that they now market their own produce, especially palay. With regard to the processing of copra, a copra mill was opened and coconut farmers now sell their products to this mill at a price that also prevails in towns.

TABLE 3
YIELD OF PALAY PER HECTARE/TURNOVER, 1982

<i>Cavans</i>	<i>Experimental</i>		<i>Control</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
70-99	27	84.38	3	10.71
40-69	2	6.25	15	53.57
10-39	3	9.37	10	35.72
Total	32	100.00	28	100.00
Average Yield	77.00 cav.		47.00 cav.	

On Employment

After the project, a noticeable shift from farming to nonfarming occurred in the experimental area. The nonfarming group increased by 16 percent. The main reason for the change, according to the respondents, was the opening of the road. Farmer-owners set up business enterprises such as the tricycle business and sari-sari stores. Other family members of farmers shifted to being "bankero" at the Pagsanjan resort since they could more easily reach the place now than before. Others became salesmen and laborers doing odd jobs in and outside the RIA. There was little change, on the other hand, in the occupation of respondents in the control group.

Impact on Income Level

Mean monthly income of the respondents in the experimental area increased from ₱255.50 to ₱669.07. For the control group, mean monthly income increased from ₱211.50 to ₱480.08. The increase in income in the experimental group is greater by 35 percent than that in the control group. A t-test revealed that there is a significant difference in the income level of the experimental and control groups after the road construction.

Other Findings

No changes in education and literacy which can be attributed to the road were noted. Percentages of those who attended school were the same as before, both for the experimental and control groups. However, with regard to services engaged in case of illness, 28.69 percent of those used to consult the *herbororios* now depend on doctors. This may be attributed to the presence of transportation.

V. SUMMARY AND CONCLUSION

The study of Dingin-Calachuchi Road, which was constructed in 1979, gives us a picture of how roads play an important role in the growth and development of rural areas. The actual analysis of the data generated from the pre- and postsurveys, and the comparison of the changes that took place in the road influence areas of Dingin-Calachuchi and Liliw-Novaliches Roads (the experimental and control

areas, respectively) show a positive impact on the income levels of households in the experimental road.

The household heads (primarily small farmers) from the four barangays of the road's influence area benefited both directly and indirectly from the project. The opening of the road not only gave them the opportunity to have social contact with people outside their isolated area but also helped them solve their economic problems.

In addition, due to the opening of the road, farmers and other members of their households were given the opportunity to venture into other types of employment aside from farming in and outside of the road influence area. With additional sources of income plus a higher level of agricultural production, household incomes increased, creating a positive change in the living patterns of the small farmers.

APPENDIX 1

DEFINITION OF ROADS

Rural roads can be functionally divided into three categories based upon their service to agriculture, the area served, traffic levels, road condition, and the anticipated benefits from road improvement. These are: (1) major rural roads, (2) minor roads and, (3) penetration roads.

Major Rural Roads

Major rural roads serve as main access routes to agricultural areas connecting poblaciones and product collection centers to the primary road network. Current traffic levels are high (200 ADT and above) and usually open to traffic throughout the year. Although operating costs are high because of low construction and maintenance standards, these roads do not significantly hinder the transport of agricultural inputs or commodities to the market. The major result of improvement is the lowering of transportation costs (reduced vehicle operating costs). Present and future users of the road will incur lower costs for operating their vehicles.

Penetration Roads

Penetration roads usually involve new construction or improvement of low standard roads or trails. Penetration roads can open entirely new areas to settlement or serve areas where cash crop production is very small due to lack of transport facilities. Dry weather access is difficult and, in some cases, impossible due to lack of bridges over perennial streams. Traffic levels vary from very low

to nonexistent. There is uncertainty as to the rate and type of development which could be expected from the establishment or improvement of penetration roads.

Minor Rural Roads

Minor rural roads serve smaller producing areas and communities. They are in general closed during part of the year or very difficult to negotiate in the rainy season. Traffic levels range from moderate to low (ADT below 200). These roads are the first links in the farm-to-market transport system connecting agricultural producing areas to nearby poblaciones and product collection and storage centers and/or the major feeder road networks. Increased agricultural production is a basic reason for road improvement and should result from extended road use in the rainy season, thus allowing more production to reach markets and inputs to reach the producing areas.

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