

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523
BIBLIOGRAPHIC INPUT SHEET

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Batch 50

1. SUBJECT CLASSIFICATION	A. PRIMARY	TEMPORARY
	B. SECONDARY	

2. TITLE AND SUBTITLE
Social and behavioral impacts of a technological change in Colombian villages

3. AUTHOR(S)
Torres, Augusto, ; Lichtenstein, Stanley; Spector, Paul

4. DOCUMENT DATE 1968	5. NUMBER OF PAGES 87p.	6. ARC NUMBER ARC IN.301.32.K62
--------------------------	----------------------------	------------------------------------

7. REFERENCE ORGANIZATION NAME AND ADDRESS
AIR

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)
(Final rpt:CSD-755 Res.)

9. ABSTRACT

(Social Sciences R & D)
(Science & Technology R & D)

10. CONTROL NUMBER PN-AAD-061	11. PRICE OF DOCUMENT
12. DESCRIPTORS	13. PROJECT NUMBER
	14. CONTRACT NUMBER CSD-755 Res.
	15. TYPE OF DOCUMENT

CO
20735
11/17

CSD-755 Res.
AIR
PN-AAD-061

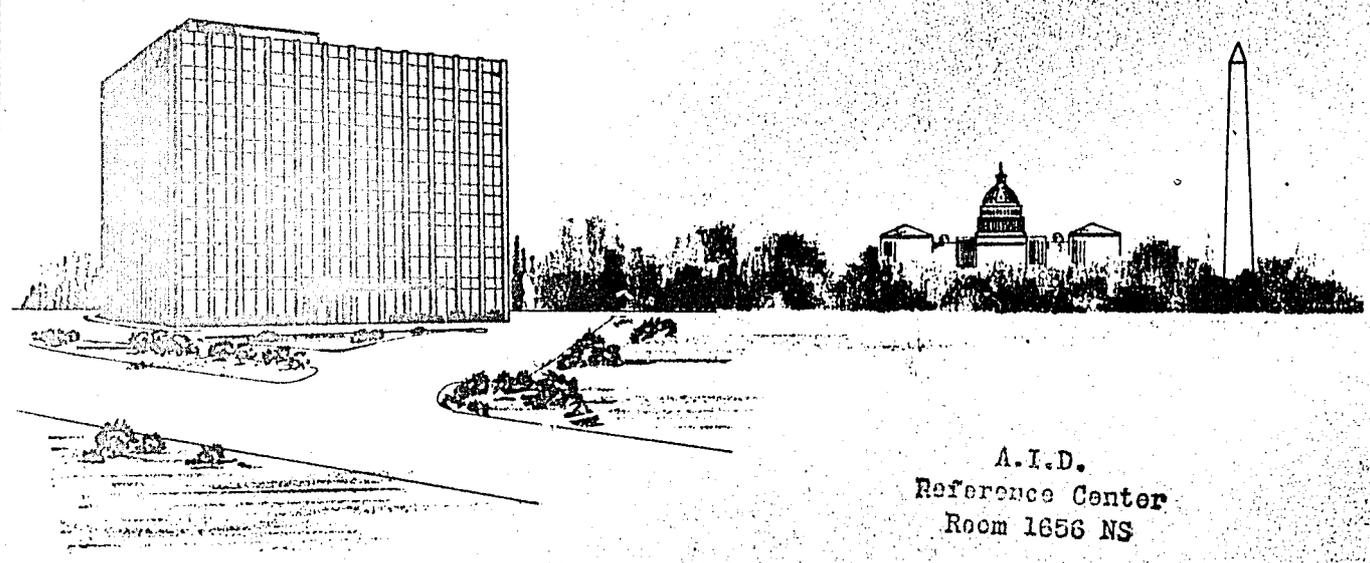
Social and Behavioral Impacts of a Technological Change in Colombian Villages

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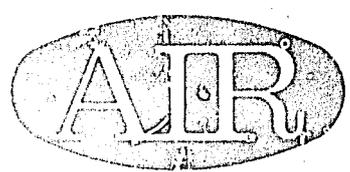
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Final Report
APRIL 1968



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R68-1

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TECHNOLOGICAL CHANGE IN COLOMBIAN VILLAGES

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FINAL REPORT

Prepared under Contract for
Agency for International Development
Washington, D. C.

Contract No. AID/csd/755

American Institutes for Research
Washington Office
International Research Institute

April 1968

ACKNOWLEDGMENTS

The authors would like to express their appreciation to the members of the field staff in Colombia, without whose efforts, both in the field office and in the villages, the study would not have been done. The full-time staff members were Rubby Mercado M., Beatriz Xiques P., Jesus Alvarado S., Fabio Grizalez G., and Gilberto Vejarano M.

We would also like to acknowledge the efforts of the auxiliary interviewers who participated in the two major surveys, and the cooperation of Fr. Gustavo Perez Ramirez, Director General of the Instituto Colombiano de Desarrollo Social.

Special thanks are due to Mrs. Johnette B. Clark, of the AIR staff, for her insightful editing, and to Mrs. Margaret Keller for her efficient work in producing this report.

TABLE OF CONTENTS

	<u>Page</u>
Acknowledgments	i
List of Tables and Figures	iii
Section I. Introduction	1
Background of the Generator Project	1
Research Design	7
Section II. Hypotheses and Procedures	9
Hypotheses	9
Utilization of Electricity	9
Social and Community Relations	9
Personal Changes	10
Economic Changes	10
Infrastructural Changes	11
Procedures	11
Section III. Results and Discussion	16
Functioning of the Generators	16
Availability of Electricity	16
Cost of Electricity	19
Opinions of the Electrical Service	22
Involvement of Agencies	23
Impacts of Generators	27
Utilization of Electricity	27
Social and Community Relations	28
Personal Changes	31
Economic and Infrastructural Changes	44
In Conclusion	47
APPENDIX A. First Survey Questionnaire	A-1
APPENDIX B. Final Survey Questionnaire	B-1
APPENDIX C. The Search for Economic Practices	C-1
APPENDIX D. Training for Local Management of the Electrical Service	D-1

LIST OF TABLES AND FIGURES

		<u>Page</u>
Table	1 Basic Characteristics of Generator Sites	5
Table	2 Households Using Electricity, by Town (1965)	6
Table	3 Number of Households Surveyed, by Town	14
Figure	1 History of Generators	17
Table	4 Cost of Operation of the Generators, by Town (1965)	20
Table	5 Opinions of Costs of Electricity (1966)	21
Table	6 Types of Improvements in Electrical Service Desired	22
Table	7 Utilization of Electricity	27
Table	8 Summary of Changes in Social Relations	30
Table	9 Types of Community Improvements Desired by Townspeople	32
Table	10 Types of Personal Improvements Desired by Townspeople	32
Table	11 Types of Tools Desired	33
Table	12 Proposed Uses of Potential Surplus Money	34
Table	13 Townspeople's Reports of Effects of Electricity on Opinions, Attitudes, and Outlook (1966)	36
Table	14 Knowledge of Assistance Alternatives (1966)	38
Table	15 Willingness to Assert Rights (1966)	39
Table	16 Self-Confidence: Type of Occupation for Which Townspeople Believed They Could Have Been Successfully Trained (1966)	40
Table	17 Willingness to Accept Changes Regarding Work (1966)	41
Table	18 Willingness to Accept Changes Regarding Education (1966)	42
Table	19 Willingness to Accept Changes in Attitudes and Behavior of Others (1966)	42
Table	20 Responses Concerning Economic Changes During the Inter-Survey Period (1966)	45
APPENDIX		
Table C-1	Basic Production Data	C-2

SECTION I

INTRODUCTION

The purpose of this study was to determine the effects of small electrical generators on rural communities in Colombia. Fourteen generators, ranging in size from 5 to 20 kilowatts, together with wire, street-light fixtures, and meters, were distributed by the Agency for International Development to small towns located in various parts of Colombia. The towns, ranging in size from 28 to 209 households, had been selected at the time the study began and most of the generators had already been installed. AID had intended to place a generator in a fifteenth town, but due to a variety of administrative problems it was not placed during the life of this project. The field investigation took place over a two-year period, from January 1965 to January 1967.

Background of the Generator Project

From its inception, the generator project was conceived by AID/Washington as a pilot study, with the generators distributed for the specific purpose of research, rather than as part of an operational program. The major steps initiated by AID consisted of a feasibility study by a consulting anthropologist, the selection and purchase of 15 generators and related equipment, the selection of the generator sites, and the award of a research contract.

The objectives of the generator project were stated by AID in a summary (prepared by Dr. Ferdinand E. Okada, Program Sociologist, AID/Washington) which accompanied AID's invitation to submit a proposal. Quotations from this summary follow:

"I. Statement of Project

The Problem

A new source of light and energy is going to affect the lives of people living in fifteen Colombian villages. Changes that will inevitably occur can only

be predicted by guesswork, however well thought out. The problem is to obtain enough data so that, even during the early life of the project, patterns will begin to emerge which can be used as bases for further guidance and action; and in future projects, where a modern innovation will have a direct impact on traditionally oriented societies, the presence of a body of facts and generalizations drawn from it will give a firm foundation for planning and operation.

"Background

The Colombia power pack project, activated by USAID/Colombia and CARE/Peace Corps had its genesis over two years ago with President (then Vice-President) Lyndon B. Johnson. His expressed interest in the use of small electrical generators as a source of power for the improvement of social and economic conditions in rural communities, particularly in underdeveloped nations, has led to the present program of installing power packs, individually of 5 Kw to 20 Kw capacity, in 15 selected Colombian villages.

"Discussion

Problems of social change have always been of keen interest to social scientists and much work has been done in this area, resulting in the accumulation of a large body of data and conclusions. Very few studies exist, however, where the impact of a single piece of modern technology upon the socioeconomic fabric of a specific community has been intensively studied over a sufficient period of time. The Colombian power pack project provides a unique opportunity to study, not one, but fifteen communities each reacting to the installation and use of an electric generator.

"Even allowing for some loss of continuity and inadequacy of reporting, regularities and patterns of reaction will appear so that definitive statements can be made on the processes of social change, which can have predictive value for the use of power packs in similar villages (i.e., pre-industrial and traditional in orientation) in other parts of the world. More general statements, but still with predictive value, can be made for situations where economic aid is inducing social change. These generalizations, up to now conjectural rather than backed by facts, are essential to more effective development plans and to the creation of development assistance projects designed to cope with the problems of an underdeveloped nation.

"More specifically, such questions would be answered as to the feasibility of focusing community development projects around power packs and whether AID would want to embark on similar projects in other regions of the world. It is also believed that the Colombian project will provide answers or give clues to the solution of a large number of problems: what alternative uses of power can be most efficiently and acceptably utilized; how to cope with such problems as installation and maintenance of the power plants, or type of fuel and fuel supply; what circumstances bring forth the greatest response in terms of self-help; what is the role of the Peace Corps Volunteer or Community Development Village Worker as an agent of change; — the practical application of data from the Colombian project can fit a wide variety of foreign aid situations.

"Conclusion

The installation of power packs in Colombian villages offers a unique opportunity for the controlled study over a sufficient period of time of the socio-economic impact of a new technology and a new source of power upon traditional societies. Such a study will provide answers of practical application in development planning, programming and operations."

On the recommendation of AID's consultant, the USAID Mission in Colombia enlisted the cooperation of Peace Corps Volunteers, who surveyed likely towns to determine their suitability for the project. (The factors to be considered were developed by the AID consultant.) The principal criterion for selection was the fact that the town was not scheduled to be incorporated in the national electrical grid within a decade. A second criterion appears to have been the willingness on the part of at least a majority of the householders to participate in the project. (In several cases the Volunteers had to persuade the townspeople to participate.) The townspeople agreed to form juntas to take responsibility for administering and operating the systems, that is, for hiring, paying, and supervising operators, for collecting fees, and for purchasing fuel and lubricant. Participating townspeople also agreed to pay for installation of household wiring, meters, and outlets, and to pay agreed-upon monthly rates for the service.

The towns were of three types: sierra communities, generally very remote from major cities and small; coastal communities, both relatively large and small; and inland lowland communities, also remote and relatively small. Table 1 shows the size and other basic characteristics of the towns at the outset of the project. Table 2 shows the number and percentage of households subscribing to the electrical service in each town at that time. This ranged from 12%, in a town where the service was used only for the school and the homes of the school teachers, to 91% of the households in one of the other towns.

The Mission made agreements with the various departmental Electrificadoras whereby in return for titles to the generators, wiring, and associated equipment and supplies, the Electrificadoras would install the electrical systems and the street wiring, would train the townspeople to operate the equipment and perform routine preventive maintenance, and would repair the generators in case of breakdowns. The generators were reputed to work well for long periods without needing complicated repairs, and the U. S. company which sold them reportedly intended to maintain a service representative in Colombia as part of its regular commercial business there. The manual of operating instructions was translated into Spanish, and a spare-parts list was provided for eventual use by the Electrificadoras.

When the research study began, 13 of the 15 generators had been installed, and service had been inaugurated in 10 of the sites. The USAID Mission launched the operation of each generator with a formal and festive inauguration attended by one or more of its representatives.¹

¹This was the procedure in all but one town where the town leader, who was opposed to the U. S. and to AID, forbade any formal inauguration.

TABLE 1
BASIC CHARACTERISTICS OF GENERATOR SITES

Site	Department	Geographic characteristics	Population 1965	Number of households	Principal economic products	Principal ecological features	Major social characteristics
Caracolí	Atlántico	Lowland	641	103	Yucca-bollos Yucca	Concentrated	Acción Comunal strong; homogeneous population
Pitalito	Atlántico	Lowland	436	69	Yucca	Fairly concentrated	AC weak, heterogeneous
Santa Rita	Atlántico	Lowland	235	41	Yucca, banana, tomato	Concentrated	Homogeneous, but strife between factions
Lomarena	Bolívar	Seacoast	1300	209	Fish	Concentrated	AC moderately strong, heterogeneous
Apure	Magdalena	Lowland	565	90	Tobacco, corn sesame	Concentrated	Strong town leadership, homogeneous
Guazo	Bolívar	Lowland	316	68	Fish, corn	Concentrated	Strong female leadership since men gone half of each year, homogeneous
Brasil	Antioquia	Highland	523	83	Coffee, banana, Sugarcane	Concentrated	AC very good, homogeneous
Líbano	Antioquia	Highland	528	75	Coffee, sugar- cane		AC weak; resigned to low economic condition; homogeneous
Mundo Nuevo	Cundina- marca	Highland	166	28	Milk, potato		AC weak, however popular response is good when requested; homogeneous
Punto Soldado	Valle	Seacoast	288	61	Fish		Fishing Co-op is main force in community; AC weak; homogeneous
Itaibe	Cauca	Highland	432	71	Sugarcane, beans	Concentrated	AC weak; heterogeneous, but striving for agreement
San Andrés	Huila	Highland	220	43	Coffee, sugar- cane	Dispersed	AC weak, population disenchanted with projects for development
Pescado	Huila	Highland	181	32	Cattle, sugar- cane, coffee	Dispersed	AC weak, homogeneous
La Plazuela	Cundina- marca	Highland	268	51		Dispersed	AC fair, homogeneous

TABLE 2
HOUSEHOLDS USING ELECTRICITY, BY TOWN (1965)

Town	Number of households	Number of households using electricity	Percentage of households using electricity
Caracolí	103	63	61
Pitalito	69	42	61
Santa Rita	41	35	85
Lomarena	209	137	66
Apure	90	--*	--
Guazo	68	56	82
Brasil	83	20	24
Líbano	75	18	24
Mundo Nuevo	28	15	54
Punto Soldado	61	49	80
Itaibe	71	42	59
San Andrés	43	25	58
Pescado	32	29	91
La Plazuela	<u>51</u>	<u>6</u>	<u>12</u>
Totals	934	537	57

* Not in operation at time of survey.

Research Design

As planned originally, the study was to be exclusively observational rather than experimental. The plan called for an initial feasibility phase, consisting of informal visits to the sites by members of the project staff and a USAID/Colombia representative. The purpose of this phase was to determine whether generator impacts that had already occurred would preclude the acquisition of "before-generator" data. If this turned out not to be the case, the next step would be to conduct a systematic and comprehensive survey of the towns, followed by periods of observation to determine qualitative changes and a final survey approximately 1½ years after the first survey.

The feasibility phase took place in January and February of 1965.² The inauguration of service in 10 of the sites had taken place a few weeks to 10 months prior to this time. The general conclusion of this phase was that the generators had had little apparent impact on the lives of the townspeople to that point, and that baseline measures would yield data that was essentially the same as it would have been had the measures been taken prior to installation of the generators.

The implication of the above conclusion was that the generators would continue to have little impact unless other innovations were introduced in addition to the generators. It was therefore recommended that the basic approach of the study be changed to that of an "experiment," i.e., that attempts be made to introduce feasible economic practices utilizing the generators as sources of energy. It was felt that this approach would broaden the utility of the study's findings regarding the introduction of developmental innovations. In addition, it was believed that new economic enterprises in the towns might at least raise incomes sufficiently to offset the cost of operating the generators and utilizing

²A report on this phase was submitted to AID/Washington: Spector, P. and Torres, A. Research on the effects of power packs on Colombian villages. Phase I Report, March 8, 1965, International Research Institute, Contract No. AID/csd/755, Agency for International Development.

the service; these costs had been found to be burdensome during the initial feasibility phase. The recommended change in approach was agreed to by AID in March 1965.

The changed design called for: (a) an initial survey expanded to include data on factors relevant to economic change, such as distribution of skills, motivation, and organizational capabilities in the towns, (b) observation measures expanded to include data on production and distribution, (c) marketing studies, (d) increased focus on individual attitudes and community relations likely to be affected by engaging in the development and implementation of an economic enterprise, (e) the establishment of the enterprises, and (f) a final survey of the impacts of both the generators and new economic activity.

As the study developed, two changes were made in the above design: It became necessary to train the townspeople in maintenance and management of the electrical service in order to increase its reliability. Second, it became necessary to abandon the attempt to introduce new economic enterprises.

SECTION II
HYPOTHESES AND PROCEDURES

Hypotheses

Hypotheses concerning the potential impacts of the electrical generators were formulated, and grouped under five major headings. It should be noted that several of the potential impacts depended upon the prior occurrence of another impact, namely, the utilization of electricity for income-related purposes. When this failed to occur, the hypotheses concerning the dependent impacts became untestable. These hypotheses are identified with asterisks. The hypotheses were as follows:

Utilization of Electricity. It was hypothesized that:

1. Households would utilize electricity increasingly over time, i.e., more households would begin to utilize electricity, and the uses of the electricity would become more diversified.
2. Utilization of the electricity would depend upon its cost in relation to the potential benefits perceived, and in relation to the householders' ability to pay for the service.
3. Electricity would be utilized for income-related purposes.

Social and Community Relations. It was hypothesized that:

1. Townspeople would participate increasingly in civic, developmental, and social organizations, particularly those townspeople who were utilizing the electrical service.
2. That the number and variety of informal social contacts for recreational and other purposes would increase, particularly for the users of the electricity.
3. That interactions with outside agencies and with other communities would increase.

**4. That increases in productivity resulting from the use of electricity for economic purposes would:

- a. tend to create more evenly distributed income, giving rise to such associated phenomena as increased social mobility and decreased social distance between economic classes,
- b. lead to increased complexity of formal organizations, with increased differentiation of individual functions within the organizations, and
- c. lead to increased interactions with outside agencies and with other communities.

Personal Changes. It was hypothesized that:

1. The personal and community changes desired by the townspeople would become more realistic with time, and would be more oriented toward economic improvement; these attitude changes would be greater among the users of the electrical service than among the non-users.

**2. As a result of engaging in the development of economic enterprises, various personal changes in outlook would occur that are associated with a shift from traditionalism to modernism, including increased knowledge concerning sources of development assistance, increased willingness to assert rights, increased self-confidence, and increased acceptance of change.

3. Users of the electrical service would show more of the above characteristics than would non-users.

Economic Changes. It was hypothesized that:

- **1. The use of electricity for economic purposes would result in:
- a. a rise in per capita income, and
 - b. an increase in the use of credit for investment purposes.

**2. Increased income would be lead to increased expenditures for household improvements, for public facilities, and for better electrical services.

Infrastructural Changes. It was hypothesized that:

**1. Concomitant with development of economic enterprises, improvements would be made in roads and streets, public and private buildings, water systems, and production facilities.

**2. These improvements would be accelerated as income increased as a consequence of the new economic enterprises.

Procedures

The field staff was headed by a Latin American project director assisted by Latin American project associates and North American and Latin American consultants. All field work was carried out by Latin Americans, mainly Colombians.

When approval for the second phase was received from AID following the feasibility phase, field staff were recruited from among graduates of various universities, and were trained in the use of survey and observation methods. A comprehensive baseline-survey questionnaire was developed and interviews were conducted in small communities near Bogotá for the purpose of training and testing the questionnaire procedures. (A copy of the interview schedule is included as Appendix A.)

The baseline survey covered the following general topics:

1. The presence and utilization of electricity in each household.
2. The attitudes of the householders toward the electricity, and their interests concerning potential changes in their communities.
3. The basic economic characteristics of the communities, including data on land tenure, production, capital equipment and facilities, and the skills and work experience of the townspeople.
4. The basic social structure of the communities, including the availability of leadership.

All 14 of the generator sites were systematically surveyed in June and July 1965 by three- or four-man teams of trained interviewers under the supervision of senior project researchers. An attempt was made to

interview every householder, or a responsible substitute, in each of the 14 towns. With a few exceptions, this goal was achieved.

After the initial survey and data analysis, observation procedures were developed and project personnel were trained in their use in small communities near Bogotá. Each community was systematically observed by project researchers who lived in the communities initially for approximately 10 days each and subsequently for shorter periods ranging from one to four days. The observation procedures were aimed principally at: (a) determining the problems in electrical utilization, including those concerned with operation and maintenance of the generators, (b) the economic potential of the communities, (c) the communities' interest in and capacity for undertaking new enterprises, and (d) the typical rounds of activities during various seasons in the life of these communities.

For sites in which initial observations indicated that further exploration of economic development possibilities was warranted, such explorations were undertaken. See Appendix C for more details concerning procedures, findings, and problems in relation to the search for economic practices.

During the initial survey and observation periods, it became apparent that 10 of the 14 towns were beset by mechanical and administrative problems connected with the generators; in most of the towns the generators were not consistently in proper working order and could not be relied upon for productive energy. It had been AID's understanding that the provincial Electrificadoras (quasi-public electric companies) would train the townspeople to operate and maintain the system. In almost all cases, however, the townspeople proved to be inadequately trained.

Without functioning generators it would be pointless to introduce other innovations. It was therefore decided, with the concurrence of the AID Mission in Colombia, that the project would be expanded to include development of a training program, including development of an operations and maintenance manual, and that responsible townspeople would be trained

to administer, operate, and maintain the generators effectively. This effort was undertaken in association with Electraguas, the Colombian Government agency concerned with electrical power, and Acción Comunal, the national community development agency. (See Appendix D for a description of the training program.)

The final procedural step was the development and administration of the final survey which was carried out approximately 16 months after the first survey. A number of the items used in the final survey were the same as those used in the initial survey. In addition, there were a number of items suitable only to a later survey, and items which had been developed to serve as measures of psychological modernization after the introduction of new enterprises. These latter items were originally designed to be administered immediately prior to the introduction of new enterprises, and, subsequently, after they had been in operation for a period of time. They were introduced into the final survey in order to determine whether people currently using electricity differed systematically from those who were not using the electricity. The bulk of the items in this instrument, and in the first schedule, were based on specific hypotheses, presented in the preceding section. The final survey interview schedule may be found in Appendix B.

The final survey was conducted in all but one of the participating towns, using a sample from each town.³ Late in the project an additional town with a functioning generator had been added to the sample at the request of the USAID Mission in Colombia, and the final survey was also conducted in this town. The sample of households ranged from 11% in the larger towns to 36% in the smaller towns, as shown in Table 3.

³It was not possible to conduct the final survey in one of the towns because many of the townspeople were engaged in a large-scale illegal activity at this time, and the project staff were believed to be government inspectors. They were quietly ushered out of town a few hours after they had arrived.

TABLE 3
NUMBER OF HOUSEHOLDS SURVEYED, BY TOWN

Town	Number of households surveyed-1965 (total population)	Number of households surveyed-1966	Percent of households surveyed-1966
Caracolí	103	18	17
Pitalito	69	12	17
Santa Rita	41	10	24
Lomarena	209	23	11
Apure	90	19	21
Guazo	68	12	18
Brasil	83	15	18
Líbano	75	9	12
Mundo Nuevo	28	10	36
Punto Soldado	61	--*	--
Itaibe	71	15	21
San Andrés	43	10	23
Pescado	32	10	31
La Plazuela	51	6	12
Providencia	53	10	19

* See footnote, page 13.

A 100% sample was used in the first survey because detailed information on the occupations, skills, and attitudes of each family was required in order to develop plans for the economic utilization of the generators, and to provide an accurate baseline against which to measure the effects of economic activity. It was felt that only a small sample was required for the second survey, since there had been no economic activity and it was apparent that there had been very few changes.

All of the information obtained through the two surveys was categorized and tabulated for computer analysis. The results of the first survey were analyzed on a town-by-town basis in order to provide the specific information necessary for further investigation of the feasibility of utilizing the electricity for income-related purposes.

The major data analysis consisted of comparisons involving users and non-users of the electricity, across all towns, and comparisons between the two time periods. Thus, the following comparisons were available:

1. First survey, 1965: Users (N=537) vs non-users (N=487).
2. Second survey, 1966: Users (N=95) vs non-users (N=84).
3. Users: 1965 (N=537) vs 1966 (N=95).
4. Non-users: 1965 (N=487) vs 1966 (N=84).

The statistical analyses were carried out by computer, utilizing the t-test of the difference between means or between proportions as the basic test of significance. (All qualitative variables were converted to numerical scales for this analysis.) The 5% level of confidence was accepted for significance.⁴

⁴At this level of confidence, a true difference is deemed to exist between two variables if statistical evaluation indicates that a difference as large as the observed one could be expected to occur by chance less than 5 times in 100 under the assumption that there is no true difference between the two variables.

SECTION III

RESULTS AND DISCUSSION

The findings are presented in three major sections.

The first section contains findings concerning the functioning of the generators, including the availability of electricity, its cost, and the townspeople's opinions of the electrical service.

The second section contains a qualitative description of the effect of the course of the program on the key agencies involved, and the effect of the agencies' actions on the course of the program.

The third section presents the findings on impacts that were related to the various hypotheses that were explicitly testable. It contains findings on the utilization of electricity, social and community relations, personal changes, economic changes, and infra-structural changes.

Functioning of the Generators

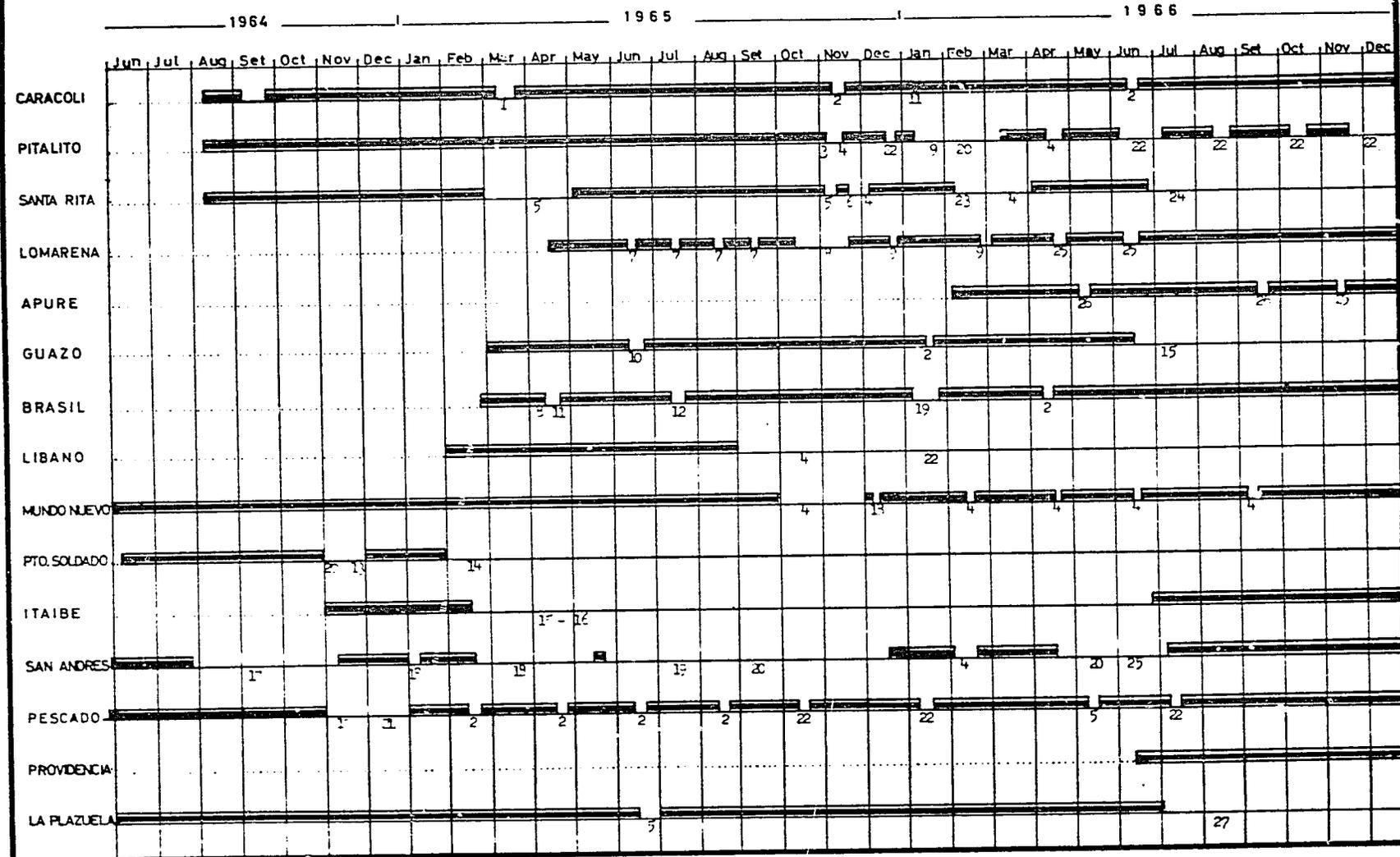
Availability of Electricity

In all of the towns, electrical service was supplied, as a rule, only for four hours per day, from 6:00 p.m. to 10:00 p.m. On rare occasions, such as fiestas, service was made available for longer periods.

All of the towns experienced difficulties with the electrical systems, and suffered interruptions in service to varying degrees. Figure 1 shows schematically the periods during which the generators were operating from the date at which service was inaugurated in each town until December 1966. The numbers at each hiatus are keyed to probable causes of the interruptions in electrical service.

As can be seen from the chart, in 6 of the 15 towns the generators were not functioning at all during most of the life of this project. In two of these (Apure and Providencia), service was begun late in the project; in two others (Libano and Punto Soldado), service ceased soon after the project began.

HISTORY OF GENERATORS^{1/}



KEY: Probable causes of interruptions in electrical service.

- | | | | |
|--------------------------------|----------------------------------|--|---|
| 1. Poor lubricant | 6. Bendix damage | 15. Broken connecting-rod | 22. Insufficient payment by users--
no funds for fuel or oil |
| 2. Discharged storage battery | 9. Damage in the injector system | 16. Engine block damage | 23. Damage in the control panel |
| 3. Loose driving-pulley | 10. Odd noise in the engine | 17. Damage in starting motor | 24. Theft of parts of generator |
| 4. Lack of fuel or oil | 11. Dirty plugs | 18. Lack of knowledge for
maintenance | 25. Replacement parts needed |
| 5. Obstructed radiator | 12. Loose screw in the panel | 19. Burned coil | 26. Defective installation |
| 6. Short circuit | 13. Burned resistance | 20. Melted points | 27. Unknown damage |
| 7. Defective fuel inlet system | 14. Site and generator flooded | 21. Starting system breakdown | |

^{1/} Until six months prior to the end of the period shown in Figure 1, no records had been kept in the towns concerning periods of service interruptions or causes of interruptions. The information shown is based on the recall of town leaders, who were asked for this information each time the town was visited. The reliability of the probable causes is further diminished by the fact that the informants lacked technical knowledge and experience regarding engines and generators.

In the 24-month period between January 1965 and December 1966, when all 15 towns are taken together, the generators were operative only 118 months of the possible total of 221 months, or 53% of the total possible time.⁵ If the time is extended back to the date of inauguration for those generators installed before the study began, the generators were operative for 162 out of 272 months, or 59% of the total time possible. Four of the generators had operated less than 50% of the total time since their inauguration (one as little as 20%). Four were in operation for more than 90% of the total time possible. There was no relation found between the size of the generator and the percentage of time it was functioning.

The interruptions in service were occasionally caused by lack of funds to buy fuel or lubricant; more usually they were caused by malfunctions which the townspeople could not or would not repair, for one or more of the following reasons:

1. They lacked the knowledge to do so.
2. They could not afford to buy replacement parts.
3. They could not obtain replacement parts when money was available, either because they did not know where to obtain them, or because they were not available in Colombia.
4. They refused to buy parts because they felt that AID or the provincial electric company was responsible for maintaining the equipment.
5. They did not legally own the generator and were reluctant to pay for repairing equipment they did not own.

⁵It should be noted that in one town, Providencia, the generator was not placed by AID but was bought by the townspeople (AID contributed wire and other supplies). Service was begun only about mid-June of 1966. The 15th generator which AID bought for the project was never actually installed during the life of the project.

6. Too few townspeople were interested in having service restored.

7. No one in the town was willing to take responsibility for restoring service.

Sometimes malfunctions had far more serious consequences than simple interruptions in power, as is illustrated by the following case:

In one town the Peace Corps Volunteer had persuaded the people to accept the generator with the promise that the service would cost them nothing beyond the monthly charge for fuel. However, after the generator, street wiring, household wiring, meters, outlets, and bulbs were installed, they were dismayed to learn that the generator and street wiring were to be supplied free, but that they were required to pay for all household equipment and bulbs. Each bulb alone cost almost a full day's wages for an unskilled laborer. As soon as the power was turned on, all the bulbs in the town burned out; this happened on three other occasions within a short period of time, and the people became embittered by the whole project.

Cost of Electricity

The cost of operation of the generators varied widely, from 180 pesos to 775 pesos per month, as shown in Table 4. The costs depended not only upon the capacity of the generator, but upon more significant factors such as the frequency and types of breakdowns, and the efficiency of obtaining and using fuel and oil. For example, it was found in some sites that the oil was changed every 70 hours of operation, although the instructions recommended only that the oil filter be changed every 70 hours and that the change of oil be made at intervals of 1,000 hours.

The monthly cost to a subscriber ranged from 2 pesos, to 70 pesos, with an average of 10 pesos. (It should be noted that 10 pesos, at the time of the survey, was the average daily wage for a laborer in the rural areas.) Table 4 indicates the average monthly cost for those subscribers who paid their bills. These payments ranged from 5 pesos to 29 pesos per month. If every subscriber paid his monthly bills, operating costs would have been covered in only three of the sites. In the eight other sites in which information on operating costs was available, the average deficit between the cost of operation and subscribers' bills was 136 pesos. Since not all subscribers paid punctually, all of the generators were being operated on a very marginal economic basis.

TABLE 4

COST OF OPERATION OF THE GENERATORS, BY TOWN (1965)

Town	Total cost per month (pesos)	Total subscriber payments per month	Number of subscribers who pay	Monthly cost per paying subscriber
Caracolí	775	688.00	64	10.75
Pitalito	570	423.00	42	10.07
Santa Rita	193	279.50	35	7.99
Lomarena	612	704.25	116	6.07
Apure*				
Guazo	180	515.00	53	9.72
Brasil	647	551.50	19	29.03
Líbano	446	200.00	17	11.76
La Plazuela	--**	78.00	8	9.75
Mundo Nuevo	243	156.00	12	13.00
Punto Soldado	343	313.00	49	6.39
Itaibe	--**	311.00	35	8.89
San Andrés	470	113.50	23	4.93
Pescado	236	197.50	24	8.23

* Not in operation at time of survey

** Data unavailable

During the observation periods it became apparent that householders who had failed to install the electricity or to use it when it was available felt that it was too expensive for them, or perhaps more accurately, not worth the cost to them. It was also apparent to the observers that the users of electricity tended to be more affluent than the non-users. During the final survey the respondents were asked systematically for their opinion concerning the cost of the electricity. (See Table 5.) Fifty-eight percent of the users felt that it was satisfactory. By contrast only 29% of the non-users felt that the cost was satisfactory, 36% felt that it was very expensive, and 29% failed to respond to the question.

TABLE 5
OPINIONS OF COSTS OF ELECTRICITY (1966)

	<u>Very expensive</u>	<u>Satisfactory</u>	<u>Very inexpensive</u>	<u>No response</u>
Users	35%	58%	7%	0
Non-Users	36%	29%	7%	29%

Thus about twice as many users as non-users felt that the cost was satisfactory. These results confirm the reports of many of the non-users during the observation period that they failed to take advantage of the electricity because of its cost.

The high cost of the electricity was a major factor in preventing the towns from using it for economic gain. In order to have power available for machinery during working hours, those entrepreneurs using the machinery would have had to pay the full cost of operating the generator. In only six of the towns was it feasible to utilize the power for enterprises in which substantial percentages of the

families could participate and thus share the costs. In all cases the costs of power for productive purposes would have been greater per unit of production than costs of power obtained from the departmental Electrificadoras. Although it was judged by the staff that viable enterprises might have been developed in three of the towns within a two- or three-year period, the townspeople were very reluctant to risk new ventures without initial subsidies from outside agencies, partly because of this cost disadvantage. The unreliability of the power, which if used for production would have threatened investments or even livelihoods, also contributed to their reluctance.

Opinions of the Electrical Service

Respondents were asked their opinions of the electrical service in 1965 and 1966. Users shifted their opinions to some extent during this period, toward a more realistic and concretely functional attitude. In 1965, almost a quarter of the users (23%) indicated that they would prefer a new source for the electricity. (See Table 6.) Almost half (46%)

TABLE 6

TYPES OF IMPROVEMENTS IN ELECTRICAL SERVICE DESIRED

	No answer		Want lower rates		Want government support		Want new source		Want better management		Want improved electrical service		Other	
	1965	1966	'65	'66	'65	'66	'65	'66	'65	'66	'65	'66	'65	'66
% of Users	17	16	3	2	3	5	23 ^b	17	18 ^b	34 ^a	46	38	4	0
% of Non-Users	39 ^{ab}	11	2	11 ^{ab}	1	0	12	24 ^a	5	30 ^a	43 ^a	25	2	6

^a Statistically significant difference between 1965 and 1966.

^b Statistically significant difference between users and non-users.

indicated that the quality of the electrical service should be improved. By the end of 1966, responses in these categories had dropped to 17% and 38%, respectively, whereas the category concerning better management of the system within the towns rose significantly from 18% to 34%. Thus, an increased number of the users appeared to feel that the potential for improvement in the electrical service rests in the hands of the townspeople themselves.

Non-users showed a different pattern of shifts from 1965 to 1966. More of them called for lower rates (11% in 1966 as compared to 2% in 1965). More of them also thought that they would benefit if the electricity came from a new source (24% in 1966 as compared to 12% in 1965). But here, too, the largest change concerned better management. The percentage calling for this type of improvement rose from 5% in 1965 to 30% in 1966. This pattern may indicate that the principal change in the attitude of non-users was from a general disinterest in electricity to a desire to have electrical service which they could afford to use.

The users and non-users differed at the first survey in that more users wanted a different source of electricity, more users wanted better management, and more non-users did not respond to the question. These findings are consistent with the obviously greater involvement in the problem on the part of the users. At the time of the second survey, the only difference between users and non-users was that more non-users wanted lower rates, confirming the previous finding that cost was an obstacle to many non-users. The absence of other differences suggests that non-users became more involved in the problem, or, to put it differently, that the problem of the generators became more of a community-wide problem.

Involvement of Agencies

Most of the townspeople felt that the USAID Mission in Colombia was the responsible agency for the generator project, although many knew that the departmental Electrificadoras had agreed to take responsibility for it. In a number of instances the towns appealed to AID for

assistance in repairing the generators or complained to AID about the ineffectiveness of the Electrificadoras. One town petitioned AID to provide the wiring needed to tie it into the departmental system.

Some of the Electrificadoras initially responded with enthusiasm, but ultimately all felt that the burden of administering the remote little electrical systems and maintaining the generators was not worth the effort required in view of their other responsibilities. Even those that initially entered the project with enthusiasm could not carry out the program effectively. Engineers sent out to the towns to install the systems and instruct the people in their uses, although definitely well qualified, spent as little time as they possibly could in the towns because of their remoteness and inadequate amenities; consequently, installation tended to be poor and people were inadequately trained to administer, operate, and maintain the systems. It should also be noted that the Electrificadoras had major responsibilities connected with the expansion, operation, and maintenance of their primary systems, in light of which the problems of the remote towns were of lesser importance. The Electrificadoras bore the initial costs of installing the generators and wiring and of training the townspeople as eleemosynary gestures, and felt that additional expenditures of manpower and money would not do justice to their shareholders. Beyond this, they usually could not spare the men or materials from their primary commitments.

The involvement of the Electrificadoras may have been significantly affected by the fact that a number of the Electrificadora officials and engineers with whom the research staff talked indicated that they believed that in many instances AID had chosen the wrong towns, and had ignored their advice in doing so. They felt that the wrong criteria had been used in selecting the sites. Potential economic applications for the electricity had largely been ignored. As they had anticipated, without increases in income sufficient to pay for the operation and maintenance of the electrical systems, the Electrificadoras inherited

the burden of keeping the systems going--a financial burden to which they felt they had not committed themselves. As mentioned earlier, one of the principal criteria employed by AID for selecting sites was the probability that the sites would not be included in the national electrical grid within the ensuing 10 years. Some Electrificadora personnel felt that this was a faulty criterion because they foresaw that one of the principal benefits of siting individual generators would be to familiarize the people with the use of electricity so that they would develop interests in and habits of using electricity on a small scale that would prepare them to use it more fully. They felt that the people would then be receptive to having the towns electrified within the national net and would know how to use its full consumer and producer potential. Thus, they would have preferred to choose towns where it was planned to extend the national net within two or three years. They also preferred less remote locations so that new economic enterprises that might be developed could be more readily integrated into larger regional development efforts; for example, a location which would permit a town to fabricate parts of products being produced in larger towns or cities.

In summary, the Electrificadoras' frequent lack of cooperation with the project stemmed from a combination of problems: in part from their feeling that the towns that were chosen could not make optimal use of electricity and therefore would not be able to pay for it, in part from a lack of resources needed to supply the required assistance to the towns, and in part from resentment of AID for not taking their advice in siting the generators.

For its part, the USAID Mission felt that the agency had discharged its chief responsibilities through its initial planning and agreements with the Electrificadoras. It considered that its remaining function was merely to maintain liaison with the research staff. In view of its need to apply its very limited manpower to the requirements of more important programs, the Mission was reluctant to deal with each little

town's problems. On several occasions and with some success, it attempted to obtain the cooperation that the Electrificadoras had agreed to furnish. But the time-consuming procedures of writing letters and memos, waiting for replies, and arranging and holding meetings resulted in inevitable delays. Comments made to project staff members by town leaders indicated that the delays were taken as evidence of the agencies' disinterest and refusal to honor their commitments.

In the course of the research project, the project staff and, on occasion, AID officials, discussed with the townspeople the possibilities of introducing new machinery and credit in those towns where it appeared feasible to employ the electricity to raise income. On the basis of the townspeople's subsequent comments, it was apparent that some of them interpreted these discussions to imply that AID intended to furnish them with additional support, and they became further disillusioned when the support was not forthcoming. This added to the general dissatisfaction with AID and with the generator project.

Thus, a series of circumstances led people in several of the towns to feel that they had been dealt with badly. In their view AID had given promises and had induced them time and again to make agreements, to bear costs, and to expend energy, time, and emotion in a venture in which the performance of both the Agency and its equipment was disappointing.

As emphasis had changed in the Agency from an earlier interest in community development to other types of assistance programs, Mission officials indicated that the project was of relatively little importance compared to the Mission's major programs in Colombia. Thus, when things began to go wrong with the projects--delays in installation, breakdowns in equipment, deficiencies in administration, failures to pay for the service, failures to make repairs, strife in the towns connected with the projects and their problems--and as complaints began to come in from the towns, the Mission could not afford to assign its very limited manpower to deal with them effectively. Further, the Mission felt that the townspeople's dissatisfaction represented a political liability.

Consequently, it preferred to curtail its support of the field work, and it was especially disinclined to support new town enterprises which were inherently risky. The Mission decided that it would be better to disengage itself from the generator project than to support a new set of activities (introduction of new economic practices) which might open a Pandora's box of further difficulties. It aimed to transfer as quickly as it could all functional responsibility for the generators to the Colombian departmental Electrificadoras. It took the position that its interest in the project at that point was confined only to the question of whether the Colombians would and could make use of the generators without further attention from AID.

Impacts of Generators

Utilization of Electricity

It had been hypothesized that electricity would be utilized increasingly over time--specifically, that more households would begin using electricity, and that households would be using electricity for a wider variety of purposes. The results bearing on this hypothesis are summarized in Table 7 which compares uses of electricity in 1965 with uses in 1966, 16 months later.

TABLE 7

UTILIZATION OF ELECTRICITY

Period	% of households using electricity	No. of uses per household	% using for light	% using for radio	% using for ironing	% using for other purposes	No. of light bulbs per household
1965	52	1.20	98	7	10	3	2.59
1966	53	1.69 ^a	100	22 ^a	36 ^a	12	3.87 ^a

^a Statistically significant difference between 1965 and 1966.

There was virtually no change in the number of households using electricity; the figures for the two surveys were 52% and 53% of the households, respectively. (The percentages ranged from 24% of the households to 94%.) It was found that households using electricity used it to a significantly increased degree over time. The mean total uses of electricity per user-household rose significantly from 1.2 uses per household to 1.7 uses per household. In the initial survey most of the households were using the electricity only for lighting; approximately 7% of the households reported that they were also using it for radio, and 10% for ironing clothes. In the later survey it was found that over 22% of the households were using the electricity to power radios and 36% were using it for ironing. Use of the electricity for lighting itself also increased significantly. During the first survey users reported an average of 2.6 electric light bulbs per household. By the second survey the average had risen significantly to 3.9 bulbs per user-household.

Social and Community Relations

It had been hypothesized that townspeople, particularly those using the electrical service, would participate increasingly in civic, developmental, and social organizations.

One of the chief impacts of the generators was that organization and responsibility were required to keep the electrical service going; individuals and groups in the towns had to take action with regard to a community problem. It should be noted that between the first and last survey, the development committees in four towns were reorganized as part of the change in administration and operation of the generators (see Appendix D). Thus, there were changes in the social organization which were a direct consequence of the generators. This was true from the inception of the generator project, inasmuch as development committees concerned with the administration of electricity came into being solely for this purpose. In some towns realignments of factions necessitated

by the generator program were judged by the staff to be of considerable social significance to the townspeople.

Often interruptions in service occasioned meetings of the juntas responsible for the administration of the generators, or meetings of the whole town, where the problem was discussed, sometimes with great acrimony. In some towns the specific difficulties with the generators or other difficulties, such as failure to pay for service, became the focal issue for exacerbation of long-standing rivalries between hostile factions or individuals. In towns where the generator functioned well and payment difficulties were few, the experience of managing the service was judged by townspeople and the project staff to be beneficial. In the other towns, however, attempts to solve the problems introduced by the generators often ended in failure, leading to disappointment and negative attitudes toward the officials and agencies considered responsible by the townspeople.

On the basis of the direct observations by resident project members, it was found that the recreational life of several towns had changed somewhat. Specifically, when the systems were functioning there appeared to be much more attendance at public places, such as tiendas, during the evenings. This observation was confirmed by responses to the last survey.

Eighty-three percent of the users, significantly more than the non-users, indicated that there had been positive changes in their social relations, and the same percentage reported that their leisure-time activities had changed as a consequence of the electricity. (See Table 8.) This was significantly more than the percentage of non-users (38%) who indicated that such change had taken place, indicating that there was more visiting among the users and more time spent by the users in community affairs.

The surveys also indicated a significant change in group membership among both the users and the non-users. During the first survey, 61% of the users belonged to at least one community group. During the last survey, approximately 16 months later, this had risen to 85% of the users. Corresponding figures for non-users are 48% and 81%. Significantly more

TABLE 8

SUMMARY OF CHANGES IN SOCIAL RELATIONS

A. Percent Reporting Effects of Generators on Social Relations (1966)

	<u>Positive changes</u>	<u>Negative changes</u>	<u>No change; No response</u>
Users	83 ^b	1	16 ^b
Non-Users	60	4	37

B. Percent Reporting Change in Leisure-Time Activities (1966)

	<u>None</u>	<u>Rest or social activities</u>	<u>Community or economic affairs</u>
Users	17 ^b	62 ^b	21 ^b
Non-Users	62	30	8

C. Percent Reporting Membership in at Least One Group

	<u>1965</u>	<u>1966</u>
Users	61 ^b	85 ^a
Non-Users	48	81 ^a

^a Statistically significant difference between 1965 and 1966.

^b Statistically significant difference between users and non-users.

users than non-users had belonged to at least one group at the time of first survey, but this difference had disappeared at the time of the second survey.

There is some evidence that the generators tended to exacerbate poor social relations between classes. The poorer people made it explicitly clear to observers that they could not install and use electricity for lack of funds. In one town, for example, the wealthier townspeople refused to keep the generator in operation (although they apparently could afford to do so) because they did not want the poorer people, who had had the electricity installed, but who could not pay for it, to

benefit from the electricity at their expense. Hostility between the two classes of people was thus increased, rather than diminished, by the presence of the generator.

It had been hypothesized that relations between the sites and outside organizations would be increased as a result of the generator being in the site. The results indicate that this in fact happened, and that it was perceived to a significantly greater extent by the users than by the non-users. In the most remote towns, trips for fuel and lubricant increased contact with the outside world. Residents from a number of the towns traveled to provincial capitals to negotiate with Electrificadoras and government agencies for assistance in changing the installations and maintaining the generators. During the second survey, 60 percent of the users (versus 35% of the non-users) said that the attention given the site by outside government authorities had improved, 53% (versus 32%) said that the priest was giving the site greater attention, and 65% (versus 46%) said that the prestige of the community in the eyes of other communities had improved.

Personal Changes

It had been hypothesized that changes desired by the townspeople would become more realistic with time, and would be more oriented toward economic improvement, with these attitudes being more prevalent among the users of the electrical service than among the non-users.

There is some evidence in the findings that some of the townspeople developed a greater sense of realism, or a more instrumentally productive orientation, in their conceptions of needed improvements. As shown in Table 9, 64% of the users and 61% of the non-users indicated in 1965 that they thought that the town needed services and goods, thus evidencing primarily a consumer orientation. By the end of 1966, although approximately the same percentage of users chose this category, the percentage of non-users had dropped significantly (39%), and slightly larger percentages of non-users chose other categories, e.g., education, better electrical service, and land ownership. The major shift in response of users between 1965 and 1966 also indicated such a change in

TABLE 9

TYPES OF COMMUNITY IMPROVEMENTS DESIRED BY TOWNSPEOPLE

	None specified		Services and goods		Education		Income improvement		Capital & tools		Land ownership		Better electrical service	
	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966
% of Users	4	0	64	67 ^b	11	5	5	7	2	12 ^a	3	4	12	4
% of Non-Users	4	2	61 ^a	39	13	18 ^b	6	11	2	5	3	12 ^a	10	13 ^b

^aStatistically significant difference between 1965 and 1966.

^bStatistically significant difference between users and non-users.

orientation. Increased numbers of respondents reported a desire for capital and tools for the town (from 2% to 12% of the user respondents).

This trend toward realism is further evidenced by the responses of the townspeople to the question asking for their opinions concerning changes that would be of personal benefit. (See Table 10.) In this case,

TABLE 10

TYPES OF PERSONAL IMPROVEMENTS DESIRED BY TOWNSPEOPLE

	None specified		Services and goods		Education		Income improvement		Capital & tools		Land ownership		Better electrical service	
	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966
% of Users	20 ^a	3	7	9	1	0	30	23	28	51 ^{ab}	15	6 ^a	0	4
% of Non-Users	16 ^a	6	4	10 ^a	0	0	33	33	25	32	21 ^b	15 ^b	1	4

^aStatistically significant difference between 1965 and 1966.

^bStatistically significant difference between users and non-users.

the users showed the more significant shifts in response between 1965 and 1966. In 1965, 28% indicated that capital and tools would contribute most to their personal betterment, but by the end of 1966 as many as 51% mentioned capital and tools. This percentage is also significantly greater than the 32% of non-users who mentioned capital and tools in 1966. The users also showed a significant drop in the percentage who cited land ownership for personal betterment, and in both surveys more non-users than users gave this response.

It can be conjectured that the shift in interest from land ownership to capital and tools may represent a move from a traditional to a more modern orientation. The facts that more non-users chose land ownership than users and, conversely, that more users than non-users chose capital and tools would tend to reinforce this conjecture. Land ownership may have more operationally meaningful value for some of the rural poor than capital or tools. The differences between users and non-users may simply indicate that more users already own land and now need tools to improve it.

Respondents were asked both in 1965 and 1966 what tools they would like to have to work with. (See Table 11.) In 1965, 44% of the users

TABLE 11
TYPES OF TOOLS DESIRED

	No answer or none		Common hand tools		Improved tools		Advanced or very advanced		Profes-sional		Unde-fined	
	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966
% of Users	44 ^a	6	22	33	0	1	21 ^b	33 ^b	6	24 ^a	0	3
% of Non-Users	39 ^a	18	32	42	6	1	5	16 ^a	11	23 ^a	0	1

^aStatistically significant difference between 1965 and 1966.

^bStatistically significant difference between users and non-users.

and 39% of the non-users either indicated that they wanted no new tools or gave no answer to this question. By the end of 1966, only 6% of the users and 18% of the non-users gave no answer or replied that they wanted no new tools. In 1966, 58% of the users and 40% of the non-users mentioned tools more advanced than the common agricultural laboring tools (including power-driven tools). Previously, the proportions were 27% and 22%, respectively, indicating an increased level of desire on the part of both users and non-users. It is reasonable to assume that experience with the generators contributed directly to these changes. This tends to confirm the prediction of the Electrificadoras that one of the chief benefits of the generators would be to familiarize the people with the potential uses of electricity. The finding that more users wanted advanced or very advanced (power) tools than non-users, tends particularly to confirm this prediction.

In a further attempt to discover aspirations of the townspeople, they were asked what they would do if they had surplus money, for instance, if they had won a lottery. As can be seen from Table 12,

TABLE 12

PROPOSED USES OF POTENTIAL SURPLUS MONEY

	No answer		Travel		Charity		Household improvements, education, health, pay debts		Savings		Work improvements		Investment, business	
	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966	1965	1966
% of Users	6	2	3	7	6	12	61 ^a	39	1	0	51	46	32 ^b	34
% of Non-Users	5	0	4	7	7	2	57 ^a	32	0	0	69 ^{ab}	46	19	42 ^u

^a Statistically significant difference between 1965 and 1966.

^b Statistically significant difference between users and non-users.

here again there is some evidence of a shift from a consumer to a producer orientation. In the first survey, 61% of the users and 57% of the non-users indicated that they would spend the money for improvements in the household, for education, for health, or to repay debts. In 1966, significantly fewer respondents in each category preferred these uses of money (39% of the users and 32% of the non-users). In 1965, significantly more users (32%) than non-users (19%) indicated a preference for investment or business, but in 1966 the proportion of non-users rose significantly to 42%, while the proportion of users remained virtually the same.

Why the percentage of non-user responses indicating intention to invest in work improvements fell between 1965 and 1966 is unclear. It is possible that members of this group felt that work improvements were not realistically possible, having been disappointed by the lack of support and progress in this regard after the generators were introduced. The finding that an increased percentage of non-users indicated that they would invest surplus money in businesses might argue against this explanation. However, it is possible that a number of non-users came to believe that they could improve their condition by business investments because of the discussions of the economic potentials of the generators that were introduced by the project staff.

In the final survey at the end of 1966, the respondents were asked whether the generator had affected their opinions, attitudes, or outlook. (See Table 13.) Twenty-five percent of the users and 39% of the non-users indicated that there had been no change during the period. The percentages of users choosing the various categories of changes were similar to the percentage of non-users. The predominant responses indicated only vague improvements in environment or in the individual. Very small percentages of both users and non-users indicated that there had been changes in business or in work (between 2% and 4%). Only 6% in each category spontaneously cited an increased desire for full-time electricity as a result of having the generator.

TABLE 13
TOWNSPEOPLE'S REPORTS OF EFFECTS OF
ELECTRICITY ON OPINIONS, ATTITUDES, AND OUTLOOK (1966)

	None	Better <u>ambiente</u>	Community <u>progress</u>	Individual <u>improvement</u>	Community <u>development</u>
% of Users	25	17	23	15	5
% of Non-Users	39 ^b	15	17	13	2

	Business improve- <u>ment</u>	Work change	Desire for full-time <u>electricity</u>	Average changes <u>mentioned</u>
% of Users	3	3	6	3.24 ^b
% of Non-Users	4	2	6	2.06

^b Statistically significant difference between users and non-users.

All of the types of changes mentioned in response to direct questions concerning ways in which the electricity or the presence of the generator had affected the townspeople were tabulated to obtain a rough quantitative indication of the differences in users' and non-users' opinions concerning the impact of the generators. Users mentioned an average of 3.24 changes, whereas non-users mentioned an average of only 2.06 changes. The difference between the two groups was statistically significant.

The proportion of respondents who indicated that they had considered leaving their communities increased significantly between the two surveys, for both users and non-users, going from 19% to 32% for the users and from 14% to 32% for the non-users. For both groups, over half of the reasons given involved economic improvement. (53% of the reasons given by the users; 64% of the reasons given by the non-users.) This tends to

confirm the observers' impressions that the electricity had made both groups aware of potential economic improvements and had sharpened class distinctions. Thus, one can speculate that both groups, and particularly the poorer townspeople, had become increasingly dissatisfied with economic conditions in their towns over the period of the study, perhaps because of the potentialities that electricity opened to them, perhaps because of greater contact with the outside world, or perhaps directly as a consequence of discussions of potential economic innovations introduced by project staff in connection with this study.

It is not known whether some of the differences between the two groups resulted from changes over the two-year period as a consequence of the electricity, or are associated with other differences between the two populations. For example, the users tended to be more affluent and better educated than the non-users. Many previous studies have found that socioeconomic status is positively related to the adoption of innovation. Thus, it is quite possible that many of the more positive and progressive attitudes and the greater knowledge shown by users are associated with the personalities and economic capabilities which caused them to adopt the electricity, rather than the converse. However, insofar as non-users tended to respond more like users with time, and since their economic conditions had not improved, this too would argue that the generator project (not necessarily the personal use of electricity itself) had contributed to changes in outlook, attitude, or intention of non-users as well as users.

It had been hypothesized that as a result of engaging in the development of economic enterprises, various personal changes in outlook would occur that are associated with a shift from traditionalism to modernism. It was also hypothesized that regardless of engagement in economic activity the users of the electrical service would show more of the "modern" characteristics than would the non-users. The findings which follow bear on the latter hypothesis.

(1) Knowledge of Assistance Alternatives. The townspeople were asked three basic questions to determine their knowledge about various practical development alternatives, such as credit, water supply, health needs, agriculture, housing, roads, education, legal problems, etc. They were asked to cite all the agencies or offices whose function it was to supply help concerning each specific problem, to describe the ways in which these places could give help, and whether they believed people really would get help in these places.

As can be seen from Table 14, users showed consistently higher mean

TABLE 14

KNOWLEDGE OF ASSISTANCE ALTERNATIVES (1966)

	<u>Potential sources of help mentioned</u>		<u>No. of mentioned ways sources could help</u>		<u>No. of ways of helping judged to be likely</u>
	<u>Mean No. mentioned</u>	<u>Mean No. correct</u>	<u>Mean No. mentioned</u>	<u>Mean No. correct</u>	<u>Mean</u>
Users	15.16 ^b	11.28 ^b	14.68 ^b	11.16 ^b	13.14 ^b
Non-Users	12.32	8.11	11.70	7.80	10.60

^b Statistically significant difference between users and non-users.

scores than non-users. In all cases the differences are significant. Users knew of more sources, knew of more ways in which the sources could supply help, and were more often correct about both of these sorts of alternatives. They also were more optimistic, or perhaps more realistic, than non-users concerning the actual possibility of obtaining help from these sources. Insofar as a knowledge of correct alternatives is an essential part of problem-solving, it can be conjectured that these figures may indicate that the problem-solving capability of the users was somewhat higher than that of the non-users.

(2) Willingness to Assert Rights. In an attempt to determine willingness to assert one's rights, four questions were asked. One concerned the respondent's reactions to a problem between himself and the government, namely, "If the government were to use your land for a public service and wanted to pay you too little for the land, what would you do?" The second was concerned with a problem between individuals: "If a merchant has been selling you bad products, for example, false medicine, wrong fertilizers or insecticides, or bad food, what would you do?" The third concerned a relationship between authorities and the community: "If authorities neglect to provide what should be available at the site, like water supply or teachers, or if they change the transportation system, abandoning this site, what would you do?" The fourth concerned an unspecified relationship: "If you were paid too little for your products or paid too low a wage for your work, what would you do?" A respondent was classified as willing to assert his rights if his response indicated refusal to accept the condition or that he would take a positive remedial action.

The results are summarized in Table 15. No significant differences

TABLE 15

WILLINGNESS TO ASSERT RIGHTS (1966)

	Government vs. <u>Individual</u>	Individual vs. <u>Individual</u>	Authority vs. <u>Community</u>	Unspecified relationship
% of Users	63	89	79	72
% of Non-Users	63	88	68	77

were found between users and non-users with regard to any of these questions. Both groups indicated a greater willingness to assert

their rights with respect to other individuals than with regard to the other types of interaction (almost 90%).

(3) Self-Confidence. Two measures were developed to determine self-confidence. In one measure the respondent was given a list of specific occupations and was asked to choose one for which he felt he might have been successfully educated or trained. The occupations were then classified as low-occupational-ability and high-occupational-ability groups. In the lower-ability group were such occupations as farmer, waiter, and truck driver, and in the higher-ability group were such occupations as teacher, army or navy officer, architect, and lawyer. The results are summarized in Table 16. The users differed

TABLE 16

SELF-CONFIDENCE:

TYPE OF OCCUPATION FOR WHICH TOWNSPEOPLE BELIEVED
THEY COULD HAVE BEEN SUCCESSFULLY TRAINED (1966)

	<u>Lower ability group</u>	<u>Higher ability group</u>
% of Users	32	68 ^b
% of Non-Users	51 ^b	48

^b Statistically significant difference between users and non-users.

significantly from the non-users with regard to this measure. Sixty-eight percent of the users chose an occupation which indicated a high regard for personal capability as compared to only 48% of the non-users.

The second measure of self-confidence was aimed at determining where the individual respondent ranked himself as compared with others in the community concerning his ability to deal with various kinds of community, family, and other issues. Specifically, he was to rate himself in his occupation, to rate himself concerning his capacity to be the local president of Acción Comunal, on his capacity to advise on economic

problems in the town, on his ability to advise on family problems, and on his ability to conduct a business. The users and non-users also differed significantly on this measure. Of a total possible score of 35 (allowing seven scale points for each of five answers) users had an average aggregate score of 22.02; non-users had an average aggregate score of 17.73.

On the basis of the two measures, we may conclude that the users of electricity are probably more confident of their own personal abilities than the non-users.

(4) Acceptance of Change. A number of items were constructed in an attempt to determine how readily respondents would accept changes in work, education, and community attitudes and behaviors. For each of these topics, individuals were asked whether they believed change was necessary, whether they believed that change was realistically possible, and a series of questions concerning what they would do to bring change about if they thought it desirable and possible. Responses indicating a willingness to take action to bring about change were aggregated into a Change-Effort Score.

Tables 17, 18, and 19 summarize the differences in attitude

TABLE 17

WILLINGNESS TO ACCEPT CHANGES REGARDING WORK (1966)

	<u>Need for improvement in work conditions</u>			<u>Possibility of improve- ment in work conditions</u>			<u>Change-Effort Score</u>
	<u>Percent</u>			<u>Percent</u>			(Scale:0-14)
	<u>None</u>	<u>Some</u>	<u>Much</u>	<u>None</u>	<u>Some</u>	<u>Much</u>	<u>Mean</u>
Users	2	45	53 ^b	17	76 ^b	7	10.65 ^b
Non-Users	11 ^b	46	43	36 ^b	56	8	9.83

^b Statistically significant difference between users and non-users.

TABLE 18

WILLINGNESS TO ACCEPT CHANGES REGARDING EDUCATION (1966)

	<u>Need for improvement in education conditions</u>			<u>Possibility of improve- ment in education condi- tions</u>			<u>Change-Effort Score</u>
	<u>Percent</u>			<u>Percent</u>			(Scale:0-5)
	<u>None</u>	<u>Some</u>	<u>Much</u>	<u>None</u>	<u>Some</u>	<u>Much</u>	<u>Mean</u>
Users	5	38	57	5	78	17	4.42 ^b
Non-Users	10	38	52	11	76	13	3.80

^b Statistically significant difference between users and non-users.

TABLE 19

WILLINGNESS TO ACCEPT CHANGES IN ATTITUDES AND BEHAVIOR OF OTHERS (1966)

	<u>Need for improvement in attitudes & behaviors of others</u>			<u>Possibility of improve- ment in attitudes and be- haviors of others</u>			<u>Change-Effort Score</u>
	<u>Percent</u>			<u>Percent</u>			(Scale:0-7)
	<u>None</u>	<u>Some</u>	<u>Much</u>	<u>None</u>	<u>Some</u>	<u>Much</u>	<u>Mean</u>
Users	4	38	58	12	77	12	5.04 ^b
Non-Users	11	39	50	24	62	14	4.62

^b Statistically significant difference between users and non-users.

between users and non-users in 1966 with regard to work, education, and community attitudes and behaviors, respectively.

As shown in Table 17, significantly more users thought there was a great need for improvement in work conditions and that there was some possibility that such improvements could come about. Similarly, users obtained a significantly higher mean Change-Effort Score than non-users, indicating a greater willingness to devote effort to bring about improvements. Although 43% of the non-users and 53% of the users indicated that there was much need for improvement in work conditions, only 8% of the non-users and 7% of the users thought there was much possibility of improvement. It may be conjectured that both non-users and users may have become disillusioned with the possibility of work improvement because little or no improvement had occurred as a consequence of the generator, and that this disillusionment was slightly stronger among the non-users.

These results, together with the findings on the use of surplus money (see Table 12), lend support to the possibility that the presence of the generator had made both users and non-users more aware of their poverty and more concerned with economic improvement. It will be recalled that over half of the users and almost two thirds of the non-users who reported in 1966 that they had considered leaving their communities gave reasons involving economic improvement. The fact that more users are sanguine about the possibility of work improvement is consistent with the finding that fewer users considered leaving their communities for economic reasons.

With regard to willingness to accept changes in education and changes in community attitudes and behavior, users and non-users did not differ significantly, at least half of each group indicating that there was a great need for improvement and over two thirds indicating there was some possibility for change. (See Tables 18 and 19.) A consistent difference is found, however, with regard to the degree of effort they said they would be willing to engage in in order to bring about changes

in the three areas; with the users consistently indicating a greater willingness to work toward achieving changes than the non-users.

It is apparent from the differences in sophistication, confidence, and apparent willingness to bring about improvements that the users of the electrical service, as a group, were relatively more "modern" in orientation than the non-users. Perhaps the most plausible explanation of these differences is that it was the more modern attitude which led them to subscribe to the electrical service at the start of the program, although it is, of course, possible that at least some users' attitudes were influenced by their participation, particularly by their involvement in the administration of the electrical systems and by their increased exposure to radios.

Economic and Infrastructural Changes

The hypotheses regarding the economic impacts of the generators were untestable since they were based on the assumption that the electricity would be utilized for economic purposes. This section summarizes some of the findings regarding the possibilities for such utilization of electricity, and some of the findings regarding economic and infrastructural changes that occurred during the field period of the study.

No new economic activity was undertaken as a direct consequence of the electricity, nor did any existing economic activity utilize the electricity during the two-year period of the project. Although it was believed by the project staff, on the basis of analysis of existing and potential productive capacity and markets, that possibly 6 and probably 3 of the 14 towns might improve their economic conditions by employing the electricity, no active steps were taken by any of the towns to realize their potential. They lacked the capital to invest in new machinery, the internal organizational capability, and the external assistance that might have taught them the requisite skills and methods and encouraged them to embark on new ventures.

Appendix C presents the detailed results of an analysis of prospective economic practices and market potentials for the various

towns. It should be recognized that it was the judgment of the staff, on the basis of the aforementioned analysis, that in 8 of the 14 towns there was virtually no chance for the townspeople to introduce or adopt new economic practices either because their productive capacity was insufficient or the marketing problems too great to permit any significant improvement. The cost of producing marketable items using the electricity of the generators would have been higher than the costs to other towns deriving their electricity from the national grid. Even in the three towns which were judged to have the best chance for improvement it was believed that the risks of failure were very high, and that the towns could not prepare proposals for small project assistance which would contain sufficient justification to warrant assistance from USAID's small-project funds.

Several of the questions in the second survey bear indirectly on the criteria of economic change. At this time householders were asked whether they had obtained a new job, whether they had obtained credit, and whether they thought business had improved within the last 16 months. The results are summarized in Table 20, showing responses of users and non-users to these questions.

TABLE 20

RESPONSES CONCERNING ECONOMIC CHANGES DURING THE INTER-SURVEY PERIOD (1966)

	Obtained new job	Obtained credit	Business in community improved	Changes in work*
% of Users	35	54 ^b	52	68 ^b
% of Non-Users	24	38	40	40

* The entries indicate the percentage that gave at least one positive response in a set of five questions (see text, page 46).

^b Statistically significant difference between users and non-users.

Thirty-five percent of the users reported that they had gotten a new job during the period as compared with 24% of the non-users. Fifty-four percent of the users had obtained credit during the period as compared to 38% of the non-users. About half the users and 40% of the non-users believed that business had improved in their community. The difference between users and non-users was significant only with regard to obtaining credit.

The respondents were also asked a set of five questions pertaining to "changes in work" over the past two years:

- a. Have you improved your work in any way?
- b. Do you have new tools or materials?
- c. Do you have new seeds or crops?
- d. Have you made any new buying or selling contacts?
- e. Have there been any other work changes?

As shown in the last column of Table 20, significantly more users (68%) than non-users (40%) gave at least one positive response to these questions.

Since the power was never utilized directly in income-producing activities, it is probable that the difference between users and non-users in economic betterment was not a direct result of having electricity; it may instead reflect a higher initial socioeconomic status on the part of the users. However, it is also possible that users developed or reinforced a more progressive outlook and may have taken specific action to improve their economic conditions as a consequence of their experiences with the electricity, its administration, or their related contacts with the outside world.

With regard to infrastructural changes, the only changes readily observed in the towns were those directly connected with the introduction of the electrical systems (small buildings in each town to house the generators, street-wiring installations from generators to houses, and a few street lights). Significantly more of the users (59% compared with 32% of the non-users) indicated there had been improvements in the

roads or streets in their communities over the past two years, which probably reflects greater attention to the street lights on the part of the users. There were slight improvements inside public buildings (church, health center, or school), but no improvements in transportation or in means of communications.

The general conclusions of the study concerning economic impacts of the generators is that the generators, because of their placement without regard to economic potential, did not contribute directly to improvement in the economic conditions of the towns. Had they been sited in communities with better production and market potentials, in regions where the generator communities were not in competition with other communities having cheaper sources of power, and had external agencies, either Colombian or foreign, supplied the additional capital or capital goods, and the training, organization, and motivational improvements that the towns required, the generators might have contributed to improvement in the economic conditions of the towns and their people. Inasmuch as the generators were placed with little or no regard to any of these factors, it is apparent that the test of the utility of electrical generators was highly limited from the economic point of view; it was not possible to test the effect of placing generators in the context of favorable environmental and social conditions that might interact with other innovations ultimately leading to significant economic changes.

In Conclusion

The generator projects made a variety of impacts on the rural towns and in certain ways affected users and non-users differently.

1. Although the percentage of users did not increase during the period of study, the uses of electricity increased and became more varied.

2. Poor initial training of the townspeople in the administration and operation of the electrical systems, equipment breakdowns, and burdensome costs, together with a lack of cooperation by Colombian and U.S. agencies created considerable dissatisfaction with AID and the Colombian agencies in the majority of towns.

3. The presence of the electrical systems and the availability of electric light appears to have made generally positive changes in social relationships among a majority of users of the electrical service, and, to a lesser extent, among non-users.

4. Difficulties connected with the administration of the electrical systems appear to have created or aggravated hostilities between the wealthier and poorer residents of some of the towns.

5. The electrical systems increased direct personal contact among the townspeople, and increased contact between users and officials of outside agencies. Contact outside of the towns was also increased by the increased use of radio.

6. The presence of the electrical systems, and the activities and contacts associated with them, appear to have increased the townspeople's awareness of their poverty and their concern for economic improvement. A significantly larger percentage of users appeared to be optimistic about the prospects of economic improvement in their communities. However, it appears that many non-users became more pessimistic about the prospects of economic improvement in their communities, perhaps as a consequence of their realization that the electricity had not contributed to their improvement.

7. Both users and non-users became more aware of the potential uses of electricity and its potential economic benefits. These impacts affected users to a significantly greater degree than non-users.

8. Virtually no improvements in the physical features of the towns (roads, buildings, etc.) were made during the period of the study (other than the electrical installations themselves).

9. No economic improvements can be attributed to the electricity.

10. Users of the electricity appeared to be more modern in attitude and outlook than non-users. The degree to which their more modern orientation can be attributed to the electricity, to their experience with the administration of the electrical service, or to their higher socioeconomic status, can not be definitively stated.

APPENDIX A

First Survey Questionnaire

QUESTIONNAIRE*

IRI/AIR E-40

I. GENERAL INFORMATION

1. Questionnaire No. _____
2. Interviewer No. _____
3. Date _____
4. Place _____

We are students from the National University, working for a scientific institution and the economic mission of the United States.

As you know the economic mission gave fifteen electrical generators to fifteen Colombian communities, and now they have asked us to do an evaluation study, in order to know what results have been obtained and how these generators may best be utilized. Your cooperation is needed in providing the information necessary to achieve these goals.

* This is an English translation from the original Spanish questionnaire used in Colombia.

II. DEMOGRAPHIC INFORMATION

5.

a	No.	1.	2. etc.
b	Name		
c	Relation to Head of Household		
d	Age		
e	Marital Status		
f	Place of Birth		
g	Ability to Read		
h	Ability to Write		
i	Years of Education		
j	Principal Occupation		
k	Years of Residence		
l	Migration		
m	Motive for Migration		
n	For Whom Working		

6. Members of the family that have left home.

7. Have you lived in other places?

Place	Duration of Residence	Occupation	In comparison to your earlier residence, this one is:
			Better Equal Worse

8. Have you thought of living in another place?

- a. Where?
- b. Why?

III. ECONOMIC

- 9. Besides your present work, what other things do you know how to do?
- 10. Which of these things do you do best?
- 11. Why are you not doing it?
- 12. What other job would you like to be doing?
- 13. Why are you not doing it?
- 14. Which of your functions (activities or occupations) have given you the best income, either now or in the past?
- 15. Which members of your family are able to do other things besides those which they are actually doing?
 - a. Name
 - b. Relation to head of household
 - c. Function or skill

16. Have you worked in:

- | | |
|------------------------|----------------------|
| a. shop_____ | How did you like it? |
| b. factory_____ | " " |
| c. store_____ | " " |
| d. company_____ | " " |
| e. other settings_____ | " " |

(Use scale for: "How did you like it?")

Why?

IV. CREDIT

17. Have you obtained a loan or credit in the last five years?

Institution or person	Place	Purpose	Date	Amount of Loan	Total debt
--------------------------	-------	---------	------	-------------------	------------

18. What results did you obtain from the credit or loan?

Why?

19. In general, what do you think about credit?

Very good	Good	Indifferent	Bad	Very bad
-----------	------	-------------	-----	----------

(Use the scale)

V. INTERESTS

20. What things would you like in order to improve this town?
(If he doesn't mention economic aspects, ask specifically)

20-a What things would you like for improvement of your own situation?

21. What things would most of the people want for improvement of
this town? (If he doesn't mention economic aspects, ask
specifically)

21-a What things do most of the people want for their own improvement?

22. What would you do if you had enough money (for example, if you
won a lottery)?

VI. COMMUNICATIONS

23. Whom do you visit most frequently?

Name-Relationship	Where	Frequency	Purpose of Visit
-------------------	-------	-----------	------------------

24. Who visits you most frequently?

Name-Relationship	From Where	Frequency	Purpose of Visit
-------------------	---------------	-----------	------------------

25. Where do you go to buy or sell things?

Where do you sell	Frequency	Where do you buy	Frequency
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VII. GROUPS

26. To which of the following groups do you belong?

Acción Comunal	Director	Member
Sporting Club		
Cooperative		
Parents' Association		
Religious Association		
Other (specify)		
None		

27. Have you ever worked in a group?

With how many people?
For what purpose?
Who directed the group?

VIII. ELECTRICITY

28. Do you have electricity in your house?

29. Do you know the service schedule in this town?

30. Usually, during what hours of the day do you use electricity in your house?

31. What uses do you make of electricity (Specify - e.g., light, iron, radio, heater, other)?

32. How many bulbs do you have in your house?

33. Where are they located?
34. What conditions have changed since the installation of the generator?
 - a. in the house
 - b. in the town
35. What is your monthly cost for the electricity?
36. To whom do you make the payments?
37. What is the ultimate use of these funds?
38. What is your general opinion about having electricity in the town? (Use ladder scale ranging from very good to very bad)

(If response is negative) Why?
39. What suggestions to you have for improving the electricity service?

IX. LIVING ARRANGEMENTS

40. Number of rooms in the house?
41. Latrine _____ Toilet _____ Other _____
42. Clock _____ Radio _____ Sewing Machine _____
43. What tools do you use?
44. What other tools would you like to have?
45. Separate kitchen _____
46. Drinking water obtained from: well or spring _____ aqueduct _____
river _____ other (specify) _____
47. Distance of water supply: near (0-100 meters) _____ moderate
distance (100-500 meters) _____ distant (500 or more) _____
48. Composition of walls: adobe _____ "Bahareque" _____ brick _____
wood _____ cement _____ other (specify) _____
49. Floors: soil _____ wood _____ brick _____ cement _____ other
(specify) _____
50. Composition of roof: clay tile _____ Eternit _____ cement tile _____
zinc or tin _____ palm or straw _____ other (specify) _____

X. GENERAL OBSERVATIONS

Describe the people seen during the interview, especially those over six years of age, specifying which are wearing shoes and type of shoe.

Show interviewee each of three cards containing the reading tests.

Sentences as follows:

1. The interview is finished, thank you.
2. What is your opinion of INCORA?
3. What is the principal socioeconomic problem in this town?

(Note for each card whether read and understood)

APPENDIX B

Final Survey Questionnaire

FINAL SURVEY QUESTIONNAIRE*

IRI/AIR E-40

I. ITEMS FROM FIRST SURVEY

1. Name of informant _____
2. How many persons are there in your house? _____
3. How many of your family have left the site during the last year?

<u>Age</u>	<u>Sex</u>	<u>Why Left?</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

4. How many members of your family have returned to site during the last year?

<u>Age</u>	<u>Sex</u>	<u>Why returned?</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. Have you thought of leaving the site? Yes _____ No _____
6. Where? _____
7. Why? _____
8. What is your current occupation? _____
9. How long have you been doing that? _____
10. In the last 16 months, have you done any new or different type of work than you regularly do?

* This is an English translation from the original Spanish questionnaire used in Colombia.

11. Since July 1965, have you borrowed money or have you gotten credit from any person or institution?

Yes _____ No _____

If yes:

Institution or person	Place	Purpose	Date	Amount

12. In general, what is your opinion about credit?

Very good Good Fair Bad Very bad

13. What do you think should be done to improve the Site?

1. _____ 2. _____
3. _____ 4. _____

14. What would you like to see done to improve your income?

15. What do you think other people in town would like to see done in order to improve the Site?

1. _____ 2. _____
3. _____ 4. _____

16. What do you think they would like to see done to improve their income?

17a. Whom do you visit frequently?

Name	Relation	Place	Frequency	Purpose of Visit

17b. Who visits you frequently?

Name	Relation	Place	Frequency	Purpose of Visit

18. What groups, clubs or associations do you belong to?

<u>Officer</u>	<u>Member</u>	
_____	_____	Acción Comunal
_____	_____	Sporting club
_____	_____	Cooperative
_____	_____	Parent's association
_____	_____	Religious association
_____	_____	Association for business
_____	_____	Other (work group, community work, etc. specified)

19. Do you have electrical installation in the house? Yes _____ No _____

20. If Yes, are you using it? Yes _____ No _____ If no, why? _____

21. Usually how many hours do you use electricity in your house?

During day _____ During evening _____

22. If you don't have electricity, why not? _____

23. If it was discontinued, when did that happen? _____

Why? _____

24. What uses do you have for electricity?

	<u>Yes</u>	<u>No</u>		<u>Yes</u>	<u>No</u>
Lighting	___	___	Mill	___	___
Iron	___	___	Ventilator	___	___
Radio	___	___	Heater	___	___
Stove	___	___	Other	___	___
_____			(Specify) _____		

25. How many bulbs do you have, in total? _____

26. Is the electrical service dependable? Yes _____ No _____

27. What do you think of the cost of the electricity?
Too high _____ Satisfactory _____ Too low _____

28. Would you want electrical service during the day at present rates of payment?

Yes _____ No _____

29. Has the electricity affected the way you spend your leisure time?

30. Has the electricity affected your way of life in any other way?

31. How has the presence of the generator affected your opinions, attitudes, and outlook?

32. How has the presence of the generator affected your relations with other people?

33. What can you suggest to improve electrical service?

34. What tools would you like to have to work with?

35. If you had enough money, for instance, you won a lottery, what would you like to do?

36. Have you worked in a group during the last 18 months? Yes _____ No _____

37. How many persons? _____

38. What was the purpose? _____

39. Who was the leader? _____

II. KNOWLEDGE ABOUT PRACTICAL ALTERNATIVES

40. Please tell me about all places you know which are supposed to help or are willing to help on the following problems:

Problem on:	Places which are supposed to or are willing to help	In what way?	Can people really get help here?
Credit			
Water supply			
Health needs			
Agriculture			
Housing			
Roads			
Education			
Legal problems			
Families' problems and disputes			
Electrical service			
Labor			
Land tenancy			
Water for irrigation			

III. WILLINGNESS TO ASSERT ONE'S RIGHTS

(Group or authority to person)

41. If government were to use your land for a public service, and wanted to pay you too little for the land, what would you do?

If nothing, why not?

(Person to person)

42. If a merchant has been selling you wrong products, as: false medicines, wrong fertilizers or insecticides, wrong food, what would you do?

If nothing, why not?

(Person or group to person or group)

43. If you were paid too low for your products, or paid too low a wage for your work, what would you do?

If nothing, why not?

(Government or group to group or community)

44. If authorities neglect to provide what should be available at the site, like water supply, or teachers, or if they change transportation system abandoning this site, what would you do?

If nothing, why not?

IV. SELF CONFIDENCE

45. If you had ever had the opportunity to study or to be trained, which of the following do you think could have been learned?

<u>For Men</u>	<u>For Women</u>	<u>For Both</u>
Farmer	Dressmaker	Artist
County agent	Midwife	Veterinarian
Head waiter	Home economist	Army or Navy officer
Farm administrator	Nurse	Agronomist
Teacher	Teacher	Civil engineer
Bus or truck driver	Secretary	Architect
Auto mechanic	Bookkeeper	Lawyer
Electrician	Artist	Medical doctor
Tailor, handicrafts worker	Beauty expert	Priest or nun
	Star, in movies	Diplomat

46. If we take people that you know who are doing the same work as you, and place those who are most capable on the top of this ladder, and those who are least capable at the bottom of the ladder, at which step would you place yourself?

<u>Bottom</u>	<u>Top</u>	<u>Specify Work</u>
—	—	_____

47. In the same way, if we place people in town that can best be President of Acción Comunal at the top and those who would be least able at the bottom, where would you place yourself?

<u>Bottom</u>	<u>Top</u>
—	—

48. If we take those persons in town that are most capable to advise on economic problems, and think of those who are least able as being at the bottom, where do you think you can be placed on the ladder?

<u>Bottom</u>	<u>Top</u>
—	—

49. Taking persons in town that can be the best advisors for moral problems, as youth problems or family troubles, where do you think you can be in the ladder?

<u>Bottom</u>	<u>Top</u>
—	—

50. And placing all people that are most able to be merchants in town, where would you place yourself on the ladder?

Bottom Top
_____ _____

V. ACCEPTANCE OF CHANGE

In the work

51. Do you believe that your working conditions or work methods should be changed?

A lot _____ Little _____ Not at all _____

52. Realistically speaking, do you think you can develop improvement in your work?

Very possible _____ Little possibility _____ Not at all _____

53. Would you try to do something to get that improvement by yourself or by organizing a group to support or promote the needed improvement?

Do alone _____ Organizing group _____ Not at all _____

54. Would you join a group which is already organized to try to bring about that improvement?

Yes _____ No _____ Why _____

55. Would you be willing to work in a large factory (for example: where radios, tires, clothes, etc., are produced?)

Yes _____ No _____ Why _____

56. In order to get more money, would you be willing to work regular hours?

Yes _____ No _____

57. How would you like your wife to work regular hours in a factory?

58. How would you like it if your children were to leave home to go to another town to work?

59. Would you work for a woman boss?
 Yes _____ No _____ Why _____
60. Do you think it is necessary to start a new business in this town to improve it economically?
 A lot _____ Little _____ Not at all _____
61. Realistically speaking, do you think it is possible to start a business successfully here?
 Very possible _____ Little possibility _____ Not possible _____
62. Would you try to start a business alone?
 Yes _____ No _____ Why _____
63. Would you be willing to join others to start a business?
 Yes _____ No _____ Why _____
64. Would you buy rights or bonds in an already established business?
 Yes _____ No _____ Why _____
65. Would you combine tools or equipment with other people in order to produce more?
 Yes _____ No _____ Why _____
66. Would you be willing to combine your land with the land of others in order to have better production?
 Yes _____ No _____ Why _____
67. Would you invest with others to form capital and organize a cooperative which would enable you to buy more economically any material that you may need for your work, or which would help you to sell your products for a better price?
 Yes _____ No _____ Why _____

In Education

68. Do you think the education given in schools in this town needs to be improved?

A lot _____ Little _____ Not at all _____

69. Realistically speaking, do you think it is possible to get that improvement?

Very possible _____ Little possibility _____ Not at all _____

70. Would you try to do something, or would you organize a group to promote and support that improvement?

Do alone _____ Organize group _____ Do nothing _____

71. Would you join a group which is already organized to get that improvement?

Yes _____ No _____ Why _____

72. Do you think children should be sent to live away from home to get a better education if necessary?

Yes _____ No _____ Why _____

73. How many years of primary education do you think should be required for children before they are permitted to work?

_____ years. Why _____

Community Affairs

74. In order to achieve improvement, do you think that there is a need to change the way of thinking and the behavior of the people in this Site?

A lot _____ Little _____ Not at all _____

75. Realistically speaking, do you think it is possible and practical to get those changes among people in the Site?

Very possible _____ Little possibility _____ Not possible _____

76. Would you try alone or would you organize a group to get those changes?

Try alone _____ Organize group _____ Do nothing _____

77. Would you join an already organized group to get those changes?

Yes _____ No _____ Why _____

78. How would you like it if a large group of strange families moved to this site to live? _____

79. Would you like to see this town grow to become a municipal capital or perhaps the capital of a department?

Yes _____ No _____ Why _____

80. Do you think that communities which are opposed in any way or have something in dispute should be forced to work together in development projects?

Yes _____ No _____ Why _____

81. Do you think that only those families which have children of school age should be taxed for improvement in educational systems?

Yes _____ No _____ Why _____

82. Do you think it is better to keep those practices that were used and taught by our parents and grandparents, or is it better to try new practices and new ways of work?

83. What do you think about people who don't participate in community activities; those who don't go to meetings and festivities?

84. What do you think about people who are trying to be different, and who dress and act differently from others in town?

VI. INNOVATIONS

85. Please tell me the names of those persons in town that have been doing something for improvement in the Site. (For example: conducting work groups, actively organizing communal work, as to build a road, construct school building, organizing "fiestas" or contacting authorities).

<u>Name</u>	<u>Activity</u>	<u>When (date)</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

86. Can you tell me what things have been improved in your Site in the last two years?

<u>In the community</u>	<u>Yes</u>	<u>No</u>	<u>What improvement (if yes)</u>
_____	_____	_____	_____
_____	_____	_____	_____

87. Have the relationship among people in town improved?

_____	_____	_____
_____	_____	_____

88. Did you make new friends?

_____	_____	_____
_____	_____	_____

89. Have the social activities been improved, as better "fiestas" or community parties?

_____	_____	_____
_____	_____	_____

90. Has business been increasing or improved in the Site?

_____	_____	_____
_____	_____	_____

91. Has the attention given to the Site by authorities improved?

_____	_____	_____
_____	_____	_____

	<u>In the community</u>	<u>Yes</u>	<u>No</u>	<u>What improvement (if yes)</u>
92.	Has the esteem given to the Site by people in other sites improved?	_____	_____	_____
93.	Is the attention given to the site by the priest better?	_____	_____	_____
94.	Have roads or streets been improved?	_____	_____	_____
95.	Have there been any improvements in the church, school, health center, or in any other service?	_____	_____	_____
96.	Has transportation been improved?	_____	_____	_____
97.	Have any communication means such as telegraph, telephone or mail been improved?	_____	_____	_____
98.	How many new buildings and houses are there in town? (since a year ago)	_____	_____	_____
99.	Has any group been organized for community work?	_____	_____	_____
100.	Any other improvements?	_____	_____	_____

In your work

101.	Have you improved your work in any way?	_____	_____	_____
102.	Do you use new tools, new equipment or new material?	_____	_____	_____
103.	Do you have new crops, or new seeds, etc.?	_____	_____	_____
104.	Have you made new contacts or friends to whom you can sell or from whom you can buy?	_____	_____	_____
105.	Any other changes or innovations?	_____	_____	_____

In your home

	<u>Yes</u>	<u>No</u>	<u>What improvement (if yes)</u>
106. Have you bought new furniture	___	___	_____
107. Have you bought any new thing or device for the kitchen?	___	___	_____
108. Have you bought a radio?	___	___	_____
109. Have you bought a watch?	___	___	_____
110. Have you bought an iron?	___	___	_____
111. Have you bought a sewing machine?	___	___	_____
112. Have you bought any other thing?	___	___	_____
113. Have you added rooms to the home?	___	___	_____
114. Have you improved the house in any other way?	___	___	_____
115. Any improvement in the health of family?	___	___	_____
116. Any improvement in the diet of your family?	___	___	_____
117. Any other improvement?	___	___	_____

II. LEADERSHIP

118. When you need advice and information about any problem (give examples: work, family life, purchasing, etc.) whom do you see?

<u>Name</u>	<u>Subject consulted</u>	<u>Frequency</u>	<u>Why you see him</u>
_____	_____	_____	_____
_____	_____	_____	_____

119. Do you know if there are other persons in the Site whom others go to for advice and information when they have a problem or want to do something for themselves or for the community?

<u>Name</u>	<u>Subject consulted</u>	<u>Frequency</u>	<u>Why they see you</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

120. Are there persons in town who come to you for advice or information when they have a problem or want to do something?

<u>How many</u>	<u>Subject consulted</u>	<u>Frequency</u>	<u>Why they see you</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

VIII. WILLINGNESS TO TAKE RISK

121. Do you usually buy lottery or do you play in any type of contest?

If yes, what type? _____

122. If you had the money to spare and the opportunity to invest 10 pesos being almost sure that within a short time (say a month) you can get 15 pesos back, would you invest?

Yes _____ No _____ (a graphic will illustrate the idea)

123. If you had the money to spare and if you had 100 pesos to invest with the possibility that you could get back 200 pesos, yet the risk and the time were larger, would you invest?

Yes _____ No _____ (a graphic will illustrate the idea)

124. If you had the money to spare and if you were invited to invest 300 pesos in the possibility that you could get 3,000 pesos in return, yet it would be much more of a risk and the time would be longer than the two previous considerations, would you invest?

Yes _____ No _____ (a graphic will illustrate the idea)

X. ELECTRICITY

125. Are you interested in getting departmental lines to provide electrical service for this town?

Yes _____ No _____ Why _____

126. Do you think that other people in town are interested in getting electrical service from departmental sources?

The majority _____ 50% _____ Only few _____

127. Please tell me all the ways that you think you can use the electricity.

APPENDIX C

The Search for Economic Practices

APPENDIX C
THE SEARCH FOR ECONOMIC PRACTICES

In November and December 1965, approximately five months after the first survey, the communities were re-visited for interviews and observations bearing on the feasibility of developing income-related uses for the electricity. Information was obtained on prevailing economic resources and practices and related psychological and social data. Meetings were also held with leaders in the communities to determine their preferences for economic activities and to gauge their skill in anticipating problems and proposing solutions in connection with the planning of economic innovations.

For each site, an analysis was made of production information and preferences and market possibilities, and a tentative practice was designated where it was reasonable to do so. For several sites it was concluded that production or marketing conditions were too unfavorable to warrant further exploration. For sites in which possibilities were judged to exist, further analyses were made of the possibilities for increasing existing production, of potential markets, of the need for capital, and the costs and the potential returns of the practice.

Basic production data for each site is shown in Table C-1. These data were based on information obtained from 15% samples of three classes of producers of each product--large producers, medium producers, and small producers. The mean production report for each class of producers was then extrapolated to the entire class and the three resulting figures were summed to obtain the "Total" figure shown in Column 3 of the table.

During the interviews with community leaders, it was noted that they required considerable guidance in coming to grips with the salient factors in planning economic practices, such as the requirements for equipment, labor, and organization. Considerable time was taken to work through the details of such problems, and it was noted that during this process their ideas became more and more practical, and

TABLE C-1

BASIC PRODUCTION DATA

SITE	Principal products	Estimated total annual production	Estimated number of producers	Average Production ¹ (per producer per year)
CARACOLI	<u>yucca-bollos</u>	1,184,265 units ²	90	13,158
	<u>yucca</u>	4,505 <u>cargas</u>	85	53
PITALITO	<u>yucca</u>	962 <u>cargas</u>	26	37
SANTA RITA	<u>yucca</u>	1,054 <u>cargas</u>	31	34
	banana	3,120 stems	13	240
	tomato	97,920 lbs.	17	5,760
LOMARENA	fish	216,890 kgs.	115	1,886
APURE	tobacco	83,879 kgs.	37	2,267
	corn	202,673 lbs.	19	10,667
	sesame	30,000 lbs.	15	2,000
GUAZO	fish	10,620 lbs.	60	177
	corn	148,764 lbs.	28	5,313
BRASIL	coffee	180,390 lbs.	42	4,295
	banana	37,380 stems	42	890
	sugar cane	768 <u>cargas</u>	16	48
LIBANO	coffee	52,875 lbs.	47	1,125
	sugar cane	667 <u>cargas</u>	23	29
MUNDO NUEVO	milk	179,985 bottles ³	15	11,999
	potato	1,127 <u>cargas</u>	23	49
PUNTO SOLDADO	fish	314,982 kgs.	54	5,833
ITAIBE	sugar cane	8,320 <u>cargas</u>	16	520
	bean	625 <u>cargas</u>	25	25
SAN ANDRES	coffee	241,500 lbs.	23	10,500
	sugar cane	1,760 <u>cargas</u>	16	110
PESCADO	cattle	416 head	8	52
	sugar cane	10,296 <u>cargas</u>	12	858
	coffee	27,000 lbs.	12	2,250

¹ Units of measurement are the same as those shown in Column 3.

² A carga equals 250 pounds.

³ A bottle equals approximately three fourths of a liter.

their initial scepticism or disinterest moved toward greater optimism and enthusiasm.

At this stage it was estimated that the generators potentially could contribute significantly to the development of six of the sites --providing a source of capital could be found. For these six there was further investigation of marketing possibilities. This was accomplished through interviews with industrial and individual consumers and with wholesalers and retailers. The questions were adapted from standard procedures developed and utilized in Colombia for national market surveys. Market information was obtained about the following products or practices:

1. Industrial starch derived from yucca. Two of the sites which were growing yucca were favorably situated in relation to industrial consumers of starch (textile and clothing manufacturers and bakeries). Information was obtained on purchasers, potential volumes, and prices. Preliminary analysis indicated that growers of yucca could double their income if they produced starch. For example, in one village with 85 producers of yucca, it was estimated that the growers' combined annual income of about \$9,500 could probably be increased to \$18,000. It was estimated that about \$3,000 of capital investment would be required for the equipment necessary to make and market the starch.

2. Changes in tomato production and marketing. In one village, which was growing tomatoes on a one-harvest-per-year basis, it was estimated that staggered harvests and a shift in market from a local food-processing company to city retailers or large-volume consumers (such as restaurants) could result in a five-fold increase in income, even with no increase in the yield per harvest. Possibilities of increasing production were investigated and favorable conditions were identified. It was determined that the shift in marketing would necessitate the purchase of transportation equipment and the utilization of appropriate packaging methods. The estimated capital requirement for this innovation was approximately \$3,000.

3. Purchase and use of ice-making equipment. In one of the fish-producing sites, located near an urban market, it was estimated that the income derived from the sale of fish could double if ice-making equipment were available. In the current marketing system, the villagers were dependent upon several wholesalers who brought the ice to the village and purchased only the most recently caught fish. With their own equipment, it would have been possible to market and sell their entire catch and to receive a better price from the wholesaler. Capital investment of about \$2,000 would have been needed to increase the village's income from fishing from \$15,000 to \$30,000 per year.

4. Manufacture of clothing. It was estimated that in one community as much as \$9,000 per year could be earned by making dresses, men's work clothes, and children's apparel and marketing these throughout the local municipio. Interest in this practice was very high. The local 4-H Club had begun training 24 women and girls, the community had begun construction of a building for a sewing center, and the local priest had been making arrangements for distribution of the clothing through the retail outlets of the Coffee Growers' Federation. It was estimated that an expenditure of approximately \$3,000 would have been required, chiefly for electric sewing machines.

5. Motion pictures. In two communities which lacked marketable products, it would have been possible to utilize the available electrical power for showing motion pictures. The market data indicated that in one community, for example, approximately 60% of the population attended movies at least once a week. These movies were presented three days per week by an itinerant group. To establish this practice, it would have been necessary to organize a group of townspeople to select and rent the films, to manage the admission income and expenses, to handle publicity, and to operate the projectors. Approximately \$2,000 would have been required for the purchase of equipment. It was estimated this enterprise would yield sufficient income to pay for operation and maintenance costs of the generators.

Following the foregoing determinations, meetings were held with the USAID Mission to explore ways of obtaining the necessary capital or credit for the various practices. It was at this stage that the Mission decided that it would be best to terminate efforts to promote the use of the generators in income-producing ventures. Cost factors, political factors, and administrative factors were judged to be too problematical, as indicated in the section of the report on "Involvement of Agencies".

APPENDIX D

Training for Local Management of the Electrical Service

APPENDIX D

TRAINING FOR LOCAL MANAGEMENT OF THE ELECTRICAL SERVICE

During the first observation period it was found that the townspeople had been inadequately prepared to administer, operate, and maintain the electrical systems. A supplementary progress report entitled "Current Status of the Generators and Conditions of Administration" (January, 1966) was submitted to Electraguas and the USAID Mission. This report recommended that training be instituted in each site, including both the technical aspects of operating and maintaining the generators and the organizational and administrative aspects of managing the electrical service, since in the absence of properly functioning electrical systems, it would have been impossible to carry out the remaining research steps. The Mission requested that the project staff develop and conduct the training, with the support of Electraguas and Acción Comunal, the Colombian national agency responsible for community development.

The objectives of the program were as follows:

1. to turn over legal responsibility and authority regarding the electrical service to the governing group of the community--generally the Acción Comunal committee,
2. to organize an electricity committee, and to train the members of this committee to keep cost records, set and collect fees, acquire needed parts and technical assistance, and implement enlargement or curtailment of service as needed, and
3. to train two or three people as generator operators.

A set of training and management materials was prepared for each site. This consisted of the following items:

1. A manual of instructions for generator operators. In addition to the text, this manual contained 30 photographs of key parts of the generators and of operator actions.

2. A six-page set of instructions on the organization and functions of the electricity committee, including record-keeping and accounting.
3. A contract form for transferring the title for the equipment from the Electrificadora to the Acción Comunal committee.
4. A set of training instructions for use by the Electrificadora technician in training the operators, and a set of instructions for use by the Acción Comunal promotor in training the electricity committee.
5. A ledger for keeping the accounts of each user and for recording operating expenses and computing the financial status of the service over a six-month period.
6. An inventory form, to be completed during the training period.
7. Miscellaneous photographs for motivational purposes.

A three-man training team was constituted for each site, consisting of a technician from the departmental Electrificadora, a promotor from Acción Comunal, and a member of the research staff.

The training program was carried out in June and July of 1966, in all but three of the sites. In one of these sites the town had recently relocated due to a flood, and had not as yet relocated the generator. In another, the townspeople preferred to try to convert the generator into a hydraulic system because they could not afford to pay for the operation. In the third town the electrical power was being used only for the school and a small group of teachers' houses, and there were no operating or administrative difficulties. All sites except the latter one accepted title to the property, and electricity committees were formed in all but the three above-mentioned sites. In four of the sites, non-functioning Acción Comunal committees were re-organized. The training period in each town was utilized to obtain further observational data on the townspeople's motivation, organizational capabilities, methods of solving organizational problems, and intra-community relations.

Following the training, six of the sites had uninterrupted electrical service for the remaining six months of the field study.

(See Figure 1, p. 17.)