9320009001701

PD-AAE-792

AN EVALUATION OF THE PROGRAM PERFORMANCE OF THE INTERNATIONAL PROGRAM DIVISION OF THE NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION (NRECA)

A Report Prepared for the
Agency for International Development
under Contract No. AID/otr-C-1383, Work Order No. 19

Development Alternatives, Inc.
1823 Jefferson Place, N.W.
Washington, D.C. 20036

January 28, 1977

Development Alternatives, Inc.

An Evaluation of the Program Performance of the Interna
Program Division of the National Rural Electric Coopera
Association (NRECA)

January 28, 1977

89 pages

3 appendices

AID Contract Number: AID/otr-C-1383, W.O. # 19

AID Project Number: 921-13-960-009
932-13-950-058

Source: ARC 621.393 D489

The evaluators believe that the International Program Divi
(IPD) of the National Rural Electric Cooperative Associati
(NRECA) is highly qualified and perhaps without equal in th
fields of encouraging governments to undertake rural elec-
trificatio and in offering technical planning and technica
consulting services and training to developing countries.
The evaluators agree with IPD tha cooperatives re pre-
ferred method of distributing electricity in rural areas.
A well organized cooperative can exert powerful pressures to
obtain electrification for its area and it can lead to more
efficient management. IPD's decision not to insist on operating
exclusively through cooperatives is quite practical because
sometimes social and economic situations on the national leve
are not conducive to the health of cooperatives. In these
cases rural electrification through either private companies
or national authorities can be promoted. The evaluators made
14 recommendations which include: (1) AID should continue to
fund the International Programs Division of NRECA to carry
out rural electrification promotion, technical planning and
training; (2) the comparative advantages of cooperatives
versus other organizations should be more thoroughly studied;
and (3) AID should specify the impact assessment model which
it desires NRECA to attempt to implement.

MICROFILMED FROM BEST
AVAILABLE COPY

TABLE OF CONTENTS

PREFACE iv

INTRODUCTION 1

THE EVALUATION PHILOSOPHY 1

CONTRACT AND GRANT OBJECTIVES 3

Task Order 1 4
Development Program Grant. 6

INTERPRETATION AND INTEGRATION OF T.O. 1 AND THE DPG. 8

IPD's Interpretation of T.O. 1 and the DPG 9
Differences in Intent and Interpretation
Between AID and IPD. 11

CONCLUSIONS 16

RECOMMENDATION 18

ASSESSMENT OF PERFORMANCE 19

LIMITATIONS ON THE ASSESSMENT 19

NRECA PLANNING AND PROGRAMMING ACTIVITIES 21

Program Promotion and Initiation 21
Program Planning and Design. 25
Assessment of IPD's Planning and Programming
Activitities 33

THE ARGUMENTS FOR RURAL ELECTRIFICATION NOW AND EVERYWHERE. 39
ARGUMENTS AGAINST SUPPORT FOR RURAL ELECTRIFICATION NOW AND EVERYWHERE. 41
AID SUPPORT TO NRECA TO PROMOTE NRECA 46
INTEGRATING RURAL ELECTRIFICATION INTO NATIONAL DEVELOPMENT OBJECTIVES 47

Conclusions Concerning NRECA Planning and
Programming Activities 50

RECOMMENDATION 51

TABLE OF CONTENTS (CONTINUED)

THE ISSUE OF COOPERATIVES AND RURAL ELECTRIFICATION. .52

IPD's Perspective on Rural Electric Cooperatives. .52
Cooperative Benefits -- National and Popular. . . .53
Conclusions 58

RECOMMENDATION 59

TRAINING 60

Description 61
Assessment. 63
Conclusions 68

RECOMMENDATION 68

REPORTING. 69

Overall Assessment. 69
Four Issues 69
Conclusions 74

RECOMMENDATION 74

THE IMPACT OF ELECTRIFICATION ON THE RURAL POOR. . . .75

The State-of-the-art of Impact Assessment in Rural Electrification 75
Evidence from Model One Studies on the Impact of Rural Electrification. 78
The Results of Incomplete or Partial Model One Impact Assessments. 84
What NRECA Can Contribute in Impact Assessment Studies 86
Conclusions 88

RECOMMENDATION 88

TABLE OF CONTENTS (CONTINUED)

ANNEX A: RURAL ELECTRIFICATION IN THE PHILIPPINES

ANNEX B: NICARAGUA

ANNEX C: BOLIVIA

PREFACE

The purpose of this report is to evaluate the program performance of the National Rural Electric Cooperative Association (NRECA) under two AID funding mechanisms which are aimed at the promotion and planning of rural electrification in developing countries. One funding mechanism, issued first in November 1962, is Task Order 1 (T.O. 1) of a Basic Ordering Agreement[1] between AID and NRECA, the purpose of which was (and is) to enable NRECA to establish and maintain a central office and staff in Washington in order to advise and assist in the development of cooperative rural electrification projects overseas. The second funding mechanism is a two-year Development Program Grant (DPG) issued in July 1975 the purpose of which is to enable NRECA to expand its capabilities in the areas of management, program and project design analysis and evaluation in order to increase its effectiveness in program planning in developing countries.[2]

---

[1] AID/pha/BOA-1090, Project Number 921-13-960-009.

[2] Project Number 932-13-950-058

The research for this evaluation of NRECA program performance was conducted in two stages. In the first stage, two evaluation specialists from Development Alternatives, Inc. (DAI) spent a total of five person-weeks in three countries in which NRECA had assisted rural electrification programs. One evaluator spent two weeks in the Philippines; the other evaluator spent one week in Bolivia and two weeks in Nicaragua. In each country discussions were held with electrification officials, with NRECA specialists where available, with government and AID officials and, when feasible, with users and non-users of electricity in the project areas. In the second stage, the two evaluators held discussions with the staff of the International Program Division (IPD) of NRECA in Washington and reviewed IPD documents.

A draft report was submitted to the sponsoring office on December 15, 1976, and the contents subsequently reviewed with PHA/PVC/OPNS, the NRECA International Program Division staff, and the Bureau of the Census (PASA contract with AID) which supports rural electrification evaluation in the Philippines. The comments received from those who reviewed the draft report were appreciated and valuable in this revision. As a result of their insights the body of the report has been substantially re-written.

The major conclusions reached by DAI are that IPD has been very successful in accomplishing most of the assignments called

for in the task order and the DPG but that others are beyond their human and financial capability. Specifically, it was found that IPD is actively, and successfully, engaged in promoting rural electrification throughout the world, in offering technical and consultative services to rural electrification programs in developing countries and in providing training in support of most aspects of rural electrification. It was also found that IPD has not designed and, for lack of human and capital resources, should not be expected to design, academically sound studies of the development impact of rural electrification.

These conclusions and others are reported in the body of the report. The detailed data to support these conclusions gathered in the three countries visited by the DAI evaluation specialists are presented in three country annexes.

DAI would like to thank all those whose cooperation and patience have made this report possible. We are grateful especially to Dr. Thomas Venables and Mr. Leon Evans, the Coordinator and Deputy Coordinator, respectively, of IPD for providing us with all requested information and documentation. Our thanks also to the USAID officials who provided us with information and logistic support in visiting cooperative sites, particularly Mr. Ike Hatchimonji in Nicaragua, Mr. Harry Baker in Bolivia and Mr. Richard Dangler in the Philippines. Co-op managers in all three countries proved generous with their time,

warm in their hospitality and rich in information. It is our hope that all these men and the many others involved in rural electrification throughout the world will find the observations in this report useful in carrying on and improving their work.

Craig V. Olson
Donald R. Mickelwait

January 28, 1977

AN EVALUATION OF THE PROGRAM PERFORMANCE OF THE INTERNATIONAL PROGRAM DIVISION OF NRECA

INTRODUCTION

THE EVALUATION PHILOSOPHY

In order to assess the performance of NRECA under T.O. 1 and the DPG, it will first be necessary to understand the purposes and the intent of these two funding instruments. This will not be easy because the documents for both sources of funding are written in language that is often open to diverse interpretation. A second task will be to ascertain how IPD understands the intent and purposes of T.O. 1 and the DPG and whether IPD's assessment of what it can do with its funding in the real world differs significantly from the intent of the funding organization. The actual performance of IPD will then be assessed in the light of whatever differences in understanding and interpretation have been uncovered.

DAI believes that in this type of evaluation, it is also necessary to go a bit beyond this rather lawyer-like "understand the intent, assess the performance" methodology in order to raise some fundamental questions about the nature of the funding mechanisms, their objectives and the premises on which these objectives are based. Performance may be excellent and

mesh nicely with intent, but this will be worth little if the objectives of the contract and the grant are based on faulty premises and assumptions about the process and the benefits of development. Alternatively, performance may be found wanting, due not to any lack of capacity in the executing institution but because sufficient resources have not been made available through the funding mechanisms.

With this in mind, at least three fundamental questions need to be raised if not resolved. First, are the objectives of T.O. 1 and the DPG based on sound development assumptions? Second, is it reasonable to expect IPD to accomplish these objectives with the resources it has been granted? If not, what changes in the funding mechanisms might be warranted?[1]

In the remainder of this introductory section, an attempt will be made to understand the intent of AID in providing the T.O. 1 and DPG funds and this will be contrasted with IPD's interpretation of the uses to be made of the two funding mechanisms. The major section of the report concerns an assessment of IPD's performance and is divided into sections concerning programming, the use of cooperatives in rural electrification, training, reporting, and evaluations and impact assessments of rural electrification. Recommendations follow

---

[1] DAI recognizes that these questions go beyond the letter of the intent of the evaluation of IPD it has been asked to undertake. However, we believe that this evaluation will serve little purpose if these fundamental questions are not raised.

MICROFILMED FROM BEST AVAILABLE COPY

this introductory section and each part of the Assessment of Performance Section. The body of the report is followed by three annexes on the programs of rural electrification in the three countries visited by DAI.

CONTRACT AND GRANT OBJECTIVES

The objectives of both T.O. 1 and the DPG deal basically with promoting, designing and supporting rural electrification projects in developing countries.[1] The objectives of the two funding mechanisms clearly overlap -- there is, in fact, an explicit intent that the two should complement each other in

---

[1] The term "promoting" is not used in AID funding documents but is used liberally in NRECA documents. In NRECA's DPG proposal, for example, the purpose of the DPG was explained as follows:

> Basic Purpose - To *promote* the establishment of additional rural electric systems for the benefit of residents in the rural areas of LDC's and institutions to support these systems.

In the same document the "Basic Need for NRECA Assistance" in LDC's was explained in this way:

> NRECA's experience to date indicates that the majority of its development activities result from program planning or *promotional* efforts. It does respond to requests from Missions for assistance and some of its development activities fall into this classification. But, in most of the countries where development has taken place, it has resulted from investigative or *promotional* type activities by either NRECA's General Manager or its International Programs Division staff and then follow-up activities on a regular concerted basis by members of the IPD staff.
>
> The underlying reasons for the need for NRECA's *promotional* efforts is the basic reason for NRECA's request for this Development Program Grant. (Italics have been added.)

(Continued)

MICROFILMED FROM BEST AVAILABLE COPY

their promotional and training objectives -- but they are not necessarily identical.

Task Order 1

The contract known as T.O. 1 is the basic instrument which has provided for the establishment and the maintenance of the home office staff of IPD over the past 14 years. In CY 1976, the following home office staff were authorized:

		Fm: 12/01/75 To: 11/30/75 Man-Months
1.	Coordinator	8
2.	Deputy Coordinator	9
3.	Assistant Coordinator for Engineering Services	6
4.	Assistant to the Coordinator	6
5.	Office Management-Accounting Specialist [a]	2
6.	Power Use-Member Relations Specialist [a]	-
7.	Rural Electrification Specialist [a]	
8.	Secretarial Staff	29
	Total Man-months	62

[a] Short-term specialist positions.

The concept of promotional activities is also well integrated into the international cooperative movement, with promotional divisions or departments appearing on the organizational charts of many local cooperatives, or second-tier support agencies. The term encompasses notions of motivation, education and training, and, as such has no pejorative connotation.

MICROFILMED FROM BEST AVAILABLE COPY

T.O. 1 is project oriented. It does not, in itself provide funding for either long-term or short-term technical assistance to rural electrification projects but it does provide the mechanisms by which IPD recruits specialists for these projects. These specialists are generally recruited from one of NRECA's member co-ops in the United States and their services are paid for through separate task orders.[1] Aside from recruiting these specialists, T.O. 1 requires IPD to supervise, coordinate and evaluate their performance.

Another objective of T.O. 1 has to do with investigating the desirability and feasibility of establishing rural electrification programs in various countries and of using cooperatives to distribute electricity. T.O. 1 requires IPD to "conduct or supervise the conduct of such studies that may be necessary to determine the social, economic and political desirability for establishing rural electric cooperatives and the advantages, possibilities, and limitations of such cooperatives."

The use of cooperatives in rural electrification is heavil encouraged in U.S. government documents. The Basic Agreement between AID and NRECA was drawn up pursuant to the Humphrey Amendment of the Foreign Assistance Act of 1961 which made it

---

[1] As of February 1, 1976, 74 task orders for technical assistance or for training and consulting had been signed.

MICROFILMED FROM BEST AVAILABLE COPY

the official policy of the foreign aid program to "encourage the development and use of *cooperatives*, credit unions and savings and loan associations." (Italics added) The foreign assistance act was further amended in 1966 to state that:

> ...emphasis shall be placed on assuring maximum participation in the task of economic development on the part of the people of developing countries, through the encouragement of democratic private and local government institutions...this goal can best be achieved through the fostering of cooperatives, labor unions, trade and related associations, community action groups and other organizations...; through broader and more effective utilization of the experience and resources of existing private and voluntary organizations.... (Underlines were included in the original AID documentation.)

T.O. 1 also asks IPD to be responsible for organizing formal and informal training programs for Cooperating Country participants involved in rural electrification activities.

Development Program Grant

The DPG is intended to be less project-oriented than T.O. 1. The funding mechanism was shifted from contract to grant to give NRECA the opportunity to work outside the narrow project framework in order, in the words of the PROP, to "identify or design projects, particularly involving working directly with private-sector cooperative organizations in the LDCs outside the parameters of A.I.D.-host government programs."

Two areas are to be emphasized in the DPG: program planning (including training) and evaluation. The DPG authorizes

MICROFILMED FROM BEST AVAILABLE COPY

NRECA to hire a Program Planning Specialist who will assist in development planning "in the field" and will "develop training programs or recommend training programs for improving the ability of the existing NRECA staff to provide program planning assistance in the field."

Major emphasis under the DPG is given to evaluation. The PROP noted that "The cooperatives have had little incentive to develop good evaluation systems, since evaluation has generally been performed by A.I.D." The Work Plan of the PROP, in describing the scope of work of the two Management Specialists to be hired under the DPG, mentions two kinds of evaluations to be performed. The first might be described as "management evaluations," i.e., assessments of the internal operations of the cooperatives. According to the PROP, the specialists will "assist the existing cooperatives in evaluating and improving their management, their systems operations and maintenance, and their ability to provide better service to the rural people. They would also evaluate member education programs to improve the ability of the members to use electricity for increased agricultural production, cottage industry and rural industry." The second type of evaluation might be called "impact evaluation," i.e., assessments of the impact of electrification and of the cooperatives on the social and economic conditions of the areas served. Again the PROP makes this purpose explicit: "These specialists would also provide reports to NRECA which would evaluate and show the impact of rural electric systems

on the lives of rural people and the improved production and employment that occurs when central station rural electric service is provided in developing countries."

In order to provide these services, the DPG authorizes NRECA to employ one Programming Planning Specialist, two Management Specialists and one Administrative Assistant. In February, 1976, the DPG was also amended to permit NRECA to employ short-term consultants to respond to special problems and requirements which may arise and, also, to use $10,000 of the DPG money for partial support of the Asian Seminar on Rural Electrification in Manila, Philippines which was held from March 1-12, 1976.

INTERPRETATION AND INTEGRATION OF T.O. 1 AND THE DPG

Because T.O. 1 and the DPG are potentially ambiguous with regard to purpose and intent, IPD was asked to say what they considered to be their main responsibilities under the two sources of funding. As a result of this inquiry, it became evident that IPD's interpretation of its responsibilities under the two funding mechanisms was sometimes at odds with what DAI understands to be AID's intent concerning the use of its money. The differences in interpretions were often subtle, frequently arising from ambiguities in the AID documentation, but were nevertheless important as to the potential effect on IPD's

performance.[1]

IPD's Interpretation of T.O. 1 and the DPG

The first issue over which problems of interpretation arose concerned the difference between T.O. 1 and the DPG. Except for one area, IPD sees little substantive difference between the tasks to be accomplished under T.O. 1 and under the DPG. According to IPD staff, the main effect of the DPG is to increase IPD's capability to do more of what it has already been doing for 14 years under T.O. 1. About the only activity required by the DPG that was not required or carried out under T.O. 1, in IPD's understanding, is in the area of designing and carrying out impact assessments of rural electrification.

The second issue concerned relative emphasis on tasks to be accomplished. Substantively, IPD sees three large areas of responsibility under both funding mechanisms. The first is to promote and export rural electrification to as many rural areas in as many countries around the world as possible.[2] Once the

---

[1] Differences in interpretation will be explored in this section. The effect that these differences might have had on IPD's performance will be discussed in the Assessment of Performance Section.

[2] It would not be greatly exaggerated to describe IPD as a true believer in the cause of rural electrification. In conversation and in document one message comes through clearly: all rural areas in all countries are candidates for electrification and, furthermore, serious development can not take place without central station electricity. NRECA's commitment to this cause is well stated by Clyde Ellis, formerly the General Manager of NRECA who has written, "rural electrification will never be complete until the last person in the most remote area of the last country of the world who wants electric service has it." Clyde T. Ellis, *The Giant Step*, Random House, New York, 1966, p. 221.

MICROFILMED FROM BEST AVAILABLE COPY

idea of rural electrification has been favorably received by a donor agency or an LDC, a second IPD responsibility is to initiate and organize a process of planning for a countrywide rural electrification program, including providing for whatever training might be needed for electrification officials. The third large area of responsibility, as seen by IPD, is in providing existing cooperatives, other rural power companies or national rural electrification agencies with management evaluations and technical assistance to cope with special problems. This troubleshooting usually deals with organizational, management, accounting, or engineering problems, or with other aspects of the internal operations of rural power authorities or rural electric cooperatives. As mentioned, IPD also sees the DPG as adding "impact assessments" to the type of evaluations with which IPD must be concerned.

A third issue arose over IPD's understanding of their responsibilities concerning the role that cooperatives should play in distributing electricity to rural areas. IPD explained that althought they still prefer to establish cooperatives for distribution whenever possible, they will no longer insist upon this at the risk of getting no rural electrification program underway at all. The most important objective, in other words, is to get electricity into the rural areas; if this can be done through cooperatives, all the better, but if not, IPD will also work with whatever distribution structure -- i.e., public or private power companies -- a particular government wants to establish.

MICROFILMED FROM BEST AVAILABLE COPY

Differences in Intent and Interpretation Between AID and IPD

Perhaps the greatest difference between IPD's interpretation and DAI's understanding of the original intent of the funding mechanisms concerns the nature of the difference between T.O. 1 and the DPG. The authors of the DPG PROP clearly intend for there to be a difference as is evidenced by the following language:

> [There is a need] for a new relationship that provides the cooperatives with the necessary flexibility and enhanced capabilities to break out of this mold, and to meet the higher standards of program design, management and evaluation that are concomitant with increased autonomy in the use of A.I.D. funds... This PROP calls for moving from a relationship in which NRECA was responsive to specific A.I.D. requests to one in which it can take greater initiatives and enter into a more mature "partnership" with A.I.D. NRECA will not simply be a recruitment mechanism for A.I.D.-designed projects, but will participate in project development at an early stage. A manifestation of this new relationship is the shift from a contract to a grant as the funding instrument... The new DPG grant will thrust NRECA into its own developmental role, apart from A.I.D. activities. Through the DPG, NRECA will be able to take new initiatives and will be undertaking its own developmental role, along with a commitment to continue that role with its own resources when the DPG is completed.

That there is an intended difference between T.O. 1 and the DPG is clear from this language. Exactly what this difference is, on the other hand, is less than crystal clear. Calling for "greater initiatives" and a "more mature partnership" do little to clarify what sort of initiatives are desired or how the new partnership shall be manifested. Calling for "higher

MICROFILMED FROM BEST AVAILABLE COPY

standards of program design, management and evaluation," moreover, would seem to imply that what is desired is not so much new activities as qualitative improvements on old ones. "Program planning," an activity which is to be heavily emphasized under the DPG, appears to be defined so ambiguiously or broadly -- including: the identification of countries and areas in countries for the establishment of programs; identifying what resources are locally available and what will need to be furnished externally; identifying and assessing the capacities of national systems to help plan rural electrification programs; identifying training needs; and arranging for participation in NRECA training programs; -- that IPD can make a good case for claiming that this was already a major area of its emphasis under T.O. 1.

As will be shown in the section on Assessment of Performance, promotional, program planning, even project design activities of the small IPD staff have often overlapped in the context of the activities of a single IPD staff member's activities on a particular trip to a cooperating country. Since these activities often overlapped in practice, there is a natural tendency for them to overlap conceptually as well. IPD's position, if we understand it correctly, is that they have been engaged for years in exporting rural electrification in the best way they know how and to the limit of their resources. The new resources provided by the DPG allow more staff time for more countries and more tasks within each country,

MICROFILMED FROM BEST AVAILABLE COPY

but do not require any great qualitative changes in the way IPD carries out its tasks.

The emphasis that AID and IPD would place on qualitative improvements in IPD's support to rural electrification is difficult to assess in practice. DAI believes that IPD places its emphasis on exporting rural electrification, while AID (under the DPG) places its emphasis on improvements in the quality of program planning and project design for those rural electrification programs which get underway. The difference in interpretation apparently stems from the fact that IPD believes that its promotional, planning and technical assistance activities under T.O. 1 were already of high quality and that what is needed is not so much improvements on the old model but simply an expansion of the model. Thus, duties and activities of the new program planning specialist at IPD headquarters hired under the DPG appear to be much the same as those of the program planning specialists working under T.O. 1 and little new direction or significant qualitative improvements can be expected from his addition to the staff. The field management evaluation specialist in Latin America, on the other hand, has broken new ground by doing more of what IPD has argued it needed to do more of all along, i.e., improving the management of local rural electric cooperatives and designing and conducting impact assessments of rural electrification. All in all, the ambiguity of documentation will allow IPD to argue that it is fulfilling its responsibilities under the DPG while essentially,

in DAI's opinion, it is conducting more business as usual.

With regard to the problem of the use of cooperatives in rural development, there appears to be a considerable amount of indecision and "second-think" on this subject both by IPD and by AID. Faced with occasional host-country reluctance to adopt the cooperative model and, more importantly, with the desire of almost all the countries to tightly control all rural electrification from the top, IPD does not insist that countries use the cooperative model in rural electrification.[1] AID itself seems to be at least of one-and-a-half minds on this subject. Although it would seem demonstrably clear that NRECA has been selected for funding by AID <u>because</u> it is a cooperative organization and in order that it promote the international cooperative movement in its work, nowhere in the AID documentation justifying NRECA's funding is there any serious discussion of the value of cooperatives specifically for <u>rural electrification</u>. In the PROP for the DPG, the justification for working through cooperatives to distribute electricity is based in fact, on an AID assessment of the value of <u>small farmer credit co-ops</u> and even this assessment does not come out with an unqualified endorsement of cooperatives:

---

[1] As long ago as 1964, in fact, an NRECA Country Survey of El Salvador recommended the use of co-ops for rural electrification <u>only if</u> the (at that time) current plan to electrify the countryside through a private power company did not work out. See El Salvador Country Survey, October 20, 1964, p. 2.

MICROFILMED FROM BEST AVAILABLE COPY

> With respect to institutional alternatives, the conclusion is that none of the major delivery mechanisms -- cooperatives, credit unions, commercial banks, rural banks, supervised credit agencies, etc. -- is demonstrably superior. They share the same problems -- default, low production impact, drift toward a large farm clientle. Nevertheless, the effort to group farmers at some point in the delivery process seems essential to correct the major institutional problem -- the high cost of individual loans. That gives the nod to co-ops and credit unions, but these suffer from serious management and political weaknesses that government will have to help eliminate.[1]

The PROP goes on to say:

> Working with A.I.D. over the past 12 years, the cooperatives have participated with varying degrees of success in the international development effort, as borne out by the 1973 Spring Review. Some of the early A.I.D. experiments appear to have suffered from an overreliance on the ideological assumption that the very creation of a cooperative would solve all the problems of social organization, of credit, or marketing and distribution.[2]

Despite these caveats, the DPG continues apparently to require that IPD give most of its assistance -- particularly with regard to management evaluations -- to cooperatives. In the program description for the DPG, for example, the duties of the two management specialists to be hired under the DPG are to "assist the existing cooperatives to evaluate their management, their operations and maintenance and their ability to provide better service to the rural people.[3]

---

[1] Non-capital Project Paper for the DPG, May 15, 1975, p. 4. The PROP quotes Mr. E. B. Rice, PPC/EPA, Director of the Spring Review on Small Farmer Credit in June 1973 in his abstract of the Small Farmer Credit Papers. (Underlines are in the original AID documents.)

[2] Ibid., pp. 4-5.

[3] Program Description, Attachment A, AID/pha-G-1122, p. 2.

REFILMED FROM BEST AVAILABLE COPY

The problems of the role that cooperatives should play in rural electrification will be further discussed in the cooperatives portion of the Assessment of Performance Section of this report. For now, suffice it to point out that AID's present intent with regard to the use of cooperatives in rural electrification is not at all clear from the funding documents and that, as a result, IPD is left with few guidelines on this subject. In future funding of NRECA this subject should be given a thorough airing. IPD should discuss with AID whatever problems it has encountered in promoting the cooperative model for rural electrification and AID must decide whether it is content with the present practice of pushing rural electrification with or without cooperatives.

CONCLUSIONS

A careful reading of the background and funding documents for T.O. 1 and for the DPG indicates that not only are there differences in the provisions, emphases and nuances of the two funding mechanisms but also that the specific requirements of the two documents are very difficult to interpret. DAI is in basic sympathy, therefore, with the difficulties encountered by a practical, task-oriented organization like NRECA in interpreting the requirements of the two funding mechanisms and in transferring these requirements into their actual operations.

In a later section, DAI will recommend that AID continue to fund IPD for tasks which are described and justified in that section. But whatever tasks are ultimately decided on, it would appear to DAI that the simplest solution to clearing up the actual and potential ambiguities in the differences between T.O. 1 and the DPG would be simply to combine them into one funding mechanism. Combining the two funding mechanisms into one would have a number of advantages. Reporting and accounting would be simplified and streamlined both by AID and by NRECA. Combining T.O. 1 and the DPG would also remove the implicit assumption that IPD's performance under T.O. 1 has been somehow inadequate. But most importantly, combining the two would put an end to the guessing about what the differences in the requirements of the two current funding mechanisms are. Naturally, any combination of the two should be accomplished by a thorough discussion leading to understanding and agreement on specific tasks to be accomplished.

DAI recommends that this combined funding mechanism be in the form of a grant. It is recognized that there are legal differences between the obligations under a contract and those of a grant and that the basic ordering agreement has served as a convenient mechanism for the issuance of specific task orders. It should be possible, however, to apply a bit of bureaucratic immagination to come up with an arrangement that would overcome

these difficulties. It seems clear that both AID and IPD would benefit from their relationship being handled by one, rather than two funding mechanisms.

RECOMMENDATION

In future funding of NRECA, consideration should be given to combining the provisions and expected outputs of T.O. 1 and the DPG into a single funding mechanism.

ASSESSMENT OF PERFORMANCE

LIMITATIONS ON THE ASSESSMENT

Two preliminary points must be made before assessing the performance by IPD under T.O. 1 and the DPG.

For the purposes of the evaluation, the selection of countries to which the DAI evaluators were sent was not optimal. Most of IPD's efforts go into promoting, initiating and planning new rural electrification programs in cooperating countries or in planning for extensions to ongoing programs. But the three countries visited by the DAI evaluators were ones in which the rural electrification programs had long been established. Thus, with minor exceptions, IPD had in recent years, spent almost none of its time or money under T.O. 1 and the DPG in the three countries visited. In Nicaragua, which is the oldest NRECA assisted rural electrification program, there has been, in fact, no NRECA loan-funded assistance since before the DPG was issued. Since that time none of the co-ops in Nicaragua have received short-term technical assistance or evaluations from NRECA, nor have there been any serious promotional or program planning activities on the part of IPD. In Bolivia, loan funds were currently paying for one long-term and several short-term NRECA technicians but there was no evidence of any direct T.O. 1 or DPG activity in the country since

before the loan-funded activities began. In the Philippines, which is by far the largest of the NRECA-assisted rural electrification programs, $10,000 of DPG money was spent on the Asian Seminar on Rural Electrification and two short visits from IPD staff were charged to T.O. 1 and the DPG, but the overwhelming majority of NRECA assistance in the Philippines was project-oriented and loan funded.

Another problem concerned the interface between IPD activities and the activities of NRECA technical assistance personnel financed under AID project loans to cooperatives or host country governments. Much of the "hard evidence" of rural electrification activity in the three countries (poles, lines, meters, membership rosters, etc.) was directly attributable to the work of loan-funded technicians working with host country personnel. Indirectly, however, some of this evidence must be seen as outputs of T.O. 1 or the DPG since the loans and the technicians may never have existed without the original promotional and program planning activities of IPD. It was very difficult (if not theoretically impossible), in other words, to distinguish between the outputs of grant-funded IPD activities and the outputs of loan-funded project activities. Thus, although DAI's contract did not call for an evaluation of NRECA loan-funded activities, it was, nevertheless necessary to look at these activities in order to obtain indicators of IPD program performance. By the same token, in evaluating the cooperatives and the electrification programs, it soon became

clear that NRECA faced a myriad of constraints which impeded their performance, constraints which the best program planning or technical assistance sometimes could not overcome. These are taken into consideration and, where critical, made explicit in the evaluation.

NRECA PLANNING AND PROGRAMMING ACTIVITIES

The planning and programming activities of IPD are described in two sections: program promotion and initiation; and program planning and design. A description of IPD's activities and accomplishments in these two activity areas is followed by an assessment of IPD's entire planning and programming package including a discussion of certain premises upon which IPD's charter under T.O. 1 and the DPG are apparently based.

Program Promotion and Initiation

A great deal of IPD time and energy goes into the promotion and initiation of rural electric cooperatives throughout the world.[1] The main ways in which IPD carries out this type of activity is through direct and indirect contact with government officials of LDC's which are potential candidates for a rural electrification program, through multinational conferences and

---

[1] Readers will recall the special meaning of the words "promotional activities" as explained in the footnote on page 3.

and through presentations and discussions with potential lending institutions.

Contacts with LDC government officials are generally made through the initiative of IPD staff. IPD does not passively wait for requests for its assistance but actively seeks out opportunities to create or expand rural electrification programs in developing countries. Opportunities to visit new countries or revisit old ones are pursued by letter, by contact in Washington and international conferences and on other propitious occasions.[1]

Once an invitation to visit a new country is secured, conversations are held with government and with electrification officials and a preliminary investigation into the requirements for establishing a rural electrification program is undertaken. The success of IPD's promotion and initiation activities can be

---

[1]"Over a period of several years, NRECA has developed a listing of some 25 countries which have demonstrated a strong interest in the potential for rural electrification. Some of these countries, we believe, will give increased emphasis, or a new priority to rural electrification, and request NRECA's assistance, if program planning assistance can be provided to the host-country agencies or to the USAID Mission. In most of the countries where rural electrification development has taken place, it has resulted from investigative or promotional type activities by NRECA's International Programs Division staff. For the most part only the Division's Coordinator and Deputy Coordinator have been available to carry out this function. There has been limited NRECA support staff to follow up these investigative and promotional activities and to assist the LDC's with rural electrification program planning on a regular, concerted basis for those times when there has been a positive response from the host country. This is a strong underlying reason for NRECA's request for the Development Program Grant." IPD/NRECA, Progress Report on the DPG, March 1, 1975 through January 15, 1976, pp. 2-3.

MICROFILMED FROM BEST AVAILABLE COPY

seen in the number of countries in which rural electrification programs have been established. At latest count, IPD staff have carried out promotional activities in a total of 55 countries since 1962. As of February 1, 1976, 32 of these countries had received formal assistance from NRECA.[1] Aside from trips to individual countries, promotion of rural electrification is also carried out through multinational conferences and through presentations of NRECA activities to international donor organizations.

A good example of a multinational conference held for promotional purposes was the Philippine Rural Electrification Conference for Southeast Asia held in Manila, March 1-12, 1976. Twenty-five delegates representing ten countries or institutions (NRECA, Asian Development Bank) attended the conference.[2] Three

---

1 IPD has kindly furnished DAI with a complete list of all the trips taken by IPD staff charged to T.O. 1 or the DPG. The listing furnished names, dates and countries, but not the purpose of the trips. Purpose and duties performed have been inferred from a reading of trip reports and the quarterly and semi-annual reports of IPD to AID. Table I on the following page shows the number of person-weeks that have been spent on visits to individual countries under T.O. 1 from January 1975 to July 1976 and under the DPG from July 1975 to December 1976.

2 Letter to Mr. Cleo Shook, PHA/PVC, December 8, 1975, from Dr. Thomas M. Venables, Coordinator, IPD/NRECA.

> "Subject: Asian Seminar on Rural Electrification to be Held in Manila, March 1-12, 1976 -- Use of DPG Funds
>
> Program - The Filipinos and NRECA are anxious to show the attendees the progress made utilizing the rural electric cooperative approach. Col. Dumol has established as the objective of the seminar to persuade the high level attendees that they should undertake a rural electric program patterned after the Philippines."

TABLE I

VISITS TO FOREIGN COUNTRIES CHARGED TO T.O. 1
FROM JANUARY 1975 TO JULY 1976
TO DPG FROM JULY 1975 TO DECEMBER 1976[1]

T.O. 1/1/1975-6/30/76

Country	Person-Weeks
Bangladesh	1
Bolivia	5
Brazil	4
Chile	1
Ecuador	6
Guam	1
Honduras	1
Hong Kong	1
India	1
Indonesia	4
Jordan	2
Malaysia	1
Nicaragua	4
Panama	1
Papua New Guina	1
Philippines	6
Thailand	3
Venezuela	1
Total	44

DPG 1/1/1975-12/31/76

Country	Person-Weeks
Chile	8
Colombia	1
Costa Rica	25
Ecuador	2
Egypt	3
Honduras	4
Iran	3
Ivory Coast	1
Kenya	2
Liberia	10
Pakistan	1
Panama	4
Papua New Guinea	3
Peru	2
Philippines	3
Sierra Leone	1
Sri Lanka	1
Syria	1
Total	75

[1] Person-days have been aggregated to the nearest person-week.

MICROFILMED FROM BEST AVAILABLE COPY

days were spent in seminar sessions in Manila and seven days were spent touring cooperatives and cooperative areas. Another such conference was the Latin American Conference on Rural Electrification held in Caracas, Venezuela from September 28 to October 4, 1974. This conference was attended by two IPD staff members who gave a paper on the role of rural electrification in economic development programs and showed slides from the Philippines. Although these conferences are sometimes listed as "training" activities, DAI feels that they can also be regarded as promotional development activities since the intended and usual result is the initiation of an NRECA-assisted rural electrification program in a new country or an expansion of an existing program.

A good example of a promotional activity conducted for a donor or lending institution was a presentation on "Rural Electrification in Developing Countries," held at the World Bank on September 16, 1976. Five top staff from IPD in cooperation with specialists from REA and from other branches of NRECA participated in this presentation which was attended by several dozen professionals from the Bank Group. The purpose of the presentation was to increase interest in the Bank and IDA in lending money for rural electrification.

Program Planning and Design

First visits to a country usually end with several suggestions for future steps toward rural electrification. These

steps may include an invitation for key electrification officials from the host country to attend a rural electrification conference or a training program or to visit one of the NRECA cooperatives in the United States; a suggestion that NRECA assist the country in developing a long-range plan for rural electrification or manpower training in support of rural electrification; a suggestion for a country survey or even a full-scale feasibility study for establishing one or more rural electric cooperatives in a particular area; or, in the case of a previously-assisted country, a recommendation that the country's rural electrification system would benefit from more technical or managerial assistance.

For new countries -- i.e., countries in which no NRECA- or AID-assisted rural electrification program has previously existed -- NRECA has developed a program, consisting of a series of phases and steps, for the introduction of electrification into rural areas. This program is described in a document entitled: "Phases and Steps for Organizing, Establishing and Operating an Initial Rural Electric Cooperative Project in a Newly Developing Country." The document was written in 1962 and revised in 1971 and, although, as will be explained later, circumstances and events usually make it impossible to follow the neat step-by-step process the document describes, the "Phases and Steps" document remains the only written description of the program planning activities of IPD. IPD staff admit that the step-by-step process is not often followed precisely as described

in the document, but argue that the objectives of the program are still sound and that the reason that the document has not been revised since 1971 is that the program has worked well in the past and is still working well at present.

If preliminary investigations and visits with host country officials result in an agreement to further pursue the possibilities of a rural electric program, the first activity called for in the program is a "Country Survey."[1] The objective of the Country Survey is "to select an area or areas for developing one or more pilot rural electric cooperative projects and to take inventory of the resources available for their development." To conduct this survey, IPD recruits a Rural Electrification Specialist (General), or a Team, who will generally spend about 45 days carrying out a series of tasks as described in the scope of work and the "steps to be conducted" portions of the Phases and Steps Document. These tasks amount basically to gathering all the information necessary for the selection of areas for pilot projects and the preliminary planning of a full-scale rural electrification program.

DAI believes that the Country Surveys are not, nor are they intended to be, "feasibility studies" in the sense of deciding

---

[1] The Country Survey is not a T.O. 1 or a DPG activity; typically, it is funded through a separate AID Task Order issued under the Basic Ordering Agreement. T.O. 1 and the DPG do make IPD responsible, however, for "program planning" and "program design" activities of which the Country Survey and other planning and design actions must serve as examples to be used for evaluation.

whether a rural electrification program can and should be car out in a particular country. One of the items in the scope o work for the Country Survey calls for a determination of "whe further assistance in the field of rural electrification is desirable." However, IPD can recall no instance in which a Country Survey found such a program undesirable.[1] Rather, the Country Survey, assuming that a program is desirable, attempts to identify the resources that will be needed for such a program, select areas for pilot projects, identify training needs and devise a strategy for designing and developing the overall program.

The second and third phases in the NRECA program planning process are called "Organization" and "Engineering, Feasibility and Loan Application," respectively. The second phase, "Organization," refers to the formation of a rural electric cooperative (or cooperatives) in a selected area. The third phase refers to the conduct of thorough engineering and economic studies to identify, as precisely as possible, the resources that will be needed and the costs and the benefits of specific rural electrification programs. The data generated by these studies are intended for use in project loan applications.

---

[1] As will be discussed further, IPD is apparently convinced that all countries can and should have rural electrification programs; about the only circumstance in which a "no go" decision is selected from within the IPD decisionmaking set is when the political environment in the country is not conducive to rural electrification. In a technical sense, the Country Survey, using such technical criteria as the availability of power, of wood for poles and of population density, will select several areas in a country which are the most likely to be able to support an electrification program. DAI knows of no Country Survey in which all areas of a country were found unsuitable.

As originally designed, the process called for the cooperatives to be formed before the studies are conducted. The apparent reason for this is that a legal entity (i.e., the cooperatives) needed to exist in order to apply for the loan. In the first rural electrification project in Nicaragua, for example, the AID project loan was made directly to a cooperative with the government of Nicaragua co-signing as a guarantor.[1] In two subsequent rural electrification projects in Nicaragua, however, the loans were made to the national electrification authority which then re-lent the money to the cooperatives. This process, which has now become the rule rather than the exception in most NRECA-assisted countries, obviates the need for the prior legal existence of the co-ops and it is apparently for this reason that the revised "Phases and Steps" document states that "Phases II and III may be carried out simultaneously."

The last two phases in NRECA's program planning design are post-loan phases. Phase IV, "Construction and Management" is the basic implementation phase of a rural electrification project loan and describes the tasks to be carried out in putting up poles, stringing lines, installing transformers and meters, establishing the management, units of accounting and operations of the cooperatives and the like. This phase lasts two years or longer and ends when the last of the lines have been strung.

---

[1] For details, see the Nicaragua Annex.

Phase V, "Period Consultation," describes management consulting tasks to be carried out "as needed," This Phase is designed to help ease the growth pains of the cooperatives by providing troubleshooting services in areas like planning, auditing and accounting, and personnel policies.

It should be emphasized that none of the activities under the five phases are financed under either T.O. 1 or the DPG. However, IPD, using either T.O. 1 or DPG funds does initiate, plan and organize each of these activities and is, therefore, ultimately responsible for their success or failure.

What is more important, however, is that the phases and steps as described in this IPD programming document are almost never followed in the real world, and, furthermore, as reconstructed by DAI, there has occurred over the 1 st few years, a subtle but important change in the emph sis of the entire programming effort. Reading the phases and steps documents would lead one to believe that NRECA program planners work mainly through cooperative organizations which either have existed previously or which NRECA helps establish. In reality, the procedure now followed by IPD program planners is to work principally with government authorities and with a national electrification organization first to convince the authorities to spread electrification into the rural areas and then to help them plan how to do it. Often, one of the principal objectives of the preli nary IPD visits is to persuade the host country

government to set up a separate rural electrification authority within the existing national power company. It is this pre-existing or newly created national-level authority, then, which becomes, in the NRECA plans, the recipient of rural electrification loan funds and it is through this authority that the money is disbursed or re-lent to local-level cooperatives or private power companies.

In addition to the formal program planning steps in "new" countries, IPD also undertakes a certain amount of "ad hoc" program and project planning. Generally, this takes the form of making inputs into AID project proposals or of collaborating with other organizations to draft proposals for studies and surveys. In Nicaragua, for example, IPD staff assisted the USAID Mission to prepare a "Rural Electric Cooperative Management Grant" which would, with the assistance of NRECA, enable the Rural Electric Department of the National Electric Utility (ENALUF) and the National Institute for Electric Energy (INEE) to provide increased support to rural electric cooperatives.[1] In Thailand, NRECA prepared a joint proposal with R. W. Beck Engineering Company to conduct a prefeasibility study of a rural electrification program.

---

[1] This proposal was not accepted as written by AID/W. The major weakness as seen by AID/W was that the proposal addressed only management problems in the cooperatives and not the high-level policy issues of transmission and rate structure. (See discussion in Nicaragua Annex.)

Another program planning activity of IPD is in helping countries identify potential sources of funding for rural electrification. In the past the source identified has been mostly AID. More recently, proposals for World Bank funding of rural electrification projects have been initiated in Liberia and in Ecuador and the possibility of Inter-American Development Bank funding of a project in Colombia and of Asian Development Bank funding of a project in Papua New Guinea have been discussed.

DAI believes that all these new activities coupled with the significant changes that have occurred in the way IPD carries out old activities amount to quite a different set of programming planning actions than is described anywhere in IPD literature. None of the objectives or the actual work conducted in IPD's promotion and initiation activities, for example, are included as programming and design activities; yet these initial activities and contacts are often crucial in establishing the policies, directions and overall goals for future rural electrification programs. The effectiveness and value of some of these activities will be further discussed in the next few pages. The point to be made here is that the actual conduct of IPD program planning has by now so far diverged from what it was, or was intended to be, at the outset that IPD would be well advised to think through how all these activities now fit together into one programming package and to set these thoughts down on paper. "Phases and Steps," while still valuable in describing some of the detailed work to be done by various

MICROFILMED FROM BEST
AVAILABLE COPY

specialists, simply no longer adequately explains IPD's program planning goals, objectives and activities.

Assessment of IPD's Planning and Programming Activities

In assessing IPD's planning and programming activities, a distinction must be made between assessing the quality of the work performed by IPD and assessing the overall impact of that work. This is why in previous pages some pains have been taken to understand and clarify not just what IPD does for a living but what the intended and perceived outcomes of their activities are.

DAI believes that IPD is aggressive and competent, perhaps even peerless, in performing most of the work called for in T.O. 1 and the DPG. This is particularly true of IPD's work in promoting rural electrification and in initiating programs of rural electrification around the world; just the number of countries visited and assisted is ample evidence of the conviction, the zeal and the effectiveness with which IPD carries out its responsibilities. IPD is also highly qualified and effective in carrying out the technical aspects of program planning and design activities -- i.e., in such activities as identifying optimal areas and resources available and needed for establishing or strengthening electric distribution systems in rural areas.

But IPD has been asked, particularly under the DPG, to go quite a bit beyond these technical activities in order to worry

about a larger problem: how rural electrification fits into a country's overall development plans. The DPG, for example, urges IPD to investigate how rural electrification fits into LDCs' overall rural development objectives. It also asks IPD to design and conduct "impact assessments" of the benefits of rural electrification and to use the information gathered in this way to help countries integrate rural electrification into their development plans.

DAI does not believe that IPD has been given the resources (financial or human) to properly address these issues or carry out these activities. DAI has seen no evidence, for example, that activities charged to the DPG have had any qualitative impact on IPD's programming capabilities. As IPD itself has pointed out (and DAI agrees with this), the main effect of the DPG has been to increase IPD's capability to do more of what it was already doing, and doing well, in the past, but this does not include worrying about overall development and impact questions. Thus, DAI urges that, in the next funding round, IPD should be given the resources needed to do what it does well and not be burdened with tasks which have little effect but to distract it from continuing with its main job.[1]

DAI also believes that AID should carefully reconsider the overall impact of the rather limitless charter which it has

---

[1] The evaluation and "impact assessment" problem will be explored in more detail in another section.

given to IPD for the conduct of its promotional activities. The language of T.O. 1 and the DPG -- indeed everything written by NRECA and by AID on the subject of rural electrification -- reflects the belief that rural electrification is a universally and immediately desirable goal. That rural electrification is not only a desirable goal but also a necessary vehicle of development is taken as axiomatic. This belief creates a relationship between AID and NRECA in which AID funds are used by NRECA to promote the desire for, and the presence of electric service in areas outside capital cities.

The steps in the chain leading to the universal promotion of rural electrification appear to be as follows:

- First, a Congressional requirement to spend some fixed portion of AID money on cooperative development -- with particular emphasis on using U.S. cooperative organizations to worry about how AID money can be used to benefit the rural poor in LDCs;[1]

- Second, AID's funding of T.O. 1 and DPG-funded activities in which AID apparently wishes to emphasize improvements in the program design process, careful integration of rural electrification into LDC development plans, and providing evaluation systems which allow programs to be improved over time;

- Third, IPD's activities which, as we understand the system, emphasize the expansion of rural

---

[1] The issue of support to cooperatives is somewhat muddled by Congressional emphasis on greater involvement of the private voluntary sector in AID's overseas development programs (or perhaps, more accurately, programs managed by the private voluntary sector, but supported by AID). Whether NRECA is a part of the private voluntary sector could spark serious debate.

MICROFILMED FROM BEST AVAILABLE COPY

> electrification into new countries, and new regions of countries as the first priority, while agreeing in principle with AID's concern for qualitative improvement in the program design and evaluation process.

The outcome of these three steps, as seen in the documentation or literature the evaluation team has examined, is a U.S. government-funded program by which NRECA endorses and promotes rural electrification everywhere it can and without qualification. The following summary of an IPD promotional and investigative trip to Liberia, conducted under DPG funding, is illustrative of a preliminary output of this chain:

> In Summary...
>
> We will enumerate what we consider to be the most important discoveries made in two weeks of looking at rural electrification in the Republic of Liberia:
>
> 1. It is already happening, albeit in a piecemeal, unintegrated way that literally defies efficient management of manpower, money and materials.
>
> 2. The present system of providing services does not take into consideration the long-term maintenance, expansion and operation of the systems being installed; eventually, this will create a near-crisis for management and the people.
>
> 3. The social implications of rural electrification, in terms of improving food quality and raising living standards for rural people, will be felt forever in the history of this nation.
>
> 4. The economic benefits touch upon irrigation to increase crop production, the development of education and health services, expansion of industry to smaller towns and communities -- the list is endless.
>
> 5. There are few things which more quickly or more dramatically rally people to their leader-

> ship than the realization that the leadership made electric service available to them.
>
> Your country needs the help of specialists who know how to put the program together, how to organize the effort and how to supervise its implementation. Further, you need people who have the vision that is necessary and who are both able and willing to train Liberians to run their own electrification program without forever depending upon foreign assistance.
>
> Here is a basic evaluation of the situation that now exists and the potential we have found. We know without a doubt what will be required and have ideas on how to do it. We also know we're talking about a program that must be treated differently from usual electric utility operations, a program requiring people of a special kind who have engineering and administrative expertise mixed with a genuine understanding of the needs of rural people.
>
> We suggest this particular kind of assistance is available nowhere else in the world because rural electrification in the United States is unique in all the world. It is a pattern that will work in other countries such as Liberia; indeed, it is working in many at this very moment in time.
>
> We would like to be a part of Liberia's rural electrification program because we know we are uniquely qualified to help you do what needs to be done. Whether we are, depends first, upon the Administration's interest in doing this job on a systematic, proven basis and, second, upon whether we have convinced you we have the expertise and experience to satisfy the needs which exist here, on every phase of such a program from feasibility to actual system operation in the hands of the Liberian people.[1]

It should be emphasized that DAI is not questioning IPD's right, even its responsibility, under T.O. 1 and the DPG to

---

[1] NRECA, "Scope and Findings of Preliminary Investigations for a Rural Electrification Program in Liberia, 8-17 March 1976," pp. 7-8. This document was sent, with a cover letter, to the President of Liberia.

make such an unqualified pitch, either for the promotion of rural electrification, or the promotion of NRECA in assisting in the rural electrification program in Liberia or in any other country. The problem is whether AID should provide a grant which has no country/region/or area limitations on these activities. At stake is not whether rural electrification is desirable or whether it promotes development -- like transportation and communications -- electricity is an element of infrastructure which is a necessary component of modern society. The question, rather, is whether NRECA should not be given some guidance in the selection of countries and areas for its promotional activities -- whether some countries and some regions within countries should not use their resources for development investments other than poles, wire and generators. It has been argued that it is not the responsibility of NRECA, but rather of individual USAID missions, to decide whether to fund electrification or to fund some other development program. But we would argue that AID cannot have it both ways. AID cannot give an organization an unqualified charter to promote rural electrification with an LDC government and then expect a USAID mission to withstand that government's pressure to fund a program which, it has now been convinced, is a sine qua non of rural development.

The fundamental question of development strategy, then, is whether scarce development resources should be used, in particular cases, for rural electrification, or whether a more effec-

MICROFILMED FROM BEST AVAILABLE COPY

tive strategy would be to postpone rural electrification, in some cases, until other elements in society have advanced to the point where electricity can provide a real catalyst for modernizing investments and rural development. In the next few paragraphs, the arguments for and against the universal and immediate need for rural electrification will be examined.

THE ARGUMENTS FOR RURAL ELECTRIFICATION NOW AND EVERYWHERE

NRECA presents many arguments to support the need for rural electrification, and to defend its practice of approaching every country which might be interested in such a program. Two arguments, in particular, catch our attention.

> First, rural electrification benefits the rural poor, improves their quality of life, provides income and jobs from increased economic activity, and is one of the best, if not the best, development investment a Third World country can consider.

DAI believes, however, that major capital-intensive infrastucture investments like electrification are usually not neutral in their impact on income distribution, even in rural areas. This is one of the many reasons that the World Bank and AID have in recent years switched their funding from capital development to projects which more directly benefit the rural poor (the lower 40 percent). In the absence of solid evidence to the contrary, we would expect electrification, like roads, to show benefits away from the rural poor: the poor can use a road and electric power only if they can afford it.[1]

---

[1] A following section treats evidence which has been amassed to establish that rural electrification distributes benefits to the poor. However, this "evidence" shows particular benefits in selected situations without being generally convincing.

A second NRECA argument goes like this:

> Rural electrification programs are necessary to channel development funds to rural areas. Otherwise, development funds will be used mainly in urban areas, or the capital city, as evidenced by the provision of the majority of World Bank funds in the recent past into other-than-rural electrification programs.

By this argument, NRECA is maintaining that it is defending the true interests of the small farmer or other poor rural area dwellers against those of the urban dwellers. But an analysis of the way rural electrification programs really work shows that the interests of the urban dweller must be satisfied <u>before</u> those of the people living in rural areas.

Due to the requirements of density to provide payment for power which is generated, "rural electrification" rarely means "rural" in the sense of priority reach to subsistence farmers. Any "rural" electrification program must include urban centers in order to have the concentrations of power necessary to pay for the generation and distribution of power. Rural electrification, in other words, generally means that urban-centers provide the bulk of the demand for the electric service in rural areas. As the Annexes document, some of the NRECA-supported rural electric cooperatives are in urban centers with populations of 250,000 or more. Thus rural electrification does not keep funds away from the towns. Instead, the argument in favor of rural electrification must be one of extending the lines from the towns into the sparsely settled farming areas.

Furthermore, if electrification is to be provided on a non-subsidized basis, the extension of electric service must be paid for by the consumers. In order to light the homes of the very poor, some other element in society usually carries the burden of paying for electricity generation and transmission. The result is that the Boards of Directors of local cooperatives are rarely small farmers, but more likely middle-to-upperclass larger farmers or town dwellers.

Thus, the DAI team finds little reason to see how a national electrification program prevents development funds from flowing to the urban areas. The evidence examined presents only a mildly convincing case, certainly not one which would provide the justification for electrification in all countries or regions without consideration in all countries or regions without consideration of the potential returns from alternative development investments.

ARGUMENTS AGAINST SUPPORT FOR RURAL ELECTRIFICATION NOW AND EVERYWHERE

The recent history of development efforts should, by now, have taught us that different development strategies are needed for countries with differing circumstances, resources, and natural and manmade environments.[1] If this premise is accepted,

---

[1] An example of different circumstances was found in an evaluation of the impact of rural electrification in Costa Rica and Colombia.

> The developing nations of Latin America do not, at present, enjoy this favorable set of circumstances [conditions such as those prevailing in the United States during the 1940's]. Development funds are in short supply and alternative uses

four hypotheses follow:

- Assuming limited human and capital resources, there are circumstances in which rural electrification is not the best method of beginning or extending the progress of development;

- The less well developed the human resource base, serving as a supply of management, technical and accounting skills demanded by the rural cooperatives, or the local population to make productive use of the energy available from electrification, the less is the immediate benefit to be derived from electrification;

- Power use, particularly in ways which would benefit the rural poor, should be a major feature of electrification feasibility studies, and complementary funding for power use (and the local institutional development required for effective power and use) should be an integral part of a rural electrification funding package; and

- Alternative investments in modernizing agriculture (particularly traditional agriculture) should be considered prior to selecting rural electrification as a prime recipient of development assistance funding.

If these hypotheses are at least tenable -- that is, have not been proven false -- then the provision of funds to promote electrification "everywhere" is not a good development investment. Short of determining that the impact of electrification on the rural countryside is universally more positive than alternative uses of development funding appropriations, which

---

of available resources must be carefully considered. Multiple demands for investments in new industry, roads, multitude of other developmental endeavors clearly point to the advisability of careful assessments of the economic and social consequences of each kind of investment, given the scarcity of resources.

"Rural Electrification" An Evaluation of Effects on Economic and Social Changes in Costa Rica and Colombia," prepared for the Agency for International Development by the Center for Tropical Agriculture, Center for Latin American Studies, University of Florida, Gainesville, Florida, August 31, 1973, p. 2.

has not been established conclusively in the studies to date, DAI would suggest that a set of criteria be developed which would specificy which countries, regions, populations, by particular circumstances (education level, local small scale industry, irrigation potential, etc.) should be given priority as targets for NRECA/IPD and AID promotion of electrification.

The following table provides basic comparisons which might be valuable in considering the establishment of priorities for a rural electrification program. These indicators are used for illustrative purposes only. They are available from basic statistical sources but do not provide the most valuable insights on the potential for electricity to improve the lives of the rural population. A more valuable indicator would be a measure of local rural innovativeness in using materials, creating local technology, in adopting and modifying new ideas. Insofar as the Philippines has this capability, developed over several generations as the education level has risen rapidly, it is undoubtedly an excellent candidate for an electrification program. Whether a country like Liberia, on the other hand, has the human resource base which would make rural electrification an optimal development program at this time is in need of testing. In addition, as electrification gets underway in a country like the Philippines, there can be numerous power use projects which complement this energy source; some, such as rural credit available for improved agricultural inputs, may not be directly identified as such but nevertheless serve the pur-

TABLE II

COMPARISON OF RURAL ELECTRIFICATION COUNTRIES BY NATIONAL INDICATORS

	GNP $ Millions (1973)[1]	GNP Growth	GNP/Capita (1973)[1]	Growth Rate (1965-73)[1]	Literacy Rate (Age 15)	Population (000) (Mid-1973)[1]	Number of Post Secondary Students[2]	Number of Post Secondary Teachers[2]	Percent Completing Post Secondary School[4]
Liberia	450	NA[4]	$310	4.7	10 (ca 1965)[4]	1,452	1,229	164	1 (1962)
Bolivia	1,200	4.8[4] (1960-65)	280	2.2	35-40 (1973)[3]	5,331	22,919 (1968)	2,727 (1969)	NA
Nicaragua	1,060	7.9[4] (1960-65)	540	1.6	50 (ca 1965)[4]	1,973	12,519 (1972)	604 (1970)	NA
Philippines	11,170	4.7[4] (1960-65)	230	2.6	72 (ca 1965)[4]	40,219	584,171 (1970)	31,497 (1970)	4 (1965)

1 World Bank Atlas, 1975.

2 UNESCO Statistical Yearbook, 1974.

3 The World Factbook, 1974, Publishing Sciences Group, Inc., Action Massachusetts, 1974.

4 World Handbook of Political and Social Indicators, Taylor and Hudson, 1972.

pose. This purpose of a development program, of course, is not just to add a light bulb and an iron to every house. Rather, it is to provide the impetus to spark real and sustained development, i.e., modernizing change which does not leave the majority of the rural poor behind looking on from the side of the all-weather road, with a 50-watt light bulb, and with green revolution technology available all around them.

In sum, electricity must be considered as one component of infrastructure which, in the absence of adequate documentation, cannot be assumed to be universally applicable and beneficial to the rural poor. Insofar as DAI could determine, this documentation about the benefits of electricity is not complete, its universal and immediate need is not proved, and rural electrification must, therefore, take its place in the queue for development assistance funding by establishing that, for the circumstances encountered, it provides the most development impact among alternative investments. The argument in favor of the universality of rural electrifiction (to be selected over all other potential development investments) which appears to be the hypothesis implicit in AID's support to NRECA in both T.O. 1 and the DPG is not convincing to the DAI evaluation team.[1]

---

[1] Nor has it been convincing to other researchers investigating the impact of rural electrification.

> Obviously, the construction of a rural electrification project is affected by and has an impact on other infrastructure development. The problem is to initiate projects when other infrastructure levels can most aid system construction and

MICROFILMED FROM BEST AVAILABLE COPY

AID SUPPORT TO NRECA TO PROMOTE NRECA

As DAI reads the funding documents from AID, NRECA is authorized not only to promote rural electrification but also to promote NRECA's involvement in rural electrification. This leads IPD to submit quarterly and semi-annual reports showing as accomplishments responses to Requests for Proposals leading to competitive contracts in countries such as Thailand and Bangladesh in which NRECA has teamed with an engineering company to bid on rural electrification work. Under the present set of AID guidelines, it is proper for NRECA to do this. If, however, there is any question about whether rural electrification is a desired component of a development strategy in every country, then the question must be raised about whether NRECA should be encouraged to be involved in every rural electrification undertaking.

> electricity utilization while they in turn receive the maximum development boost from the availability of electric energy.
>
> This suggests, at least, minimal levels of infrastructure development (of the framework) prior to rural electrification. This minimal level will vary for each type of infrastructure (roads, schools, clinics, etc.) and will be subject to the objectives of the rural electrification project and regional and national development objectives. While it has been suggested that rural electrification (especially under the cooperative form of distribution) will have spinoff effects, prompting communities to undertake other self-help projects to develop infrastructure, this has not been demonstrated in the areas surveyed in Costa Rica and Colombia. The explanation, in part, is that most infrastructure projects require resources beyond the boundaries of individual communities. While a community may construct a school, it needs trained teachers and textbooks; construction of good roads generally requires materials and equipment not readily available; construction of a clinic still requires the services of a doctor and medical supplies.

"Rural Electrification," op. cit., pp. 29-30.

MICROFILMED FROM BEST AVAILABLE COPY

INTEGRATING RURAL ELECTRIFICATION INTO NATIONAL DEVELOPMENT OBJECTIVES

Placing rural electrification programs into the larger perspective of national development objectives was one qualitative improvement that AID was encouraging in providing the Development Program Grant. In one sense, this is partially accomplished by getting funding for programs from international funding agencies which must justify their recommendations for grants or loans in connection with rural electrification projects. If the funding is to be from AID, for example, there are social soundness and economic, environmental and technical analyses required, along with a statement of how the project would fit into other ongoing or planned development activities. The World Bank utilizes similar requirements.

However, AID's concern appears to be that NRECA itself help to integrate rural electrification into national development objectives. If this is the case, the evidence is clear: NRECA has done little development planning outside the area of electrification. Further, with its present staff and outside consultants it has little capability to do such planning.

This is not to say that there are not NRECA-assisted countries in which rural electrification does fit well into other development objectives. In the Philippines, for example, the rural electrification program is indeed integrated into the entire development picture. However, the Philippines is not so much a country in which rural electrification fits into other

ongoing activities, but a country in which other ongoing activities fit into the rural electrification program. Philippine President Ferdinand E. Marcos called the rural electrification program:

> ...the cutting edge of the effort to move towards development of the country because whether the program is agricultural productivity, large scale industry, family planning, or small and medium scale industry, electrification is the principal requirement. We will not be able to succeed in our economic and social development program unless rural electrification succeeds because it is the crucial and critical project.[1]

If such a strong political commitment to rural electrification can be generated by a nation's top leadership, then NRECA need only assist in the design of the electrification project, and the remainder of government supporting services will support it. And in the Philippines there are many institutional, organizational, technical, credit and marketing services which directly complement the rural electrification program. The history of the Philippines rural electrification program goes back ten years and is difficult to re-trace. DAI's inclination would be to credit NRECA with an excellent job in providing the technical assistance necessary to propel rural electrification forward, but without making a major input into the national level planning which has provided the complementary services to make maximum use of the electric power. In any event, this history is well before the provision of the DPG.

---

[1] Presidential Address, August 1973, at the signing of Presidential Decree No. 269.

In a more recent NRECA undertaking, which utilized at least four person-weeks of T.O. 1 time, NRECA produced a 150-page study entitled, "Rural Electrification for Indonesia." A concern for the integration of the proposed rural electrification program into other ongoing development programs is contained in one sentence: "A program of rural electrification must be considered in harmonious relationship with other infrastructure programs: irrigation, roads, marketing."[1] There is a great deal of material presented in the report to prove that rural electrification will benefit the country, reach the rural poor, bring strong economic and social growth, etc.[2] But the report concerns rural electrification as one program, and does not deal with alternative or complementary programs which are underway or are contemplated by the Indonesian government.

DAI suggests that NRECA is now concentrating its specialists and expertise on those areas in which it holds predominant capability. AID's interest in the relationship between electrification and other ongoing development programs is clearly justifiable, but likely beyond the capabilities, interests, and mind-set of the present IPD staff. If AID truly believes in rural electrification as the solution to rural poverty (assuming it can be generated and distributed in rational and technically-

---

[1] NRECA, "Rural Electrification for Indonesia: Report of the NRECA Study Team," Jakarta, Indonesia, May, 1976, p. 8. This study apparently combines Phases I and III of the IPD program planning process.

[2] Some of the benefits of the rural electrification program listed in this document are examined in a following section.

sound ways), then all other elements of a government's development plan should support the rural electrification process, as in the Philippine model. But since what NRECA is selling is rural electrification -- along with the technical expertise to make it work -- they are not the most likely candidates to do national planning, or to worry about the integration of rural electrification into national development objectives.

Conclusions Concerning NRECA Planning and Programming Activities

The record of IPD in promoting and planning for rural electrification throughout the world speaks for itself. DAI believes that IPD is highly qualified and perhaps without equal in the fields of encouraging governments to undertake rural electrification and in offering technical planning and technical consulting services and training to developing countries.

IPD is technically qualified to spark the interest of high-level officials in national electrification programs and is quite effective in assisting in those planning exercises which include preparing technical feasibility studies and providing management, technical and organizational consulting skills. IPD staff have utilized the DPG and T.O. 1 for these purposes in an effective and efficient manner and must, therefore, be listed as a major resource in providing assistance for the design and implementation of rural electrification programs in the Third World. Its ability to undertake this task, originally established by T.O. 1, has also been strengthened by the Development Program Grant.

AID's present funding documents, however, are ambiguous and prevent the accomplishment of the spirit of AID's interest in qualitative improvement in the program design and planning process by giving NRECA the charter to promote electrification everywhere that targets of opportunity -- which means governments who might be persuaded to initiate a program -- exist. Since NRECA is technically competent, the problem is not that NRECA would recommend unsound projects. Rather, it is a question of development strategy which calls for a careful reconsideration of the use of scarce development resources for electrification. Since AID has not restricted the countries to be included under the DPG, and since NRECA believes in rural electrification, the qualitative emphasis of AID in the DPG is translated into action by NRECA through a quantitative increase in the number of contacts and potential for initiation of, or improvements/expansion in, rural electrification systems. DAI believes there is no method of reaching AID's goals of qualitative improvements without setting criteria for (and thus restrictions on) the targets of NRECA for program promotion, design, planning and implementation.

RECOMMENDATION

- AID should continue to fund the International Programs Division of NRECA to carry out rural electrification promotion, technical planning and training, but as recommended previously, through a single funding mechanism;

- AID itself either should set criteria to be used for the selection of countries or regions in which IPD will seek to promote new rural electrification programs or should task NRECA with establishing criteria other than those presently utilized -- i.e., political commitment and technical feasibility. Such criteria should invite the best development strategies to compare the costs and benefits of rural electrification with alternative investments in reaching the rural poor. These criteria will generate a subset of countries for a concentrated NRECA program which could focus on qualitative improvements in program design;
- AID should seek to work with NRECA to obtain agreement on what "qualitative" changes in program design are required from AID's point of view and are possible from NRECA's point of view.

THE ISSUE OF COOPERATIVES AND RURAL ELECTRIFICATION

IPD's Perspective on Rural Electric Cooperatives

In the beginning, under T.O. 1, IPD/NRECA worked almost exclusively with cooperatives in the rural areas of developing countries. In more recent years, while IPD still prefers the cooperative structure, it is not always as finicky as to the type of power company it assists. In Bolivia, for example, its current contract calls for it not only to assist two existing cooperatives and to help in the establishment of a third but also to lend management and technical assistance to two local power distributors which are mixed companies (some stock held privately and some held by the national power authority).

This change in emphasis in the way IPD now views the role of cooperatives in rural electrification should signal to AID that some major re-thinking of previously held views on this subject is in order. As will be discussed in the next few paragraphs, it must first be recognized that rural electric cooperatives bear little resemblance to other types of cooperatives operating in LDC's and, it is, therefore, simply not possible to extrapolate benefits issuing from other types of cooperative organizations to rural electric cooperatives. This leads in turn to raising the issue of the actual and potential benefits to be derived from rural electric cooperatives.

Cooperative Benefits -- National and Popular

LDC cooperatives are generally viewed as a grouping of the rural poor meeting together in face-to-face discussions and helping to generate a sense of accomplishment and self-determination at the local level. In the case of rural electric cooperatives, however, although the potential for this local self-help may still exist, there are several factors which make it difficult for rural electric cooperatives to realize this potential.

In the first place, rural electric cooperatives are large; NRECA recommends (in Indonesia for example) that they encompass areas of from 100,000 to 500,000 people. Among existing cooperatives, one in the Philippines has more than 25,000 members and one in Bolivia has more than 27,000. The leadership of

rural electric cooperatives, moreover, is often neither rural nor poor -- at least in the sense of representing the lowest 40 percent. The United States experience with rural electrification occurred in areas in which the population was generally poor but in which the level of education (compared to the levels in the Third World) was high; by contrast, in the Third World there are often great education, as well as income, gaps between the wealthy and the poor so that illiteracy and lack of business experience often puts the directorships and the management of complicated enterprises like rural electric cooperatives outside the capabilities of local/rural leadership. Thus, in Nicaragua, all the co-op managers have been selected for their posts by the National Electric Company (ENALUF). Even in the Philippines with its 72 percent literacy rate and its very large number of university graduates, nearly 50 percent of the cooperative managers are actually employees of the National Electric Authority, on loan to the local area.

Thus, rural electric cooperatives should be seen not so much as the poor banded together to help themselves as what they more often are -- legal entities which control (within the often narrow boundaries set by a national authority) procedures and management and which are able to receive funds and pay back loans at reasonable interest rates over the life of purchased equipment.

In a national sense, one of the principal benefits of the cooperative system is that cooperatives can accept loans from the national electric authority the repayments on which are shown on the books of the national authority as an asset to match against liabilities to foreign donors. Thus without increasing, in some accounting sense, its level of debt, a national electric authority is able to receive and redistribute money destined for local rural electric cooperatives. However, to insure repayment, the authority will usually set construction, rate structure and management standards. Another benefit is that the legal entity at the local level can be used to confiscate or take over private utility franchises, which may have been the backbone of the initial rural electric system -- as was the case in the Philippines and in Bolivia.

From the viewpoint of the host country government, then, most of the benefits to be derived from using cooperatives to electrify the countryside have to do largely with legal questions and with relative debt burdens. The benefits so far mentioned, moreover, are all related to the intitiation stage of a rural electrification program. Once the rural electrification program gets off the ground, whether there is any fundamental difference in the benefits to be derived from a cooperative serving 20,000 members or a branch of the national electric authority serving 20,000 clients is open to speculation.

The limited amount of research that has so far been conducted on the question of the popular benefits of rural electric cooperatives suggests, in fact, that cooperatives have a limited impact on membership, and vice-versa. One comparative study of cooperative and state/municipal electric systems, for example, concluded:

> Cooperative systems in Costa Rica and Colombia did not appear to have generated the spin-off benefits usually attributed to the cooperative form of ownership. According to surveys of the cooperative memberships, cooperative identity is low and knowledge of the cooperative structure and function is not widespread.
>
> To stimulate involvement of its membership in self-help projects a cooperative must maintain an identity with the people, both in individual communities and across the wider distribution area. In both areas in Colombia and Costa Rica during the formative years of the cooperatives, awareness of the cooperative and its primary function generally was high because of community meetings, committees, etc. Following energization, however, this cohesiveness and identity apparently lapsed.
>
> Our findings indicate that the electric cooperatives studied serve principally, if not exclusively, simply as a means of distributing electricity, and have little meaning to their members other than that of being the supplier of energy. From the standpoint of the users interviewed, it really does not matter whether electricity is supplied by a public utility, or a rural electric cooperative. From the operational standpoint, the major advantage the cooperatives studied seem to offer is a lower rate of line loss or loss of electricity through theft. Conceivably, in the future with increased consumer education, this situation may change. But at present, based on survey data and on observation of the cooperatives included in this study, the organizational structure is not of primary importance to the use of electricity.[1]

---

[1] "Rural Electrification," op. cit., pp. 34-35.

Although different situations were found in each of the three countries visited by the DAI evaluators, the overall situation generally corroborated the conclusions reached by the study cited above.[1]

In the Philippines, it was found that the cooperatives had worked rather well in initiating a rural electrification program; although individual cooperatives had particular problems (personnel, management, etc.), the idea of cooperative organization was well received and well supported by the national authorities. In the two Latin American countries, a different situation was found. In Bolivia, private or mixed companies had a history of taking over small electric cooperatives; the only cooperative that was doing well, despite some hostility from national authorities, was the co-op in Santa Cruz, which, as explained in Annex C was not rural and so large as to virtually preclude the possibility of popular member participation in its affairs. In Nicaragua, all five co-ops were small and rather weak; all were dominated in the exercise of important decisionmaking power by the national power company; and all save one were desperately trying to grow more urban in order to become larger, stronger and more financially viable so as not to collapse or face possible take-over from the top.

---

[1] See Annexes for details on cooperatives and their benefits in each country.

Conclusions

DAI agrees with IPD that cooperatives are a preferred method of distributing electricity in rural areas. In the first place, a well organized cooperative can exert powerful pressures to obtain electrification for their areas. Once the lines have been strung, the cooperative format can lead to more efficient management, since, at least in principle, locally selected and controlled managers and employees will make decisions and run the cooperatiaves in the interest of the community. Such problems as line losses from theft and inefficient and inequitable rate structures affecting local consumers are more likely to be avoided if decisions are made from a local rather than a national base.

Aside from these internal economies and efficiencies, a dynamic and well-managed rural electric cooperative could have other community benefits. The cooperatives could serve as an organization for community meetings and the airing of problems, it could act as a lending mechanism for power use or other development activities, and it could promote leadership and participation in community affairs.

Existing evidence indicates, however, that all these benefits are still quite hypothetical.

In the Philippines there are indications that some of these benefits of cooperative organization might actually be occuring,

but in Bolivia and in Nicaragua there is little such evidence. Popular participation is virtually non-existent, leadership is ascribed rather than promoted, key decisions are made at the national level and in fact there is prima facie evidence that the national authorities, due to economies of scale in electricity transmission and in management, could distribute electricity more cheaply than the cooperatives.

All this leads to the conclusion that IPD's decision not to insist on operating through cooperatives is quite practical. If the social and economic situations on the national or local level are not conducive to the health of cooperatives, it may be wise to accede to the inevitable and promote rural electrification through either private companies or national authorities. Moreover, a great deal more study will be needed before it can be determined whether the cooperative form of distributing electricity in the rural areas of LDCs creates more benefits for the rural poor than other distribution systems.

RECOMMENDATION

It is probable that there is no universal solution to the problem of whether cooperatives or some other type of organization are best suited for distribution of electricity in the rural areas of developing countries. DAI recommends that the comparative advantages of cooperatives versus other organizations be more thoroughly studied and that feasibility

and evaluation studies of particular areas which are candidates for rural electrification be conducted with careful thought given to whether and how cooperatives can be effective.

TRAINING

Arranging for and providing training for potential or actual LDC rural electrification program participants is one of the most important services IPD performs, for in countries assisted by NRECA there is often a greater scarcity of trained human resources than of financial or natural resources. As IPD is well aware, it does little good to provide a country with poles and wires or to organize a cooperative if engineers, technicians, and co-op managers are not trained in a way that will allow them to carry on construction, maintenance and operations activities once the NRECA advisers have terminated their assistance. For this reason, one of the first and best things IPD does in beginning a new program is to identify manpower and training needs and establish a program by which these needs can be filled. An excellent example of this type of activity is the recently completed "Manpower Development and Training Program" for the Liberia Electricity Corporation. This report recommended a three-phase program, including both U.S.-based and Liberia-based training, to meet basic manpower needs for rural elec-

trification.[1]

Unfortunately, time and resources did not permit the DAI evaluators to actually observe a training program so little can be said about organizational or pedagogical methods. This section then will be relatively brief and will include a description of the type of training programs conducted by NRECA, an assessment based on examining materials and "results," and recommendations for the future.

Description

AS DAI understands it, training conducted by NRECA/IPD is of three types. First, there are formal training programs which are held usually once or twice a year. They consist of one course entitled Organization and Operation of Rural Electric Systems. The course is sponsored jointly by NRECA, USDA, AID and other institutions. IPD has prepared most of the material for the course and often supplies some teaching time but the course is administered by USDA Division of Economic Research.

The basic purposes of the course, as explained by IPD, are:

---

[1] Previously, we have questioned whether rural electrification is an optimal way for Liberia to use its development funds at this time. This argument should not be confused with our commendation of the practice of putting great emphasis on human resource development once it has been decided to go ahead with a program.

> To acquaint the participants with the pre-REA period, early beginning, problems and the growth and development up to the present time of rural electric systems in the United States.
>
> To discuss and explain each step in the development of an electrification project including the need to adapt it to the area under development.
>
> To study and analyze the place of rural electric systems in economic development, problems of cooperation in relation to social change, and the story and principles of cooperation both in theory and in varieties of practical applications.
>
> To visit rural electric systems to observe various operations of the systems and to study and learn the how and why of the technical and business operation of rural electric systems.
>
> To enroll in a Management Institute to learn the "Modern Management Principles, Tools and Techniques" needed by those who are to promote and assume leadership in rural electric system development.

This course lasts eight to nine weeks, with four weeks of classroom work, the rest consisting of observational tours to cooperative areas. From 1963 to 1975, some 270 people had participated in this formal training program.

A second type of training activity conducted by NRECA consists of informal observational tours to NRECA member cooperatives in the United States. These tours are much the same as the latter part of the formal course mentioned above. It is estimated that 30 to 40 participants a year are recipients of these tours.

Finally, there is consultative training consisting of on-the-job training and seminars which are often conducted in the

context of an NRECA troubleshooting mission to a cooperating country. In diagnosing and addressing particular problems that an electrification authority or a rural electric cooperative may be experiencing, the consultant works with a counterpart or counterparts who receive the benefits of "on-the-job" training.[1]

Assessment

Having not been able to sit in or otherwise witness any of these types of training, DAI's assessment of the training programs can be based only on two factors: (1) an examination of the course materials; and (2) discretionary observations of the "results" of previous training as seen in the actual operation of rural electric cooperatives.

In general, DAI believes that NRECA/IPD has over the years done an exemplary job of attracting large numbers of participants to the training programs and of instructing these participants in the general principles of cooperative management and utility operations. It is clear that IPD, through its network of 1,000 U.S. cooperatives, has the capacity (and exercises that capacity) to marshall the services of specialists whose knowledge of rural electrification is unexcelled. The instruction and consultative services these specialists provide is,

---

[1] This non-formal training may often be the most valuable in the long run because it deals with real problems in real circumstances.

above all else, what makes NRECA an extremely valuable organization for development purposes. The most obvious evidence for this is that some 130 cooperatives which have been assisted by NRECA and whose personnel have often been trained by NRECA in ten countries (not counting Vietnam) are currently functioning -- alive and well.

DAI sees little problem with the content of the training provided by NRECA. There are two problems concerning organization and emphasis, however, which merit discussion.

The first problem concerns the relative emphasis placed on emulation of the American model of rural electrification. This emphasis is perhaps best seen in rest ting the first purpose of the main NRECA course:

> To acquaint the participants with the pre-REA period, early beginning, problems and the growth and development up to the present time of rural electric systems in the United States.

While there is no doubt that the story of rural electrification in the United States is one of remarkable success, it is unlikely that the historical socioeconomic and sociopolitical conditions which gave rise to REA in the United States exist now or will ever exist in any of the developing countries that are targets of NRECA assistance. In the 1930's and 1940's the United States already was blessed with a sophisticated system of roads, railroads and communications, education levels were high and rising rapidly, low interest loans were available from within the country,

the spirit of self-help had long been ingrained by the rugged Westward expansion of the nineteenth century and the idea that government should own or control anything was still anathema in the political culture. Thus, whereas the technology which goes into constructing lines, installing transformers, etc., may be readily transferable from the United States to most LDCs, conditions and attitudes (education levels, self-help spirit, attitudes toward government and toward borrowing money, just to name a few) may not be so easily tranferable -- and it is often these intangibles which are crucial in determining the success of a development project, and particularly one dealing with cooperatives.

It is therefore essential that participants in NRECA-sponsored training programs be made to understood that the American model of rural electrification cannot be made to work in their own countries without making a special effort to adapt the model to their own unique circumstances. This does not mean that NRECA should do away with the observational tours of United States cooperatives which now form an important component of the training program. It does mean however, that participants should, while involved in a tour, be urged to consider not just how the technology they are seeing can be transferred to their countries but to consider also how the circumstances which make use of that technology successful in the United States might be different in their own countries.

Two concrete suggestions are also indicated in addressing this problem. The first is that NRECA's "Management Manual," which appears to be written almost exclusively for an American readership, be adapted (perhaps even translated) for foreign use. The second suggestion is that NRECA schedule more observational tours of rural electric installations in third countries, i.e., countries it has already assisted. Potential Indonesian participants, for example, could be taken on observational tours of rural electric cooperatives in the Philippines, or potential participants in one of the Central American countries could be shown how rural electric co-ops operate in Nicaragua. It should be hastily pointed out, of course, that there are often as many differences in basic socioeconomic and sociopolitical conditions between Third World countries as there are between the United States and LDCs. However, visits to countries where rural electrification is still a recent or ongoing experience and which have relied for financing on development assistance from abroad would help lend perspective to the prospects and problems of rural electrification which might await the participants.

A second problem area concerns the need for greater emphasis on two areas of training. One is in the area of cooperative principles -- the participation of memberships in the decisions of the cooperative. As discussed in the previous section, there is a very real question as to whether cooperatives are an optimal form of organization for the distribution of electricity in

rural areas. In most of the cooperatives visited by DAI, particularly in Latin America -- a very low awareness of and participation in the cooperatives by the majority of members was observed. Boards of Directors were dominated by wealthy and powerful cliques whose decisions (if they had any deccision-making power to speak of) could not be assumed to be in the interests of the majority of members. More often than not, real decisionmaking power over important matters such as rates, hiring, firing, etc., lay not in the hands of the cooperatives at all, but in the hands of the national power authorities. In the Philippines, the middle class dominates the boards of directors which have some decisionmaking power, but the excellent participation during the formation of the cooperatives has not in many instances extended into the operational phase. If cooperatives are to be the preferred means of distributing electricity to the rural areas, then some inclucation of the spirit and potential of the cooperative idea is clearly needed.

Another area in need of greater emphasis is training in power use. Virtually none of the cooperatives visited by DAI had power use or member relations or "education" sections. Yet, rural electrification can only be made a vehicle of development (particularly in the service of the rural poor) if members, as well as potential productive users of electricity, are instructed in its potential.

Conclusions

One way to address all these problems would be to try to attract more high-level government officials as participants in the formal and informal training. It is difficult to know to what extent training alone can improve the situations concerning cooperative principles and power use. DAI recognizes that a number of political and other constraints in the participating countries cannot be overcome by a United States-based training course. One move in the right direction, however, would be to hold NRECA training courses in the participating countries themselves, a move already initiated, in fact, in at least, one country.[1]

RECOMMENDATION

- Greater emphasis should be placed on training components involving cooperative principles and power use;
- More training programs should be held in the developing countries themselves;
- Participants should be led on observational tours of cooperatives in previously assisted countries as well as of U.S. cooperatives;
- The NRECA Management Manual should be adapted, perhaps even translated, for use by foreign and/or non-English speaking trainees.

---

[1] The recent "Organization and Operation..." course held in Costa Rica.

REPORTING

Overall Assessment

DAI has found that IPD's own "information system," i.e., the system of reports by which it receives information from the field and relays this information to AID, is, in general, quite satisfactory. The reports examined by DAI -- whether from a field officer to an AID mission, from a field officer to IPD or from IPD to AID -- have been, virtually without exception, well organized, well written and replete with valuable information and insights on the progress, prospects and problems of rural electrification in the various countries in which NRECA is promoting or assisting a rural electrification program. It was particularly pleasurable to discover that technical report writing can still be done in good English!

Four Issues

Notwithstanding the overall quality of the reports themselves, there are several specific issues which need to be addressed concerning the substance of the reports and the reporting system itself.

The first concerns the objectives which the various types of reports are attempting to meet. The reports of NRECA teams in the field require reporting to their own team leader as well as to IPD in Washington. This calls for a good deal of "activity"

reporting. Reports going to the implementing agency which NRECA is supporting in the field are generally intended to highlight problems or obstacles to forward progress in hopes that the agency will take action as recommended. Since few politicized national organizations can afford to have only "problem" reporting from their advisory staff, NRECA should balance this type of reporting with forward progress indicators. This is particularly a requirement in the Philippines program. Reports from DPG or T.O. 1 visitors often have multiple objectives. In addition to reporting on the trip to IPD, the reports are sometimes sent to governments, even national presidents, encouraging the adoption of a rural electrification program, with appendices relating to the status of electrification programs and potential in the country. It would appear that separate reports are indicated for these objectives. Finally, reporting from IPD to AID should highlight progress under the objectives of the two funding mechanisms. This may or may not coincide with other reporting requirements beginning in the field and extending to NRECA Headquarters in Washington.

A second problem concerns the voluminousness of certain reports. The results of pursuing multiple objectives in the reporting system is often a voluminous set of data which may well overwhelm AID's project monitor.

The August 1976 monthly report in the Philippines, for example, consisted of 14 pages of single-spaced narrative report

and 47 pages of attachments. The narrative contained detailed accounts of recent developments in NEA, of NRECA team activities and of the activities of nine individual NRECA team advisors. The individual accounts included itineraries of visits to co-ops, lists of the people included on the trips and the people visited. The attachments included a copy of a 14-page progress report from the Administrator of NEA to NEA's Board of Administrators; status accounts on construction activities, house wirings, material arrivals, poles and wires, etc.; rankings of individual cooperatives by number of house connections, number of members, gross revenue, gross margins, system loss, and system rate; and summaries of the latest financial evaluations of each cooperative and of NEA.

It is difficult to know to what extent all of this detail is of interest or use to prospective readers, but one has the impression that the writers, now knowing for sure what should be included and what left out, have decided to err on the side of too much rather than too little. If readers of these reports have sometimes been overwhelmed by the detail, it would be helpful if those for whom the reports are intended would devise a format or criteria list which would help the report writers to make judgments on what type of information the readers are looking for.

A good model for consideration would be the excellent monthly reports of Lloyd J. Lake while he was the NRECA Project Manager

in Nicaragua. Mr. Lake's reports usually ran from thee to five pages with the first page consisting of a review of the "General Situation," and the rest of the report organized by functional issues and problems with recommendations for action as required.

Another issue concerns the sheer quantity and frequency of the reports. Field reports to AID missions and to host country borrowers are usually required once a month with the monthly reports summarized in quarterly reports. Individuals under contract, at least in the case of the giant Philippine program, are required to report weekly to NRECA/Washington. T.O. 1 and DPG reports from IPD to AID/W were previously quarterly affairs although this has recently been changed to a semi-annual requirement. DAI believes that some consideration should be given to the question of whether all these reports are needed as frequently as they are now written. The current semi-annual report from IPD to AID is probably about right, but the weekly and monthly field reports may constitute a greater burden on both the writers and the readers of the reports than is necessary. Too frequent reporting has at least two drawbacks: one, the time spent in writing, reading and processing the reports is time not used in other, possibly more productive activities; and two, the requirement for frequent reports sometimes engenders a flurry of activity, undertaken not so much for the value of the activity itself, but so that the writer will have something to report on.

A final issue relates to the previous discussion about the distinction between T.O. 1 and the development program grant. Some of the quarterly and semi-annual reports from IPD to AID, and particularly the reports which were (apparently) on T.O. 1 activities, seemed to discuss activities and accomplishments of both T.O. 1 and the DPG without indicating which source of funding was being referred to. It should be emphasized that this is not an accounting or use-of-funds problem: all the accounting sheets examined made very easily discernible distinctions between what source of funding was paying for a trip or an activity. Rather, it is a problem of relating or attributing various accomplishments to the two sources of funding. Given that IPD sees the DPG as not much more than an extension of the T.O. 1 this overlap is not surprising. However, AID does see very clear differences between the objectives of T.O. 1 and of the DPG and would presumably like to see clear distinctions made between the accomplishments of the two.

As pointed out in a previous section, DAI agrees with AID that there are substantive differences between the aims and goals of T.O. 1 and the DPG, but DAI also sympathizes with the problems of IPD in making real world distinctions between the two. It is for this reason that DAI has recommened that the next time NRECA receives funds from AID, these distinctions be made only as different objectives of the same grant.[1] This

---

[1] See pp. 17-18.

action would not only clear the conceptual air but would eliminate the potential overlap in reporting.

Conclusions

NRECA reports are generally of high quality. Specific problems detected by DAI concerned the multi-objectives being served by field reports, the frequency and voluminousness of certain types of reports and the occasional difficulty in distinguishing whether a particular discussion in a report concerned a T.O. 1 or a DPG activity. To address these problems, the following actions are recommended.

RECOMMENDATION

- Each report or type of report should be designated for a specifc audience with a stated purpose, so that writers and readers are aware of the special requirements and priorities of each report;
- Consideration should be given to reducing the frequency of individual field reports from weekly to bi-weekly or longer and of reducing the frequency of the country reports from monthly to bi-monthly or longer;
- AID and NRECA should develop suggested formats for all formally required reports and should recommend criteria for the selection of information to be included in the reports based on what the prospective readers need to know; and
- As recommended earlier, in the next funding round, T.O. 1 and the DPG should be combined into one grant so that one report would report on the progress and problems in meeting various objectives.

THE IMPACT OF ELECTRIFICATION ON THE RURAL POOR

The State-of-the-Art of Impact Assessment in Rural Electrification

NRECA is tasked through the DPG with entering the field of "impact assessment," i.e., NRECA is asked to design evaluation systems which will provide measurements, or indicators, of the positive or negative changes caused by electrification among the rural poor. However, the present state-of-the-art in this field (which has recently received emphasis through a Congressional Mandate to AID) is still undefined; there are as yet no good or finished models which NRECA could copy and insert into rural electrification programs.[1]

To determine what NRECA can realistically expect to accomplish in this field, let us consider two types of impact assessments. The first, which we will call Model One, is an academically-sound, theoretically-solid impact assessment in which benefits of rural electrification are clearly specified, and causally-attributed to the development program (intervention) supported by NRECA. In Model One, results would be generalizible after a sufficient number of studies establish of conclusions in various circumstances and loc l environments. This is the type of impact assessment model which, if all

---

[1] Development Alternatives, Inc., is currently completing a state-of-the-art study on rural development information systems for TA/RD, AID/Washington.

evidence pointed conclusively to the fact that rural electrification was the catalyst for development progress among the poor could be used by NRECA to justify promoting its program everywhere. But such a positive conclusion on the impact of rural electrification has not yet been demonstrated.

In fulfillment of its DPG obligations, NRECA, through the work of James Lay in Latin America, has made a brief foray into Model One impact assessment evaluation. Mr. Lay's initial attempt to formulate and then test a socioeconomic baseline survey was instructive, and his thoughtful memorandum on the problems inherent in such a data collection effort is worthy of dissemination to others who elect to undertake this task.[1] Unfortunately, the problems which arise in attempting to carry through with a Model One-type evaluation are bigger than Mr. Lay, bigger than NRECA, indeed have proven to date even to be bigger than AID and the World Bank. A following section will deal with the evidence amassed on the impact of rural electrification through attempts to use Model One evaluations.

A second type of impact assessment, which we will call Model Two, can be used to provide evidence of any positive changes among the target population which coincide with, but are not necessarily attributable to, the introduction of a rural electrification program. That is, this Model can identify

---

[1] Memorandum to Mr. Leon Evans from James D. Lay, Subject: Evaluation of Rural Electric Cooperative, Santa Cruz, Costa Rica, dated June 24, 1976.

a large list of potential benefits which could conceivably flow from a rural electrification program, can seek to relate to these benefits indicators which reflect unidirectional improvement in the target populations' quality of life, and can determine data collection requirements which provide measurements of forward progress among the indicators. In this model, however, there can be no generality, no measure of the magnitudes or levels of benefit and little potential for cost/benefit analysis. Model Two, however, could suggest to reasonable men that rural electrification does have some positive benefits.

The way that NRECA has attempted Model Two evaluations is by creating a list of 50 potential benefits of rural electrification. This list amounts basically to a collection of unproven "hopefors." The following are sample benefits from the list of 50; they are taken from the section labelled "improved agricultural productivity":[1]

Benefit Number	Benefit
2.	Properly formulated livestock and poultry feeds prepared in small mills;
4.	Refrigeration of perishable farm agricultural products and utilization of milk coolers;
6.	Conservation of export quality of timber. (Electricity replaces wood for cooking and heating);

[1] NRECA, Progress Report under the Development Program Grant, March 1, 1975 through January 15, 1976, Appendix E-1.

8. Working through his cooperative provides farmer with some degree of leverage in the market place.

From all indications, there are two purposes to this type of listing:

- To fill out the logical framework goal-level indicators in the AID programming documentation; and
- To convince host country officials of the wide-ranging potential benefits of a rural electrification program.

As long as it is clearly recognized that NRECA is engaging in a Model Two, not a Model One exercise -- that figuratively a large net is being cast to catch all the benefits of electrification that an imaginative mind might generate -- this can be a perfectly legitimate and potentially useful exercise. To make it useful, however, NRECA must carry through to the specification of measureable indicators and data points, and to the establishment of a system by which the data can be collected and analyzed. Since NRECA has not yet done this, we are left with an empty box of potential benefits and no system to determine whether, in fact, any of the presupposed benefits have materialized in a specific rural electrification program, or a specific rural electric cooperative.

Evidence from Model One Studies on the Impact of Rural Electrification

In the next few paragraphs, we will review four studies which have been made available to the DAI evaluation team and

which would appear, at first glance, to be Model One studies. The four studies are:

- The Frank Denton mongraph on Rural Electrification in the Philippines;[1]
- The MORESCO evaluation study in the Philippines;[2]
- RECOOP II studies (1973 and 1976) on electric cooperatives in the Philippines;[3] and
- The Center for Latin American Studies evaluation of Rural Electrification in Costa Rica and Colombia.[4]

The Denton study consisted of informal interviews apparently conducted to assist NEA and AID/Manila prepare the documentation for the fourth AID rural electrification loan. The study makes the claim that the impact of rural electrification is clear and positive. Yet, there is no sample, no data, and conflicting

---

[1] Frank H. Denton, "Philippine Rural Electrification: Social Analysis," undated, mimeographed (completed for inclusion in the fourth AID Rural Electrification Loan to the Philippines).

[2] Francis C. Madigan, Alejandro N. Herrin, William F. Mulcahy, "An Evaluative Study of the Misamis Oriental Rural Electric Service Cooperative, Inc. (MORESCO)," prepared for the Agency for International Development, Manila, by the Research Institute for Mindanao Culture, Xavier University, March, 1976.

[3] Asia Research Organization, Inc.,"RECOOP II", prepared for the Agency for International Development, Manila, January 1976.

[4] James E. Ross, J. Michael Davis, John Saunders, Galen C. Moses, "Rural Electrification: An Evaluation of Effects on Economic and Social Changes in Costa Rica and Colombia," prepared for the Agency for International Development by the Center for Tropical Agriculture, Center for Latin American Studies, University of Florida, August 31, 1973.

numbers of respondents.[1] DAI does not consider this a serious Model One impact assessment study.

The MORESCO study was based, primarily, on a "probability sample" of 253 households.[2] The final report of the study, which was used to justify the fourth AID loan, is an unqualified testimony to the benefits of rural electrification on the rural poor -- benefits such a decreased fertility, increased income, increased employment, greater productivity, quality of life, etc. However, income levels are based upon naive assumptions concerning rural respondents' ability and willingness to provide overall yearly income figures. Even if all benefits were found by a more thorough investigation to be valid, there would still be serious questions about the applicability of this study to other areas of the Philippines since the cost of electricity in MORESCO was the second lowest in the country, 1.5 standard deviations below the mean kilowatt-hour rates.[3]

In short, the MORESCO evaluation utilized a small and non-representative sample and employed unsophisticated data gather-

---

[1] The Denton study is treated briefly in the footnote on Page A-14 in the Philippine Annex.

[2] The MORESCO study is treated in some detail beginning on page A-27 in the Philippine Annex.

[3] It should be clear that DAI's concerns relate to the conclusiveness of the evidence presented in the impact assessment studies, and not to what DAI believes are the real benefits of the Philippine rural electrification program. See the Philippine Annex for a detailed assessment of a program which appears to be, in this instance, an excellent development investment.

ing techniques. The final report appears to have been written with a preconceived goal in mind, and that goal was not, under the strict assumptions of Model One as previously specified, an objective evaluation of the impact of rural electrification.

The RECOOP II study was more ambiguous in its findings, with few conclusions as to the impact of rural electrification. The lack of conclusion stems from what DAI believes are major lapses in the attempt to obtain consistent longitudinal data in 1973 and again in 1976 on users and non-users of electricity in four areas.[1] Since the MORESCO area was also covered in the RECOOP II study, it offers interesting comparisons and constraints. Income figures (the most difficult data to obtain accurately in survey form) from the three studies -- i.e., MORESCO and the two RECOOP studies -- are not consistent and not believable. Perception of cooperative membership is reported to be miniscule and disconnect rates high. Few water project improvements were noted, although this was a positive and significant benefit reported in the MORESCO study. The RECOOP II study was also flawed by the inability to distinguish non-adopters from non-users -- that is, to note the difference between those not using electricity who nevertheless had access to it (the non-adopters) and those who were not using electricity because they had no access to it (the non-users).

---

[1] See the Philippine Annex, page A-30 for details on the RECOOP II study.

In sum, the RECOOP II studies are a testimony to the difficulties encountered in attempting to obtain consistent longitudinal data, given the sampling and data collection problems inherent in rural areas. The data which is available, for example the reported changes in income over the period 1973-1976, cannot be attributed (even if it could be believed) to the electrification program.

By contrast, the fourth study by the Center for Latin American Studies at the University of Florida gives every appearance of being thoughtfully and professionally conducted. There is an extended discussion in the report on the methodologies of sampling and data collection, and a justification for excluding attempts to capture income directly, with an alternative use of a more reliable "level of living" index. The study includes an attempt to obtain longitudinal data -- based upon earlier surveys which had been conducted in cooperative areas -- but which failed due to migration and inability to track the original respondents. Verification techniques included a test-retest cycle which established confidence in the results of the survey. The study did suffer, however, from being a cross-sectional analysis in a field which needs time-series data, but it is the best example of a Model One impact assessment study in rural electrification which the DAI team could obtain.

It is interesting that this study is not cited in NRECA reports on the benefits of rural electrification, possibly because many assumed benefits are, in fact, not demonstrable in the Costa Rica and Colombia examples. In many areas, a household light and a socket for an iron were the only direct benefits of electrification for the poor. In Costa Rica, there were no secondary effects such as increases in small farmer productivity. In Colombia, the benefits of electrification apparently accrued mainly to the owners of large farms, mills, dairy producers and other members of the non-target population. Employment in some areas had not decreased as a result of electrification only because labor-displacing capital investments were balanced by a few new employment opportunities. An average of one-third of the rural population living along electric lines were not using electricity, and the use of electricity (and thus the benefits) tended to vary directly with level of living (the income proxy) and education.

This is not to argue that there were not a substantial number of benefits from the Costa Rica and Colombia rural electrification program demonstrated by this study. It is, rather, to argue that even after more than five years of energization in these two countries, the demonstrated benefits did not match the "hoped for" NRECA list. On the specific point of the ability of the cooperatives to affect rural lives beyond the provision of electrification (NRECA indicator number 8 cited on page 78), the study found no evidence that the cooperatives, once in

operation and energized, performed any function other than the distribution of electric services, a service, in other words, very similar to that provided by municipal and state-owned systems. The authors of the study call for a careful analysis to determine under what circumstances rural electrification is, in fact, an optimizing development investment given scarce resources and many competing investment demands.

In conclusion, the hypothesis that rural electrification is universally applicable and beneficial to AID's target population cannot be documented by Model One impact assessment studies which the DAI team has examined to date. Rather, there appears to be a negative correlation between the scientific "hardness" of the analysis of rural area benefits and the list of actual benefits derived from rural electrification -- the more objective the study and the more thorough the data collection and analysis techniques, the fewer benefits can be attributed to rural electrification. This would indicate the need for increased and improved Model One impact assessment studies, particularly in countries such as the Philippines, where the program looks successful. Some such studies are already underway and are discussed in the Annex on the rural electrification program in The Philippines.

The Results of Incomplete or Partial Model One Impact Assessments

It is possible to argue, as do the Bureau of the Census survey specialists who are assisting AID/Manila with data

collection and analysis responsibilities, that the MORESCO, RECOOP II and other ongoing evaluation plans are necessary steps in building a capability within The Philippines' National Electrification Administration to do better, more conclusive impact assessment studies in the future. This allows earlier flawed work to be shrugged off as necessary stepping stones on the path toward truth.

But the problem with partial or unconvincing impact assessment studies is that the results may be taken as gospel by those promoting rural electrification and used to convince other countries to undertake programs modelled on a "proven" success story. In a semi-annual report on progress under the DPG, NRECA used the Philippines studies in this manner:

> The results of both studies (The MORESCO study and the Frank Denton monograph), however, conclusively showed that electric service is going into all segments of society and even those at the poorest levels who have not taken electric service into their homes are benefiting through better community health services, pure water supplies, farm irrigation, new job opportunities in large and small industries that have come into being as a result of electrification and in other ways. As of the end of the reporting period, AID had approved another significantly large loan to carry the program forward, and NRECA's contract extension is being processed at this time."[1]

As indicated, nothing about the Denton study and little about the MORESCO study was "conclusive" -- the majority of the benefits

---

[1] IPD/NRECA, Semi-Annual Report, Task Order No. 1, January 1, 1976 to June 30, 1976. See Annex A on the Philippines for a more extended discussion of the MORESCO and Denton studies.

cited were simply Model Two indicators. While electricity is reaching some portions of "the poorest levels of society," the benefits of electricity are heavily skewed toward the non-poor levels of society. In short, these partial and inconclusive studies are reported as though they were complete and convincing, and then are used to make an implied judgment on the overall impact of the rural electrification program in the Philippines.

What NRECA Can Contribute in Impact Assessment Studies

In the light of the foregoing analysis, DAI believes that NRECA can make a contribution to the advancement of Model Two impact assessment evaluations. It can do this by carrying through on its initial list of potential benefits of rural electrification to the development of a system which specifies, and then collects data on, indicators of target population benefits. This program should be started modestly, perhaps with the definition of four indicators for a pilot area. From NRECA's list it might be possible to choose the following indicators as useful proxies for first-order benefits:

- Percentage of hookups (adopters) among the rural poor who have access to electric service. This is a basic indicator of the direct benefits of the rural electrification program. The DAI evaluators have seen specific instances of less than 50 percent hookups along backcountry roads which are explained away by a variety of unique circumstances (power shortages, no transformers, etc.). Since there is a continual cavalcade of visitors from cooperatives to remote areas (meter readers and bill collectors), data collection for this indicator should not be difficult or costly to establish;

- New hookups for irrigation, or other productive activities. These need to be further divided between replacements for diesel equipment, and new establishments. Since there is a requirement for customer data when the initial installations are made, forms to record this type of data could be easily designed. DAI estimates that new employment at these installations or farms could also be relatively easily captured;

- Coverage of the electric system in comparison to the total area assigned (the percentage of the population which does not have access to electric service); and

- Uses of electricity in the home or on the farm standardized by a level of living index, collected perhaps on a different sample of the rural electric cooperative's territory each month. This could also be part of the program of member education about the cooperative, about power uses, etc.

In individual situations, there may be other benefits relating to production, productive capacity and output. If these are obvious, as they will be if the rural electrification program is an unqualified success, indicators should suggest themselves and can be included in the data collection process.

NRECA could assist the rural cooperatives and the national electrification service in attempting to establish these Model Two impact assessment systems. When some of these efforts are successful -- that is, produce useful data which has both variance and change over time -- NRECA could then move forward to more sophisticated models which might include extracting data from non-electric users to allow for some simple comparisons in project areas.

Conclusions

There are no impact assessment studies which allow generalizable conclusions that rural electrification is the optimal development investment in all Third World situations. The attempt to promote electrification in many countries tends to allow what should be preliminary and tentative impact studies to be used as convincing demonstrations of the superiority of rural electrification. In distinguishing between advanced impact assessment studies (Model One) and less sophisticated indicators of relative forward progress (Model Two), NRECA should confine its activities to the second model and attempt to implement ongoing data collection and analysis systems within rural electric cooperatives on a few selected indicators of direct and indirect benefits which are generally ascribed to rural electrification.

RECOMMENDATION

AID should specify more clearly the impact assessment model which it desires NRECA to attempt to implement. DAI recommends these be simple extensions of NRECA's present list of potential benefits, operationalized to include objectively verifiable indicators, measurements, data collection and analysis systems and a reporting format which explains what has been learned from the exercise. As these are proved valuable, NRECA can be funded to engage in more sophisticated data collection and analysis efforts, perhaps to include some comparisons between users and non-users, or electrified and non-electrified areas.

AID should also support increasingly powerful and convincing studies of impact assessment along the lines of Model One by providing funds to outside, non-involved and objective research organizations to more fully explore the impact of rural electrification on the rural poor.

ANNEX A

TABLE OF CONTENTS

RURAL ELECTRIFICATION IN THE PHILIPPINES

THE NATIONAL ELECTRIFICATION ADMINISTRATION. A-1

THE MAGNITUDE OF THE PROGRAM. A-1

DESCRIBING THE PROGRAM. A-3

NRECA SUPPORT TO NEA. A-4

WHO DOES WHAT FOR RURAL ELECTRIFICATION A-6

PORTRAIT OF THE RURAL ELECTRIFICATION PROGRAM A-9

THE RURAL ELECTRIC COOPERATIVES. A-11

INITIATION AND ORGANIZATION A-11

COVERAGE OF THE RURAL ELECTRIC SYSTEMS. A-15

BENEFICIARIES AND THE RURAL POOR. A-19

POWER USE A-24

ISSUES: THE SOCIAL AND ECONOMIC IMPLICATIONS OF A RURAL ELECTRIFICATION PROGRAM. A-25

INDICATORS OF THE IMPACT AND BENEFIT INCIDENCE OF ELECTRIFICATION A-25

THE MORESCO STUDY A-27

RECOOP II A-30

A NATIONAL EVALUATION PROGRAM A-34

EVALUATING THE RURAL ELECTRIFICATION PROGRAM. A-35

CONCLUSIONS. A-37

ANNEX A: RURAL ELECTRIFICATION IN THE PHILIPPINES

THE NATIONAL ELECTRIFICATION ADMINISTRATION

THE MAGNITUDE OF THE PROGRAM

October 1976, the Official Voice of the National Electrification Admininstration:

"The benefits of rural electrification, via the cooperative system, has now spread to some 406,550 households in 374 municipalities all over the country as of the end of July this year.

"In an effort to realize the national objective of total electrification, NEA-assisted electric cooperatives have begun to intensify barrio electrification in areas where backbone systems have been installed and energized.

"To date, a total of 3,026 barrios covered by electric co-ops have been electrified. Of the 77 co-op projects now organized, 61 are already operational providing adequate service within the covered areas. To sustain the continuous development of co-op systems, loans amounting to ₱1.1 billion have been extended to 65 cooperatives. Foreign electrical equipment and materials worth $36.1 million have already been procured, utilizing USAID loan grants, and delivered to co-ops all over the country at a rate of 100-200 tons daily.

"In line with NEA's program of developing the management and technical capabilities of co-op personnel to support the institutional growth of electric cooperatives, some 457 training courses have been conducted for more than 17,500 participants ranging from co-op linemen to Presidents and General Managers.

MICROFILMED FROM BEST
AVAILABLE COPY

"While NEA's task is centered on providing power to the rural areas, it has involved itself in other development projects geared towards the uplift of the socioeconomic conditions in the rural areas. In coordination with the Farm Systems Development Corporation, a total of 283 electric-driven irrigation pumps serving 20,102 hectares of farmland in 22 provinces have been connected to boost agricultural production of the rural folk.

"Nine power-using small-scale industry projects have been established in nine electrified co-op areas to give employment opportunities to the local people. These industrial cooperatives are funded by loans totalling ₱2.4 million.

"To date, some 375 classrooms in 58 public schools in the provinces have also been lighted up under NEA's schoolhouse lighting project designed to provide electric service to rural schools for night classes and the conduct of vocational and technical courses for the rural adult population."[1]

The national electrification program is immense, supported by $106.5 million in foreign assistance, with what is reported to be the final $20,000,000 tranche of $81 million in U.S. AID funds being conferred on August 6, 1976.[2] In all, the program approaches a quarter billion dollars dating from 1969, with the major impetus coming in 1973, when President Marcos issued Presidential Decree 269 giving the National Electrification Administration funding and priority to undertake the program. It is a massive attempt to turn the rural areas (those

---

1 Sinag (NEA), Vol. IV, No. 3, p. 1.

2 There have been four loans totalling $78 million after an initial three million dollar pilot/feasibility project was funded. In addition, there are major U.S. commitments under surplus property arrangements (from the ending of the Vietnam war) and PL 480. Japanese war reparations totalled $7.5 million, and the French recently extended an $18 million loan for commodity procurement. The World Bank is reported to be next in line.

MICROFILMED FROM BEST AVAILABLE COPY

MICROFILMED FROM BEST AVAILABLE COPY

outside Manila) of the Philippines into the electrified (and thus modernized) 20th century.

DESCRIBING THE PROGRAM

In addition to the flow of official news releases and documentation from NEA, AID has recently submitted and had approved a project justifying the fourth loan. Interested readers are referred to this document for a description of the rural electrification program in the context of the Philippines. The NEA program combines power generation in areas where the National Power Commission (NPC) has not provided service, power transmission up to and including 69.7 KVA (below the high-voltage transmission lines of NPC) and take-overs of existing private franchises. The take-overs utilize a local cooperative structure, but with strong direction, financing and control from NEA. The cooperatives themselves range from 45,000-client behometh in Pampanga to miniscule (and thus uneconomic) isolated communities of a few hundred hookups. The interface with NPC is complex, with only a few cooperatives being able to draw on cheap, plentiful NPC hydro-power. Those which do have impressive statistics in service, coverage and secondary benefits. Many of the others have serious problems in years of escalating fuel prices, attempting to generate their own power with equipment which is not of sufficient size for important economics of scale. Others mix and match NPC and local power sources, attempting to keep their

own load usage near 100 percent of their generation capacity. Not only is the system in the Philippines complex but, as those directly involved are well aware, the generating, distribution and use of electric power -- when the objective is to have the cooperatives financially viable and self-sustaining -- is a very difficult task. Demand peaks, off-peak sales, the relationship between demand and installation costs, and large scale users (cold-storage plants) versus socially important but predictable peak load users (residential) all must be entered into the equation. NEA intends to electrify the countryside, using electric cooperatives as the vehicle for management. More importantly, it intends to do this in a way which will insure that the cooperatives pay back the low interest loans and provide reserves which will pay for depreciation replacement, and expansion. This is no small undertaking among the thousands of islands of the Philippines.

NRECA SUPPORT TO NEA

Recognizing that the successful completion of the program required foreign technical assistance, AID assisted NEA in contracting for NRECA long-term involvement in the program. As of the most recent amendment, a contract of $1,689,607 specified that NRECA would provide U.S. personnel as follows:

MICROFILMED FROM BEST AVAILABLE COPY

Category	Man-Months
Home Office Professional Staff	60
Home Office Non-Professional	20
Field Staff Professional, Long-Term	327
Field Staff Professional, Short-Term	40

The objective of the NRECA contract is stated as follows:

> "The purpose of the project is to assist the Government to achieve by 1976 its goal of becoming institutionally and operationally capable of accomplishing the complete, long range, county-wide electrification policy set forth in the enabling legislation. It is believed the best way to achieve this organizational proficiency is by intensive training and assistance as the agency administers the presently projected 36-cooperative development program. The technical assistance will direct its efforts at all levels at NEA as the establishment of these operating electric cooperatives materialize. To properly accomplish the program, assistance will be needed to establish instrumental capabilities in such diverse through related fields as cooperative organization, feasibility study, preparation and review, loan preparation and negotiation, utility accounting standards peculiar to rural electric cooperatives, power use, commodity procurement, development and adoption of standard procedure manuals, job descriptions and staff functional training. Additionally, participant training will be used to augment on-the-job training in certain technical areas."

The following handout from NRECA/Philippines describes some of the division of responsibility, and ascribes to NRECA staff personnel functional areas of specialization. A more detailed listing of NRECA staff assistance subjects (96 in all) is available to the NEA staff.

MICROFILMED FROM BEST AVAILABLE COPY

WHO DOES WHAT FOR RURAL ELECTRIFICATION[1]

WHAT DOES NPC DO?

Provides the wholesale power supply to the electric cooperative where NPC generating capacity and transmission lines make this possible. Where NPC cannot sell power to the cooperative, the cooperative may generate its own power in accordance with NEA guidelines and directives.

Plans with NEA for electrifying the entire country.

WHAT DOES NEA DO?

Makes long-term, low-interest loans to electric cooperatives for area-wide service.

Provides technical assistance directly or through consultant in engineering, construction, organization, accounting, legal matters, and operations.

Asserts audit control of all program expenditures and investment to protect the government's interest.

Acquires materials and equipment for rural electrification and allocates these to the electric cooperatives.

Prepares and directs over-all program for total electrification of the Philippines under Presidential Decree 269.

WHAT DOES THE NRECA ADVISORY TEAM DO?

Advises NEA on organization, staff development, procedures, and standards.

Assists NEA in developing standards, procecures, and training programs for electric cooperatives, and inspection techniques for appraising their performance.

Works directly with board, manager, and staff of electric cooperatives in such areas as: power supply, retail rates, system maintenance, meter reading, billing and collecting, accounting, budgeting, planning, operations, power use, personnel administration, safety performance development, board-manager relations, and member relations.

---

[1] Extracted from a NRECA/Philippines handout.

MICROFILMED FROM BEST AVAILABLE COPY

Based upon a very short visit (12 days) to Manila, with field visits in the company of NRECA personnel to three installations, discussions with NRECA personnel, perusal of the lengthy monthly reports, and observation of the interaction of NRECA advisory staff with NEA personnel and co-op staff, NRECA gives every impression of fulfilling both the spirit and the letter of their contract with NEA. Their field efforts are in the realm of trouble-shooting, and they are called upon to assist the cooperatives and the NEA bureaucracy function more smoothly. NEA and the cooperative staff obviously felt, in the situations observed, that NRECA advisors had been and would be of direct utility, and requested their advice and assistance.

Both NEA personnel and NRECA Philippines staff praised the backstopping efforts of the home office (Washington) NRECA/IPD staff. With five man-years of Washington support and 40 man-months of short-term professional assistance to this specific contract, there appears to be little reason why either the DPG or Task Order One funding need be utilized in the Philippines. A total of 27 days was charged to the two grants for work in the Philippines during the 18-month period beginning January 1, 1975. In addition, a $10,000 grant was extended from DPG funds to assist NEA provide a foreign training (promotional) program for officials from neighboring countries. This is described and discussed in the body of the report.

MICROFILMED FROM BEST AVAILABLE COPY

The NRECA staff is concerned, rightfully we believe, that the trade-off between utilizing their professional skills in long-term development of NEA staff, or in utilizing their skills to augment the thinly-stretched human resource base at NEA headquarters, was resolved in favor of fast response, short-term benefits. This policy decision by NEA director Col. Dumol was understandable, given the high pressure to achieve results in the electrification program. However, it does limit the ability of NRECA to withdraw while leaving behind a trained and experienced Filipino staff to carry on their work.

NRECA staff has also entered the management/evaluation field, attempting to rationalize the use of data extracted at high cost (and amidst rather general complaining) from the cooperatives. Several draft bulletins have been prepared explaining how to utilize the data in processed form -- ratios important for successful management of the cooperatives and for review by the overseeing sections within NEA. These are management "evaluations." It should be clear that NRECA, either home office or Philippines, has little involvement on the question of the impact of electrification. In general, we believe this is a wise decision, dictated by the special demands of impact assessment when set against the more operational (and to NEA, important) assignments which they have been given.[1] There

---

[1] See following sections of this Annex for additional discussion of, and specific recommendations for, increasing NRECA's involvement in rural electrification impact assessment.

MICROFILMED FROM BEST AVAILABLE COPY

is also minimal involvement in power use, not because it is unimportant, but because there are 96 other responsibilities which are critical in getting the electricity from the generator to the customer which consume the time and attention of the NRECA staff.[1] Serving as support to NEA, NRECA must of necessity accept NEA's priorities and give assistance to areas in which various problems have stopped the forward progress of the electrification program. Both impact and power use are, to NEA, "icing", to be considered after the first set of responsibilities has been discarged. It is unlikely this situation will change before the end of the NRECA contract.

PORTRAIT OF THE RURAL ELECTRIFICATION PROGRAM

This is a highly politicized program directly involving the promises of President Marcos to transform the rural countryside. During any week in Manila, the press will offer several articles on the energizing of municipalities and barrios, and progress of NEA. Summary articles may appear in the Sunday paper. A press highlight was the birthday party given for President Marcos, reported as follows:

---

[1] With the exception of one very interesting aspect of the NRECA field staff efforts to create import substitution effects by deliberately utilizing locally-made materials in the construction of lines, substations, etc. These efforts are valuable in adding to Philippine production capacity, and eliminating some of the dollar costs of imports.

> "Recently, some 145 barrios and 9 municipalities in 35 provinces and 72 schoolhouses were lighted up as the co-ops' gift to President Ferdinand E. Marcos on his birthday. The President himself, together with his family, officiated at the energization of 3 barrios in Lanera, Neuva Ecija last September 11."[1]

This kind of front page visibility, strengthened by the use of radio and television in promoting the program, places strong demands upon NEA. Electrification is important to the municipalities, particularly the larger ones with good economic potential. Delegation after delegation appears on NEA's door to plead their case to become next in line for energization. The program has momentum and is one of the most interesting case studies of a country, at a certain level of development, which opts to put many of its resources into rural electrification. President Marcos, NEA, AID and NRECA all have heavy stakes in producing a winner. Signs point toward rural electrification as a good development investment in the Philippines.[2]

---

[1] Sania (NEA) Vol. IV, No. 3.

[2] The high stakes make any evaluation of the rural electrification program difficult. Writings on the subject are or appear to be tendentious, from the press releases to the "evaluations" performed to insure the next AID loan. There is an air of providing reports of success to help insure success -- a modification of believing in your own press reports. See the following sections for more details on the actual and expected impact of the program on the rural poor.

THE RURAL ELECTRIC COOPERATIVES

INITIATION AND ORGANIZATION

The National Electrification Administration operates through a series of rural electric cooperatives which are legal entities empowered to take over private utility franchises. The cooperatives are organized through an innovative system of public involvement, beginning with the formation of Provincial Electrification Cooperative Teams (PECT). These groups were assigned to set priorities for the gradual expansion of electric service throughout the province. They also assisted in obtaining the data necessary for the economic feasibility studies which preceded actual formation of the cooperative, and the initial plans for new energization, or take over of existing services.

A further step was the formation of District Electrification Committees (DEC) for each cooperative area. Groups were organized as community cooperative advisory committees in eight basic categories: youth, agriculture, education, church, civic organization, local barrio government, local municipality government and professional. Each group nominated one member for the DEC which then elected the original Board of Directors of the Cooperative. The Board is based, at least in the two cooperatives visited, on a geographic representation, i.e., if six municipalities are included in the cooperative, there will

be six board members, one from each district.

The organization of the cooperatives has been impressive, and many first hand reports of the meetings and the local involvement attest to the participation and interest of the communities. The "rural poor" are rarely elected to the Board of Directors and neither, so far as we could tell, are the traditional landed aristocracy in control. This is a result of the organizational system used to establish the cooperatives.

The leadership of the two cooperatives visited is likely to be representative of the middle-class involvement at the district level:[1]

BOARDS OF DIRECTORS

	Albay	Camarines Sur I
President	Government Employee, District Level Administrator	Journalist
Vice-President	Medical Doctor	Retired Army Colonel (coconut plantation owner)
Treasurer	Businessman (agricultural products)	Retired Public School Teacher
Secretary	Businessman (fibercraft products)	Public School Teacher
Director	Businesswoman (sells cemetary plots)	Elementary School Principal
Director	Government Employee	

[1] The third installation visited, Sapang Palay, is run directly by NEA after the failure of a previous cooperative in the area.

The problem with the institutional arrangements in the rural cooperatives is not in the formation, but in the continuation of local participation after the cooperative has been chartered, and actual operations are underway. There is no clearly defined role for the District Electrification Committee, or any of the cooperative committees. In some areas, the DEC's continue to provide assistance in obtaining right-of-ways, collecting debts, promoting hookups, etc. In others the DEC has given way to the Board of Directors, which administers a large electric distribution system. Although the NEA charter calls for general elections for the Board after a year of operations, this is readily by-passed through a clause which allows (or is interpreted to allow) the elections to be held a year after system completion. In the MORESCO area, many of the paid and registered members in the electric cooperatives do not know they are in a cooperative. Three percent stated co-op membership against the 43 percent who acknowledged receiving electricity from the cooperative.[1] This is particularly striking when co-op records show over 100 percent of all users are members. General elections had not been held in either Albay nor Carmarines Sur. While other sources optimistically report continuation of local participation after the formation of the cooperative, it does not appear that this is a major push of the program, and is an element which can easily be overlooked

---

[1] Asia Research Organization, RECOOP II, January 1976, page 18.

MICROFILMED FROM BEST AVAILABLE COPY

in the drive toward electrification of the country.[1]

A striking feature of the cooperative system in the Philippines is the wealth of human resource talent available for management. The general managers are often engineers, backed by CPA's who serve as deputies. The staff of more than 100, in relationship to nearly any other developing country, has extremely high educational and technical background. The Philippines is one of those rare countries which has, in relationship to other developed resources, an abundance of university-educated professionals who are from the areas in which the cooperative must work. Nevertheless, NEA has provided nearly 50 percent of all general managers on loan to the rural cooperatives. This is a commentary on both the closeness with

---

[1] In informal and (so far as we could determine) undocumented surveys conducted for NEA to provide a Social Soundness Analysis for the most recent Project Paper, the author writes:

> "To promote member involvement, co-op membership meetings are held frequently and NEA encourages efforts to have wide attendance. It is interesting to note that in a survey of 240 members in six co-ops, about 40 percent indicated regular attendance and only 15 percent said they seldom or never attended meetings." (p. 9)

In an amplification of the people's attitudes toward co-op membership, the author stated:

> "As of this date, there is every evidence that the members attitude toward the co-op is very favorable. Attendance at meetings is far higher than might be expected. Meetings are held 2 to 12 times a year depending on the judgment of individual co-op management. Most members surveyed (350) indicate that they attend co-op meetings regularly (only 15 percent of the respondents indicate seldom or no attendance at all)." (p. 14)

It is interesting to contemplate where the 32,000 members of the Pampanga cooperative might hold their regular and frequent meetings. Frank H. Denton, "Philippine Rural Electrification: Social Analysis," undated, mimeographed.

which NEA holds control, insisting that any candidates for general manager be approved by the national headquarters, and the complexity of managing the rural cooperative. The cooperatives are, in most cases, large, expensive, well-staffed and funded organizations attempting to introduce new power sources as well as meet their current, amortization/depreciation budgets.[1]

COVERAGE OF THE RURAL ELECTRIC SYSTEMS

Electrification, if it is to be self-financing over time, must provide services to high-density or high-volume users. The Philippine system begins with a focus on cities, extends into municipalities, and then more remote rural barrios. Residential housing will rarely pay the costs of power generation, particularly for small rural systems. The power peaks are clearly defined between darkness and bedtime, with an average of not more than four hours a day from minimum users. Heavy electric drawers are needed -- particularly those who can work off-peak -- as well as those who pay their bills regularly. Cold storage units, manufacturing plants, rice mills, etc., all qualify as preferred customers.

---

[1] A further advantage of the cooperative structure is an independently determined payment structure for local management -- which can include benefits difficult to provide from NEA headquarters.

The coverage of rural electric systems relates to the balance among clients, residential and commercial, industrial, public facilities, irrigation, etc. Too light a residential load suggests that the system is devoted to larger users at the expense of the rural dwellers. Too heavy a residential load places real burdens on the ability of the cooperative to meet its monthly bills. All of this is compounded by a rate structure which may discriminate in favor of, or against the residential user as a customer class, and between light and heavy users within the same class.

Tables A-I and A-II present consumer sales and revenue data for the two cooperatives visited. National reporting requirements have generally standardized the reporting system, although the two cooperatives (due to a funding restriction which eliminated the distribution of Manila-generated forms) are not exactly comparable in the right-hand columns.

The data based upon monthly consumption, shows that the Albay Electric Cooperative is 59 percent residential while Camarines Sur I is 52 percent residential. Both those figures appear very reasonable, but the complexities of load factor and pricing eliminate the use of simple ratios to describe "optimum" coverage patterns. Since the power is limited in both cooperatives, improvements in the mix, such as the addition of consistent and high volume customers, must await hook-ins to the NPC system. There is no way of determining, from the data

TABLE A 1

ALBAY ELECTRIC COOPERATIVE, INC.
August 1976

Source of Revenue	This Month				Year-to-Date		
	Number of Receiving Service	KWH Sold	Amount	Number of Minimum Bills	Average No. Receiving Service	KWH Sold Cumulative	Amount Cumulative
Residential Sales - City	3,970	185,267	₱92,540.01	1,556	4,023	1,375,072	₱ 782,308.28
Residential Sales - Poblacio	6,422	187,323	99,497.39	3,433	5,810	1,417,499	839,651.33
Residential Sales - Barrios	1,025	153,378	86,901.67	267	796	786,323	482,980.01
Commercial Sales - Small	9	7,549	2,766.64	-	8	142,072	44,142.07
Commercial Sales - Medium	-	-	-	-	-	-	-
Commercial Sales - Large	-	-	-	-	-	-	-
Irrigation Sales	-	-	-	-	-	-	-
Communal Water System							
Public Buildings and Facilities							
Cities and Poblacions	95	17,771	8,089.09	23	87	140,393	71,672.79
Barrios	68	15,931	7,166.55	25	48	99,301	51,354.70
Sales for Resale	-	-	-	-	-	-	-
Industrial Sales	10	34,936	12,371.39	-	8	180,904	102,651.96
Public and Private Security Lightings	22	28,552	8,193.59	-	20	221,625	65,674.36
Other Electric Revenue	-	-	3,881.70	-	-	-	20,117.60
TOTAL	11,621	630,707	₱321,408.03	5,304	10,800	4,363,189	₱2,460,533.14

MICROFILMED FROM BEST
AVAILABLE COPY

TABLE A-II

CAMARINES SUR 1 ELECTRIC COOPERATIVE
August 1976

Source of Revenue	August 1976				August 1975			
	Number Receiving Service	KWH Sold	Amount	Number Minimum Bills	Number Receiving Service	KWH Sold	Amount	Number Minimum Bills
Residential Sales	2,685	64,049	₱40,638.56	856	983	32,635	₱19,255.88	243
Commercial Sales	316	26,952	16,744.19	29	206	15,676	9,594.64	21
Industrial Sales	12	8,688	5,212.80	-	3	182	109.74	-
Irrigation Sales	4	5,221	3,132.60	-	1	720	432.00	-
Public Buildings and Facilities	19	3,883	2,411.72	2	7	1,215	746.26	-
Street Lights and Security Lightings	259	15,064	3,949.29	-	197	10,722	2,634.77	-
Others (Specify)	-	-	230.00	-	-	-	138.00	-
TOTAL	3,295	123,857	₱72,319.16	887	1,397	61,150	₱32,911.29	264

available, who is not using the power which is available. The non-adopters present a serious benefit incidence problem in rural electrification.

BENEFICIARIES AND THE RURAL POOR

If power were available, then the ratio of users to non-users along existing lines would give valuable insights into the benefit distribution of rural electricity. In the cooperatives visited, as well as the NEA system, no data exists on non-adopters, even though meter readers/bill collectors pass each house which is hooked-in, twice a month. Managers estimated 25 to 40 percent of the homes which could receive service, actually do. Power shortages obviously reduce the incentive of the cooperatives to promote increased customers, and not until power is plentiful (and data is collected for the indicator) will the question of whether electricity is reaching the rural poor be answered definitely.[1]

If the coverage is one side of the benefit incidence, the rate structure (as well as the wiring charges) are the other. The level of the average system rate is only slightly affected by the cooperative, depending mainly upon the cost of power.[2]

---

[1] The following section discusses the results of the MORESCO study on benefits reaching the rural poor.

[2] This obviously is an oversimplification, since management can reduce power loss, as well as other operating expenses.

Table A-III presents the peso costs per KWH in the two cooperatives in August 1974 and August 1976. These costs are the averages within any singular customer group. The table will not indicate whether rates change with increased usage within one group. The theories behind the two rates suggest that in Albay there is discrimination between the high-installation cost of residential and small commercial hookups, and the more profitable medium commercial and industrial sales. This could easily be a straightforward recognition of the true costs of providing power to different classes of customers. In the Camarines Sur I cooperative, rates are uniform with slight ferences which could reflect special agreement with slight differences which could reflect special agreements with high-volume users, based upon ease of access, or long-term arrangements. This reflects a different concept of rate setting -- that of uniform pricing between customer classes independent of the costs of providing such service.

Within any customer class, the two cooperatives operate on different rate systems. In Albay, the basic residential rates are as follows:[1]

First 15 KWH (minimum)	₱.300
Next 35 KWH	.270
Next 50 KWH	.240
Over 100 KWH	₱.180

[1] The basic residential rates apply before the special fuel cost is assessed, which varies each month but in October 1976 was .260 per month.

TABLE A-III

COMPARATIVE RATES[1]

	Camarines Sur I		Albay	
	Aug. 1976	Aug. 1974	Aug. 1976	Aug. 1974
Residential Sales - Poblacion	.624	.312	.499	.318
Residential Sales - Barrios	.646	.338	.531	.344
Commercial Sales - Small	2.18		.567	.380
Commercial Sales - Medium	.571	.491	.367	-
Commercial Sales - Large	.622	.316	-	-
Irrigation Sales	.600	-	-	-
Communal Water Systems	-	-	-	-
Public Buildings and Facilities				
Cities and Poblacions	.620	.372	.472	-
Barrios	.620	.317	.450	-
Sales for Resale	-	-	-	-
Industrial Sales	.600	.363	.354	-
Public and Private Security Lights	.262	.209	.287	.250
Other Electric Revenue	-	-	-	-
TOTAL	.586	.325	.510	.325

[1] Pesos per KWH.

In this system, the low users, those at or near the minimum of 15 KWH per month in some sense subsidize the higher volume users.

In Camarines Sur I the comparable figures are:

First 10 KWH (minimum)	.340
Over 10 KWH	.360

This reflects a different theory of rate setting, with a small benefit for the minimum users.

With such diversity in the system it is difficult to determine which reflects present policy. NEA Policy No. 401-A, Subject: The Level of Electric Retail Rates for NEA-Assisted Electric Cooperatives offers guidance as follows:

1. During the first year of operation after first energization the co-op should charge such rates as will fully cover the cash requirements of power purchase or generators and operation.

2. From the second to the fifth year of operation after first energization, the co-op should charge such rates as will result in gradually increasing gross margins.

However it is to be done, NEA expects the rates to pay for the power, and to accumulate reserves for expansion and depreciation. NEA Policy No. 402, Subject: The Structure of Electric Retail Rates for NEA-Assisted Electric Cooperatives provide more explanation:

MICROFILMED FROM BEST AVAILABLE COPY

1. An electric cooperative may charge the same rate to all classes of customers, with the exception of the larger high-load factor industrial loads.

   1.1 Alternatives to an electric co-op may charge different rates to different classes of customers, e.g., residential, commercial, street lighting, industrial. In no case, however, should the rate to small residential consumers be made to support costs incurred to serve other consumers.

2. NEA's standard rate structure involves a single rate per kilowatt-hour, to be charged to all consumer classes (or to a particular consumer class) for all consumption regardless of KWH volume.

There is obviously discretionary policy determination allowed to the cooperatives in the establishment of rates across customer classes. An examination of the rate structure for Siang Palay, the NEA-run electric system outside Manila, provides further insights into government policy. Rates within three customer classes are shown below:[1]

	Residential	Commercial	Industrial	
First 15 KWH	.040	.045	First 200 KWH	.220
Next 35 KWH	.230	.250	Next 200 KWH	.210
Next 50 KWH	.200	.200		
Next 100 KWH	.170	.180		
Next 200 KWH	.150	.180		

[1] Without fuel or demand charges.

MICROFILMED FROM BEST AVAILABLE COPY

The conclusions appear clear. While there are no uniform rate structures, there is also no discrimination against the small residential user. In contrast, minimum users pay only 25 percent of the average for the class. As a group the residential sales are not priced above commercial or industrial users. Uniform rate structures require revision of previously established rates, an expensive and time consuming job. While this is ongoing, the present philosophy of NEA is clear -- residential users do not subsidize the costs of power to other classes of power users.

POWER USE

From the viewpoint of the cooperative, power use is the responsibility of other organizations and agencies. The cooperatives wire electric pumps for the Basic Irrigation Systems Associations (BISAs), but these are formed and organized by other components for funding -- into fibercraft production, cold storage plants, etc. Feasibility studies, organizational efforts, and technical assistance come from outside the electric cooperative, whose primary focus is attempting to deliver power to its assigned areas.

The loans channelled through the cooperative come from a variety of funding sources: AID, NEA itself, The World Bank, other local GOP development funding. The loans appear to be

MICROFILMED FROM BEST AVAILABLE COPY

100 percent, i.e., outside of land (often given by the local municipality), all costs are borne by the lending party. Since the cooperative first signs for the loan, and then re-issues it to the end user (generally at .5 percent mark-up on the interest rate), the cooperative is fundamentally liable for the debt, which is not insured by NEA or the government. The co-ops place directors on the Boards of the user organizations, but do not control their operations. When asked what would happen if the user defaulted on the loan, the cooperative managers suggested that the co-op would have to run the business and make it pay. It appears as though the co-ops see the power-use loans as a service to the government which, if it did not work, would be underwritten by the government in some manner. It is not clear that the use of the cooperative to channel funds is preferable to direct funding of the entity (usually a cooperative or a pre-cooperative) which is to manage the power use activity.

ISSUES: THE SOCIAL AND ECONOMIC IMPLICATIONS OF A RURAL ELECTRIFICATION PROGRAM

INDICATORS OF THE IMPACT AND BENEFIT INCIDENCE OF ELECTRIFICATION

Several variables, such as coverage and rate structure, have already been mentioned as potential indicators of the

MICROFILMED FROM BEST AVAILABLE COPY

benefits to, or discrimination against, the rural poor in an electrification program. Another variable which must be considered is the upfront costs of house wiring, which, in the three electric systems visited, averaged 150 pesos, but were reported to average closer to 250 pesos for all NEA cooperatives. Although NEA makes wiring loans, providing up to 25 percent of the cash costs, this still increases the costs of electrification to the minimal user -- the two sockets and a wall plug customer. It thus takes a relatively long view, beyond one year, to find that electricity (and the necessary installation and membership fees in the cooperative) is cheaper than the alternative cheapest source of light, however flickering and unsatisfactory.[1]

The main report dealt with the distinction between "light" impact assessment -- the capturing of forward progress along all hypothesized benefits of the rural electrification program and generally convincing impact assessment. In the Philippines several studies have been completed, and others are in the planning stages, to more precisely determine the benefits of rural electrification and rural electric cooperatives to the rural poor. Two of these studies are examined in some detail in following sections.

---

[1] Dan Olson, "Sampling Survey on Comparative Costs of Lighting," NRECA (Peace Corps Temporary Assignment) Manila.

MICROFILMED FROM BEST AVAILABLE COPY

THE MORESCO STUDY

Taking what was to be an exploratory study of the variables which might be reasonably collected and analyzed in a rural electric cooperative area, the MORESCO project turned into a full-scale evaluation of the impact of electrification on the area's rural and urban population.[1] The final report of the study is vulnerable to criticisms that it attempted to document more than the data would support. This is particularly true of suggestions that MORESCO is representative of, or even a reasonable approximation of, benefits which flow from NEA cooperatives.

The study begins with the statement, "Mean per capita income in the MORESCO area is sixty-nine dollars," and then proceeds into a discussion of income levels and subsistence, complete with confidence intervals. The questionnaire used to establish the conclusions was drawn from a probability sample of 253 households, representing more than 20,000 in the MORESCO area. Income questions asked were:[2]

C10. Could you please tell me how much you earn in your main occupation? (for Head-of-household);

C11. Besides your main employment, do you have any other sources of income?

---

[1] Research Institute for Mindanao Culture, Xavier University, "An Evaluative Study of the Misamis Oriental Rural Electric Service Cooperative," a report submitted to USAID/Philippines, 1976.

[2] Research Institute for Mindanao Culture, Xavier University, Rural Electrification Evaluation Project, Questionnaire, p.3.

C12. What other sources of income do you have?

__farming

__sale of livestock

__sale of secondary products

__fishing

__family business

__pensions

__others (specify);

C12A. How much additional income do you earn from these other sources?_____(per time unit);

C12B. For other members of the family who are working, how much do they earn? How much do they contribute to household income per year and what type of work do they do? (Work out matrix of name, amount earned, amount contributed to household income and nature of work).

These are rather heady questions for the 56.7 percent of the exploratory sample with less than six years of school, particularly when 53 percent of the population is primarily engaged in agriculture with a great many non-market inputs and outputs.[1] Subsistence income levels, moreover, were determined, so far as we could tell, from national data and not related specifically to the MORESCO area, nor intended to be used to measure subsistence among farm families who grow their own food.

The study found a great many benefits of rural electrification, from decreased fertility rates to increased industrial

[1] The exploratory sample was of 411 households; the probability sample was of 253 households.

MICROFILMED FROM BEST AVAILABLE COPY

and agricultural production, improvements in health, education, water systems, etc. The study also established that some of the very poor purchased electricity. Many of these findings are undoubtedly true, but, unfortunately, they reflect the unique situation in this area of Mindanao in which electric rates are the second lowest in the entire NEA system, due to cheap hydro power from NPC. DAI has calculated that the MORESCO rates in August 1976 were 1.5 standard deviations below the mean, and a whopping 6.7 times lower than the highest electric rates.[1]

In the probability sample, 39.9 percent of the households are in the electric USER category, with 43.5 percent INACCESSIBLE and 16.6 percent classified as NON-ADOPTERS. The MORESCO study was originally intended to provide insights into what data could be collected in rural areas which would reflect, with some confidence, the changes associated with, or caused by electrification. Some of this intent was altered as the study apparently sought and found benefits which could be attributed to electrification, and was thus used to promote the fourth AID loan for the NEA project.

---

[1] MORESCO system rate was listed as 178 in August 1976, while the mean of the listed system rates (45) was 579.6, with the highest rate 1190. NEA Progress Report (76-14), Enclosure: Ranking of Cooperatives by System Rates, August 1976.

MICROFILMED FROM BEST AVAILABLE COPY

RECOOP II[1]

Two census-type surveys were conducted by the Asia Research Organization on four cooperative/non-cooperative categories crossed by intensive or non-intensive rural development areas. One survey was taken in 1973, the sample for which was not randomly selected insofar as we could tell. Another survey was taken in 1976 (with minor assistance from a Bureau of the Census team assigned to AID) utilizing a random sampling technique in the four areas. In all, four geographic locations were surveyed, with two containing both cooperative and non-cooperative areas.

In the beginning, one objective of the surveys was to provide longitudinal data -- time series showing changes over three years. However, this is a highly complex undertaking, one depending heavily not only on sampling, but conclusiveness of questions and consistency of interview techniques. The respondents sampled in the 1973 and 1976 surveys were not the same. Since one of the areas included in the RECOOP II studies was MORESCO, RECOOP II offers some interesting comparisons.

One apparent flaw in the design of the questionnaire is the inability to distinguish between non-users who do not have access to electricity, and non-users who elect not to have access to lines nearby. Thus comparisons are between

---

[1] Asia Research Organization, RECOOP II, January 1976, a report submitted to USAID/Manila.

users and non-users, undistinguished by the reason for non-use. Additionally, the survey in the MORESCO area reported a 12 percent decline in electricity users in 1976 from 1973, making the total 43 percent. However, no question which supports this conclusion appears in the survey instrument (a part of the summary report, January 1976). The reported decrease is the result of subtracting users in 1976 from users in 1973.

The income questions in RECOOP II are not better than those in MORESCO. However, there are more of them, a total of 14 question possibilities. Assuming that increasing the number of questions will increase the amount of income which the respondent will report, the RECOOP survey should produce higher income figures. These are shown in the following table.

TABLE A-IV

AVERAGE HOUSEHOLD INCOME AND EXPENDITURE: 1973 AND 1976

		1973			1976			
Province	Area	Average Household Income	Average Expenditure	Percent Surplus/Deficit	Average Household Income	Average Expenditure	Percent Surplus/Deficit	Sampl Size
Capiz	Co-op	₱4,513	₱5,397	-16	₱5,827	₱4,952	+18	313
Capiz	Non-Co-op	3,290	5,341	-38	5,810	5,351	+ 9	343
Misamis-Oriental	Co-op	4,715	3,770	+25	7,806	6,019	+30	226
Misamis-Oriental	Non-Co-op	3,236	4,359	-26	6,612	5,392	+23	440
Lloilo	Co-op	4,396	4,018	+ 9	8,092	8,133	- 1	465
Quezon	Co-op	3,353	4,428	-24	5,067	5,023	+ 1	373
								2,160

Source: Asia Research Organization, Project RECOOP II, January 1976, p. 49.

The previous table and the discussion of electric users reveals some of the problems of attempting to capture longitudinal data, and describe differences between two points in time to some specific cause. For example, the samples were not drawn on the same base in 1973 and 1976.[1] If 54.6 percent were USERS in 1973, it is likely that new users were added during the three-year interval. An end-of-period user percentage of 42.7 percent (an 11.9 percent decrease) could easily mean a disconnect rate of 20 percent (8.1 percent new additions balancing 8.1 percent additional disconnects). We would guess, however, that the sample does not allow such comparisons, and that it is the data rather than the behavior of electric users, which has changed since 1973.

Income figures offer some additional comparisons which show the great difficulty in obtaining reliable time series data. In Table A-IV above, four of six areas show average deficit in 1973 -- household expenditures greater than income. Three have deficits of 25 percent or more. This is possible, but highly unlikely. More likely, we would argue, is that the consumption data was extracted with more fervor by the interviewers and offered with more openness than the income data, thus the income is underestimated. This makes the large percentage jumps in income over the three-year period highly suspect, so

---

[1] Reported by the Bureau of Census specialists who were assisting USAID Manila with the surveys.

suspect, that we would not recommend using them as a basis for comparison. The error from data extraction is likely to be higher than the actual change in income over the period.

The comparisons between the MORESCO study and RECOOP II are also suggestive of great differences in the population being sampled, the sampling methods, the data extraction techniques, or some combination of the above.

TABLE A-V

MEAN HOUSEHOLD INCOME AS REPORTED IN THE MORESCO AND RECOOP II STUDIES OF THE MORESCO CO-OP AREA FOR THREE DIFFERENT YEARS

MORESCO 1974	RECOOP II 1973	RECOOP II 1976
₱2,726.39 (assuming 5.233 persons in a family)	₱4,715	₱7,806
₱3,141.11 (assuming 6.029 persons in a family)		

If the samples were drawn from the same population, there are flaws in the data collection/sampling techniques. Changes in mean income values in all likelihood do not represent real differences but collection, sampling and aggregation error. Income is one of the most difficult variables to extract and make consistent over repeated sampling. Used as an indicator for a level of development, it is acceptably plus or minus. The theory behind longitudinal data suggests that accuracy has been achieved so that the changes in the real world are reflected in the changes in the sampling means. This calls for more confidence than merely assuming that the biases are random, or

MICROFILMED FROM BEST AVAILABLE COPY

that the biases are in the same direction during measurement. It also calls for testing to show that measurement error is not greater than real-world changes. A plus-or-minus 25 percent measurement error might be plus one time, minus the next, to completely confound the analysts who hope to infer real changes from the statistics. It puts great demands on the drawing and repeating of the same sample, or increasing the size (and thus the cost) of the sample to insure representation of the total population. None of these requirements are easily met in the rural situations encountered in the Third World.

A NATIONAL EVALUATION PROGRAM

Assisted by the Bureau of the Census specialists in survey design, NEA has proposed to conduct a national sample of the impact of rural electric cooperatives on the development of the rural countryside. This program is still under development. However, two questionnaires have been designed and tested -- one filled with detailed data including an input/output matrix of agricultural production and the second a reduced form questionnaire concentrating on basic variables. The method of collection and analysis is still being finalized, although a 3,000-household sample of rural electric cooperative areas has been proposed, with a 1,000-household sample of non-cooperative areas. Fourteen cooperatives will be included in the

MICROFILMED FROM BEST AVAILABLE COPY

sample, with towns and barrios selected randomly, stratified across population density and percent electrified.[1] The data which is obtained, assuming it is consistent, will allow national comparisons between cooperative and non-cooperative areas. It may also allow some comparisons between electrified and non-electrified areas. There is some question as to the use that will be made of the survey data. The data is not seen, at least not by the Bureau of the Census specialists, as the basis for a longitudinal study, but rather as a basis for a point-in-time study among the categories mentioned previously. As a training exercise to improve NEA's evaluation capability and to upgrade their understanding of the pitfalls of data collection and analysis, this will be a valuable exercise. As a final word (or even a beginning word) on the national impact of electrification (since the focus is apparently cooperative-electrification, not merely electrification), it will increase the state of knowledge without answering many of the questions about the impact of rural electrification in the Philippines.

EVALUATING THE RURAL ELECTRIFICATION PROGRAM

The USAID program manager in the Philippines stated that rural electrification was successful "by observation." DAI

---

[1] This is as reported on December 14. More changes in the plan can be expected.

MICROFILMED FROM BEST AVAILABLE COPY

believes that he was correct, that the rural electrification program is sound and is providing infrastructure capacity whic can be readily turned to production and productivity by the highly-educated rural population in the Philippines. If the program can be "seen" to be successful, it should not take $60,000 surveys, and a great deal of manpower to prove this point. Rather, it would appear that a simple capturing of what can easily be observed would be valuable, supplemented by specially-designed surveys for special purposes. This suggests and DAI recommends -- the use of indicators which can be collected by the staff of the cooperatives, either as the members join the cooperative, or as the meters are read, bills collecte etc.[1] Such a system could go a long way toward establishing the overall impact of rural electrification in the Philippines without constituting a heavy burden either on NEA's pocketbook or on the time and energy of the cooperatives' staff. The present reporting requirements are lengthy and not well organized. Various offices within NEA request information to add to their list of accomplishments. NEA's monthly report does not allow an easy sorting of what has been done by NEA, and what has been done by other government organizations to which NEA has contributed.[2]

---

[1] Some specific approaches to the general problem of NRECA's involvement in impact assessment are covered in the appropriate section in the body of the report.

[2] NEA apparently lists all electric pumps under the BISA program as within their list of accomplishments. While the Camarines Sur Electric Cooperative lists the four BISAs it supplies, enclosure 9 to NEA's monthly report list 19 in the Province. The additional 15, insofar as we could determine, are not connected to the NEA program.

Present monthly reporting requirements are voluminous. Minor rationalization could allow new reporting that would not be a net increase, but replace other nonessential reporting. NRECA staff members have attempted to improve the value of the data which is collected, using more imaginative ratios and indicators to show management problems. This had not, during October, been adopted by NEA. Some combination of indicator reporting on the impact of electrification, reduced management and financial reporting from the cooperatives, and selectively planned surveys could offer major insights on the impact of rural electrification in the Philippines.

CONCLUSIONS

Rural electrification in the Philippines gives every indication of being a sound development investment. There are underutilized human resources in rural areas to make productive use of low-cost energy. A power source will offer a productive outlet for a literate and skilled population.

Electrification is proceeding along with power-use support. There are numerous programs involving fishermen, farmers, arti-

---

[1] NEA apparently lists all electric pumps under the BISA program as within their list of accomplishments. While the Camarines Sur Electric Cooperative lists the four BISAs it supplies, enclosure 9 to NEA's monthly report list 19 in the Province. The additional 15, insofar as we could determine, are not connected to the NEA program.

sans, light industry, etc. These are funded by the GOP, AID and the World Bank under several projects. In addition, credit available for agricultural inputs (fertilizer, seeds, pesticides, labor) after electrification has delivered the energy source, and FSDC has provided pumps for a BISA. The programs work in parallel, and provide mutually supporting assistance to the rural areas.

The impact of electrification has been the subject of serious study which, although not resolving the problems inherent in impact and benefit incidence data collection and analysis, has provided the basis from which more productive efforts can be launched. We believe that continued impact studies should be carried out in the Philippines. Prospects for successful rural electrification are high.

MICROFILMED FROM BEST
AVAILABLE COPY

ANNEX B

TABLE OF CONTENTS

NICARAGUA

OVERVIEW OF THE NICARAGUAN ELECTRIC SYSTEM B-1

BACKGROUND B-1

GENERATION AND TRANSMISSION. B-2

DISTRIBUTION B-4

REGULATION B-7

GOVERNMENT ELECTRIFICATION POLICIES AND RATE STRUCTURE. B-7

RURAL ELECTRIC COOPERATIVES IN NICARAGUA. B-9

BACKGROUND B-9

THE STRUCTURE AND MANAGEMENT OF THE COOPERATIVES B-11

USERS, USES AND RATES. B-16

Residential Consumers B-17
Industrial Consumers. B-18
Agricultural and Livestock Production B-20
Distribution and Rates. B-21

ISSUES IN RURAL ELECTRIFICATION IN NICARAGUA. B-23

BENEFITS OF RURAL ELECTRIFICATION. B-23

Production. B-24
Employment. B-25
Social Benefits B-26
Distribution of Benefits. B-27

ROLE OF COOPERATIVES IN RURAL ELECTRIFICATION. B-28

ANNEX B: NICARAGUA

OVERVIEW OF THE NICARAGUAN ELECTRIC SYSTEM

BACKGROUND

Electrification first came to Nicaragua through private firms toward the end of World War II. During the 1920's, these utilities were purchased by the municipalities in which they were located although some were later re-sold to private firms. The system in Managua, originally owned by a group of British investors, was sold to the Pacific Railway of Nicaragua, a government owned entity, in 1941. In 1954, this entity was reconstituted as the Empresa Nacional de Luz y Fuerza (ENALUF), an autonomous public corporation which today generates and transmits the bulk of the electric energy distributed to the general public.

Electrification in the rural areas was first introduced in the Department of Masaya in 1964 through the establishment of the Cooperativa de Abastecimiento de Energia Electrica Rural No. 1 (CAEER No. 1). This pilot project was financed by a direct AID loan to CAEER No. 1 with the Government of Nicaragua (GON) participating as loan guarantor. Technical assistance for the establishment of the cooperative and the construction of the lines was provided through a contract with NRECA.

NRECA also assisted in establishing a Rural Electric Department (RED) within ENALUF and in developing the First National Rural Electrification Plan. In 1968 and 1972, ENALUF and GON co-signed two loans with AID though which four more rural electric cooperatives were established in the Pacific Zone of Nicaragua. NRECA also provided technical assistance to RED for the establishment of these new cooperatives.

GENERATION AND TRANSMISSION

At the end of the 1975 total installed power capacity in Nicaragua came to 251,124 KW and gross generation of electrical energy was 932 million KWH. About 18 percent of this generating capacity is owned privately, mainly by large industries such as sugar and oil refineries and gold mines; the private owners, however, produce only about 11 percent of the country's energy. Most of the energy generated for public consumption comes from thermal or hydroelectric units while most of the private energy comes from diesel or gas units. (Tables B-1 and B-2)

The majority of electrical energy produced for public consumption is generated and transmitted by ENALUF and the integrated system it has created in the Pacific coastal region. This system now comprises seven fully connnected generating and transmitting plants, located mainly in and around the major

TABLE B-I

INSTALLED CAPACITY BY TYPE OF CENTRAL STATION[a]
(KW)

Type of Central	Public Capacity	Percent	Private Capacity	Percent
Hydroelectric	100,200	48.75	2,990	6.56
Thermal Units	75,000	36.49	17,750	38.95
Diesel or Gas Units	30,352	14.76	24,832	54.49
TOTAL	205,552	100.00	45,572	100.00

[a] Source: Instituto Nacional de Energia Electrica, *Memorial Annual 75*, pp. 15-16.

TABLE B-II

GENERATION OF ELECTRICITY BY TYPE OF CENTRAL STATION[a]
(KWH)

Type of Central	Public Generation	Percent	Private Generation	Percent
Hydroelectric	355,286,335	42.93	18,034,400	17.26
Thermal Units	452,185,030	54.68	36,085,192	34.55
Diesel or Gas Units	20,180,694	2.44	50,333,914	48.19
TOTAL	827,652,059	100.00	104,453,506	100.00

[a] Source: Instituto Nacional de Energia Electrica, *Memorial Annual 75*, pp. 15-16.

cities of Nicaragua, and four other plants which are not part of the interconnected transmission grid. From an installed capacity of 12,000 KW in 1953, ENALUF has created or acquired plants with a total installed capacity in 1975 of 201,000 KW. In 1975, there were also 11 privately operated plants serving small municipalities, mainly in areas which the ENALUF system had not reached. (See Attachment Tables)

DISTRIBUTION

There are a total of 22 entities which have concessions to distribute electricity in specified areas. By far, the largest and most important is ENALUF itself which already serves nearly two-thirds of all consumers in Nicaragua and which is legally entitled to distribute in areas which have not been granted to other entities. In addition to ENALUF, electricity is distributed by three municipalities, 13 private firms and five cooperatives. The five cooperatives serve an almost entirely rural population while the other distributors serve mostly urban consumers. Thus, whereas the cooperatives serve only about 7 to 10 percent of the estimated 2.2 million inhabitants of Nicaragua, by the end of 1975 they were serving between 15 and 20 percent of the country's rural population.

The rural electric cooperatives have enjoyed impressive growth rates in sales and consumers in recent years. (See

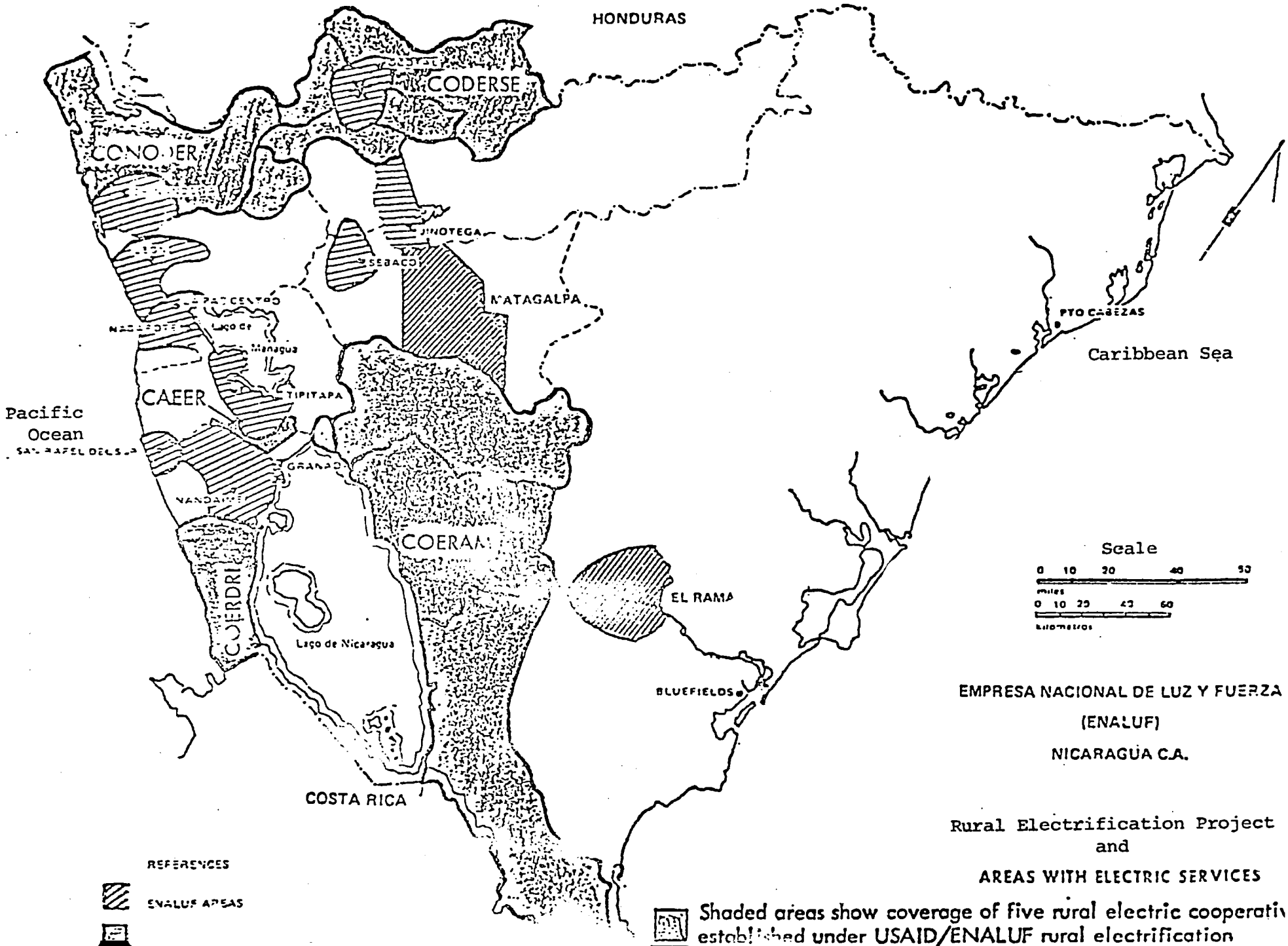
MICROFILMED FROM BEST AVAILABLE COPY

Attachment Tables.) Yet, perhaps 60 percent of the population of Nicaragua is still without electricity and almost all of those without electricity live in rural areas, mostly in areas which are outside the concessionary areas of the cooperatives or other distributors. However, there are also a large number of potential consumers within the cooperative areas who do not have electricity.

In order to expand the distribution of electricity to more and more Nicaraguans, ENALUF has prepared a Second National Plan for Rural Electrification. The Plan calls for an extension of national transmission and distribution facilities to eight new areas of the country and an expansion of the existing facilities to more consumers. To implement the first stage of the Second National Plan, ENALUF has signed a loan agreement with the Inter-American Development Bank for the construction of facilities in two new areas which will supply electric energy to 21,600 new consumers after an operating period of ten years. In addition, AID is currently considering two projects of assistance in the field of rural electrification. One is a loan to three of the five existing cooperatives which would expand the number of member-consumers in these cooperatives from a current (1975) total of 26,000 to 51,000 after ten years. The second is a grant to ENALUF and to the National Institute for Electric Energy (INEE) which would allow these entities to increase and improve their support of the rural electric cooperatives.[1]

---

[1] The map on the following page shows the areas of Nicaragua served by electricity.


HONDURAS
CODERSE
CONOPER
JINOTEGA
SEBACO
MATAGALPA
PTO CABEZAS
Caribbean Sea
Managua
TIPITAPA
CAEER
Pacific
Ocean
GRANADA
COERAM
EL RAMA
COERDRI
Lago de Nicaragua
BLUEFIELDS
COSTA RICA
Scale
0 10 20 40 50
miles
0 10 20 40 60
kilometros
EMPRESA NACIONAL DE LUZ Y FUERZA
(ENALUF)
NICARAGUA C.A.
Rural Electrification Project
and
AREAS WITH ELECTRIC SERVICES
REFERENCES
ENALUF AREAS
Shaded areas show coverage of five rural electric cooperati
established under USAID/ENALUF rural electrification

REGULATION

The power regulatory agency of Nicaragua is the Instituto Nactional de Energia Electrica (INEE), created in 1969. INEE has the power to grant concessions, to establish and approve electric rates, to arbitrate differences between power companies and their clients, and to inspect and regulate all electric installations in the country. Because a number of studies have indicated that changes are needed in electric rate structures, AID is currently considering a grant proposal which would, in part, provide technical assistance to INEE, to ENALUF and to the cooperatives in order to develop a financial plan which would improve the financial viability of the cooperatives.

GOVERNMENT ELECTRIFICATION POLICIES AND RATE STRUCTURE

The expansion of electrification throughout Nicaragua is one of the priority programs of the government. The GON also wishes to use rural electrification as an instrument to promote other rural development objectives. These objectives include increasing the productivity of agriculture and livestock through irrigation, increasing the supply of potable water in rural areas through electric pumps, and promoting agricultural and livestock processing industries with the use of electric energy.

In order to promote these rural development objectives, rate structures for the distribution of electricity have been established which provide incentives for irrigating pasture and farmland, for creating electrically powered town and village water pumps and for establishing rural industries. For the most part, rates do not differ from one part of the country to the other but they do differ not only by type of consumer but by type of distributor. By government policy, the energy rate for irrigation must be standard throughout the country, ¢0.21 per KWH. For all other categories of consumers, the ENALUF rates are lower than the cooperative rates: approximately 25 percent lower for residential consumers, 56 percent lower for industries, five percent lower for public lighting and 33 percent lower for water pumps and other government services.[1] The higher rates charged by the cooperatives are due to such factors as line losses resulting from the transformation of wholesale energy purchased from ENALUF, high factor loads per user, and high debt service obligations.

ENALUF has 35 different tariffs and schedules for special categories of users and for amount of energy used. Most of the cooperatives, however, use only six or seven rates. ENALUF

---

[1] Comparison of published ENALUF rates for February 1975 and average co-op rates for similar categories of consumers. The three cooperatives visited in Nicaragua classified their consumers in slightly different ways but generally charged the same rate for all classifications except residential consumers. For residential consumers, COERAM charged the highest rate, starting at ¢0.65 per KWH and CAEER No. 1 had a rate structure for residential consumers starting at ¢0.75 per KWH.

sells its energy to the co-ops at a bulk rate of $0.15 for irrigation and $0.20 for all other uses. All the co-ops re-sell their energy for irrigation at the national rate of $0.21 per KWH and between $0.38 and $0.85 per KWH for other uses. The table on the following page shows the rates used by CONODER.

RURAL ELECTRIC COOPERATIVES IN NICARAGUA

BACKGROUND

As noted previously, virtually all the electricity distributed in rural areas in Nicaragua is sold through cooperatives. At present there are five such cooperatives with a total membership in 1976 of close to 30,000.

The first cooperative, CAEER No. 1 near Masaya, was launched as a pilot project in 1964 and was in fact the first AID/NRECA sponsored rural electric cooperative in the world. The AID loan of $400,000 for the establishment of this cooperative and the construction of its electric facilities was made directly to the cooperative with the GON participating as a guarantor. A second AID loan of $10.2 million was made to ENALUF in 1968 for the construction of three more rural cooperatives: CONODER near Chinandega, COERDRI near Rivas and COERAM near Boaco. In order to implement this project, a Rural Electrification Department was established in ENALUF. NRECA again provided a long-

RATE SCHEDULE OF CONODER
(U.S. $1 = ₡7)

General Schedule[a]	
First 50 KWH	₡ 0.65 per KWH
Next 250 KWH	₡ 0.70 per KWH
Additional KWH	₡ 0.75 per KWH
Minimum Charge	₡ 10.00 per month
Medium-Sized Commerce and Industry[b]	
Flat Rate	₡ 0.45 per KWH
Minimum Charge	₡450.00 per month
Large Commerce and Industry[c]	
Charge for Maximum Demand	
First 10 KW of Maximum Demand	No charge
Next 40 KW of Maximum Demand	₡ 35.00 each KW
Next 150 KW of Maximum Demand	₡ 20.00 each KW
Additional KW of Maximum Demand	₡ 10.00 each KW
Charge for Energy	
First 2,000 KWH	₡ 0.60 each KWH
Additional KWH	₡ 0.30 each KWH
Minimum Charge	₡600.00 per month
Public Services[d]	
Flat Rate	₡ 0.38 per KWH
Minimum Charge	₡ 28.00 per month
Irrigation[e]	
Flat Rate	₡ 0.21 per KWH
Minimum Charge	₡ 35.00 per KWH
Government Residences[f]	
Flat Rate	₡ 0.38 per KWH
Minimum Charge	₡ 10.00 per month
Special Rate for Social Assistance[g]	
Flat Rate	₡ 0.38 per KWH
Minimum Charge	₡ 38.00 per month

---

[a] Includes rural and urban residences, commercial establishments and professional offices and educational institutions.

[b] Establishments using electric motors of between 10 KVA and 37.5 KVA.

[c] Large commercial or industrial establishments with electric motors of more than 37.5 KVA.

[d] Central or local government facilities.

[e] Irrigation for farm or pasture land.

[f] Mainly applicable to military establishments and residences.

[g] Hospitals, clinics, churches and other social assistance entities.

term project consultant and a number of short-term specialists for assistance in the establishment of the cooperatives. A third AID loan of $4.3 million was authorized in 1971 to defray the dollar costs of establishing and constructing a fifth cooperative, CODERSE, near Nueva Segovia, and, at the same time, an additional $1.0 million was authorized for the purpose of extending the distribution facilities of the four previously established cooperatives. The third loan also included funds for NRECA technical assistance to ENALUF and, through ENALUF, to the cooperatives.

Over a period of two weeks, the DAI evaluation specialist visited three of the five cooperatives -- CAEER No. 1, COERAM and CONODER -- and also had discussions with representatives from NRECA, ENALUF, INEE, and AID as well as with other GON agencies. The observations in this annex and in the body of this report are based on these visits and discussions.

THE STRUCTURE AND MANAGEMENT OF THE COOPERATIVES

The structure and management of the three cooperatives visited all had more similarities than dissimilarities. This should not be surprising since the basic structure of each cooperative follows a prototype recommended and established by NRECA.

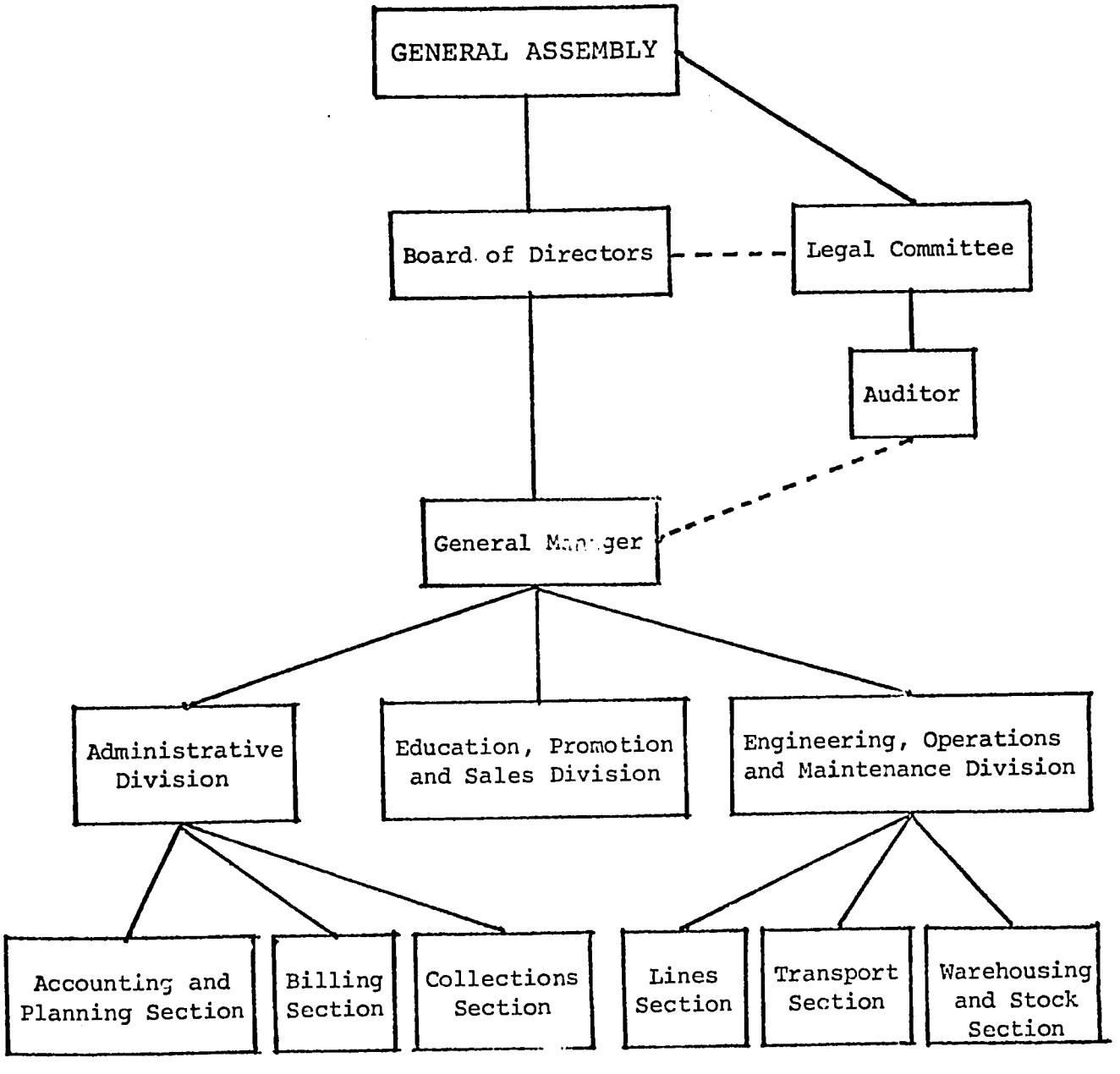
A typical cooperative organigram is shown in Figure B-I. At the top of the structure is the General Assembly or the Assembly of Delegates. The Assembly usually meets once a year and is, in theory, the supreme policymaking body of the cooperative. In CAEER No. 1 and in CONODER, the Assembly is composed of all the members of the cooperative, but in COERAM, about ten delegates are elected from each of seven districts to attend the annual Assembly meeting.

The Board of Directors of the co-ops are elected by the Assembly. COERAM has a 12-member board and CONODER a 10-member board while CAEER, much the smaller of the three, has only six members on its board of directors. Board members in all three co-ops are usually elected to represent geographic constituencies. In CAEER No. 1, elected members decide among themselves who shall hold the offices of President, Vice-President, Treasurer and so on. In the other co-ops members are elected to their offices. In each co-op members are elected to three-year terms, but the terms are staggered, as in the U.S. Senate, so that it is not possible for an entire board to be turned out in one election.

Co-op board members are invariably well-to-do, often politically prominent, members of the cooperative. In COERAM, for example, the President of the Board is a cattle rancher and a state governor. The Vice-President is a businessman and a Congressman. The Secretary of the Board is also a cattleman

FIGURE B-I

COERAM ORGANIZATION CHART
June 1975



and a state governor and the Treasurer is a coffee grower, a cattleman and a former Congressman. Other members of the COERAM Board of Directors include two mayors, a merchant, a teacher and several more cattlemen. In all the co-ops, there is usually a very low turnover of board members; none of the managers could recall a board member being defeated in a bid for re-election.

One of the reasons for this, undoubtedly, is that participation in co-op affairs appears to be limited to a rather small number of members. Attendance figures at General Assembly meetings in CAEER No. 1 were not available, but in CONODER, the last GA meeting was attended by a bit more than two percent of its members while at COERAM attendance is limited to delegates who are reportedly elected by only a handful of members in their constituencies. In an informal survey of members in all three cooperatives only one respondent said that he had attended a GA meeting and only one (the same member) said that he had voted in a co-op election. All but two respondents, in fact, were unaware of the fact that they were members and owners of a cooperative.

The managers of the three cooperatives were all rather young men, but all had a considerable amount of experience in the electric industry. The manager of COERAM had previously been the manager of CAEER No. 1. The manager of CONODER had worked in the electric industry for 18 years, including more than 15

MICROFILMED FROM BEST AVAILABLE COPY

years with ENALUF. All three managers had worked previously for ENALUF and, even though managers are theoretically hired by their co-op's board of directors, it would not be a great exaggeration to say these three managers were all selected for their present assignments by ENALUF itself. All three managers had also attended NRECA training courses in the United States and had toured several American electric cooperatives.

The number of employees in the co-ops varied with the size of the co-op's membership and ranged from 23 in CAEER No. 1 to 60 in CONODER. As shown in Figure B-I, each co-op was divided into two large divisions beneath the manager: administration and engineering (or operations). On paper, each co-op also had a division called "Education, Promotion and Sales." The functions of this department dealt with member relations, public relations, education of the members in the use of electric energy and in cooperative principles, and the promotion of the co-op among non-users. However, in two of the three co-ops, CAEER No. 1 and CONODER, there were no employees at all in this division (although CONODER had a person attached to the administrative division to publish a bi-monthly newsletter and prepare periodic radio reports). In COERAM, the division consisted of one person.

In general, only the managers and the chief accountants of the co-ops had had any university education. The three managers, moreover, all had different educational backgrounds: one had

a degree in business administration, one was an engineer, and the third was an accountant. Only the managers had received. any training from NRECA in the United States.

USERS, USES AND RATES

The number of people enjoying the benefits of electricity in each co-op area varied considerably depending on such factors as the size of the area, the density of the population, the number of years the co-op had existed and power available. It is safe to state, however, that far fewer than half of the potential consumers in the concessionary areas were receiving electricity, a figure that is usually greatly underestimated by ENALUF and co-op officials.

The greatest coverage is undoubtedly in the area served by CAEER No. 1 which is the oldest of the co-ops and also has the smallest concessionary area. It is estimated that the co-op's 3,000 consumers constitute about 60 percent of the area's potential consumers. CONODER has more than 5,000 consumers but it is estimated that the number of potential consumers in the area is between 10,000 and 15,000. In the COERAM area, which is the largest and least densely populated concession, not more than one-quarter to one-third of the potential consumers have been signed up as co-op members.

Residential Consumers

In each of the three cooperatives, as with all the electric distributors in Nicaragua, the overwhelming majority of consumers fall in the residential category. There are no available data, however, to allow distinctions to be made between users and non-users of electricity and to distinguish among residential users on the basis of how their electricity was used.

A good many of the non-users in each area live far from existing lines. However, an informal every-third-house survey along several miles of a single-phase line in the COERAM area -- reinforced by spot checks along lines in the other two areas-- revealed that even where lines had been strung, as many as half the houses were not hooked up to the electricity.[1] The reasons non-users gave for not having electricity were somewhat varied. Some claimed they could not afford the minimum monthly charge of $10 but admitted that they paid nearly that much for the fueld for their kerosene or gas lamps. Others said they could afford the monthly charge but not the installation and membership fee.[2] Most of the non-users, however, said that they would like to have electricity but were unsure of how to go about getting it. The non-users were unamimous in stating that they had never been visited by a representative of the

---

[1] The every-third-house-survey was conducted mainly along a road leading to a 15,000-acre rice farm. Many of the people living along the road depended for their livelihood on the farm. Few had any farm land of their own. Precisely half did not have electricity.

[2] Usually amounting to between U.S.$5.00 and $10.00.

cooperative. One woman said that she had been to the cooperative headquarters several years previously to inquire about getting electricity but had had no results.

The survey also showed that most of the residential consumers were using a minimum amount of electricity. With the exception of certain residences which were also small businesses -- selling soft drinks from electrically powered refrigerators was the most common type of household business -- all the residential consumers were paying between $10 and $20 per month. The electricity was most commonly being used for one or two light bulbs and sometimes an electric iron. Some households also had radios, one had a phonograph and two had television sets. The survey did not reveal any instances of the use of electricity in cottage industries, such as sewing or power tool use.[1]

Industrial Consumers

Each of the co-op areas had several industries of different sizes which used electricity for various aspects of their operations. A common sight in each of the areas, for example, were government owned and operated grain drying and storage factories. These facilities were all of standard make and consisted of six silos which processed some six to seven million tons of

---

[1] An appliance survey in the COERDRI area (which was not visited by the DAI evaluator) revealed that all the residential consumers had two or more lights, 39 percent had electric irons, 20 percent had TVs, 13 percent had radios, 11 percent had phonographs, eight percent had refrigerators, 5.5 percent had fans and "only a few" had large appliances. Reported in "Rate Study for Rural Electrification in Nicaragua," by Hamilton Treadway, NRECA, June 1974, p. 27.

grain per year. These facilities were used mostly by small farmers (owning less than 50 or 60 acres). Some farmers sell their grain directly to the factories. Others dry and store their grain there and retrieve it when prices are more advantageous. Large farmers often have their own drying and storing facilities. Electricity at these plants was used for all processes -- the elevators, the shakers, the cleaners, the blowers -- with one exception: energy for the drying came from diesel generators; all the factories had apparently been designed to run off diesel in the expectation that electricity would not be available.

Another government agency which was using cooperative-supplied electricity was the National Health Service which operated electrically powered pumps for supplying townships with potable water. In the town of Tisma, which was the original site of Nicaragua's first electric cooperative, 108 households were paying $20 per month for potable water; it was estimated that another 400 to 500 households, however, were still relying on water from shallow wells.[1]

Private industrial users of cooperative electricity included rice mills, cotton gins, milk cooling factories and dairy operations. Most of these industries had existed before the cooperatives were created but had either converted to cooperative electricity or had added the cooperative energy as a supplement to their own source of energy, usually diesel generators.

[1] The statistic on the number of households hooked-in to the National Health Service was obtained from the Service's bill collector. Estimates of the number of households not connected were mdade on the basis of estimated population figures.

Most of the industrial users preferred central station electricity because of its convenience but almost all maintained their generators for supplementary and emergency use. The manager of a dairy farm near Boaco, for example, explained that one of his employees can milk 20 cows an hour using an electric milking machine, but only 12 cows an hour with hand milking. The farm also has its own milk cooling machine. At the time of the DAI visit, however, the co-op's electricity was not working and the manager was operating his milking and cooling machines off the diesel generators.

Another factory which uses two sources of energy is a chick hatchery near Masaya which imports eggs from Miami and sells day old chicks to markets and restaurants in and around Managua. The plant's principal machines, the incubators and the hatcheries, must operate 24 hours a day. Most of the time, the energy comes from CAEER No. 1. When outages occur, however, an automatic switching device activates a gas generator. The meter on the generator at the time of the visit indicated that the generator had been used a total of 21 hours in the previous three months.

Agricultural and Livestock Production

Only on the largest, most heavily capitalized farms and ranches in the three cooperative areas was electricity used for production or processing purposes. There were a number of cattle and dairy ranches, particularly in the Boaco area, which

MICROFILMED FROM BEST AVAILABLE COPY

irrigated portions of their pasture land. Some also had adopted electric fencing and, as mentioned, electric milkers and coolers.[1] There were also several large agro-businesses which used irrigation for year-round production and processing: Standard Fruit, for example, used overhead sprinkler systems on its banana plantation in the CONODER area, and a 15,000-acre farm owned by the Somoza family used COERAM energy to pump water from Lake Managua for rice field irrigation and was also planning to convert the farm's rice mill from diesel generators to central station electricity. Despite attractive rates and a government program of promoting irrigation, however, the DAI evaluator found no small or medium-sized farmers in the three co-op areas who were using electricity for production purposes.

Distribution and Rate

In terms of the distribution of electricity to the various categories of consumers and the income received from these categories, it is clear that all the cooperatives rely heavily on the income from the majority of residential consumers to subsidize the use of electricity by the minority of large agro-businesses and other industries. In the month of August, for example, residential members of the CAEER No. 1 cooperative consumed 54.5 percent of the month's kilowatt hours but provided

[1] Near Boaco, there were also two independent milk cooling factories which got their milk from smaller dairy farms which did not have their own cooling machines.

MICROFILMED FROM BEST AVAILABLE COPY

69.0 percent of the co-op's revenue from direct sales while energy for irrigation comprised 1.6 percent of the month's KWH, but accounted for only 0.6 percent of the month's revenue.[1] In similar fashion, from January through August 1976, households in COERAM purchased 6.7 percent of the KWH distributed by the co-op, but provided the co-op with 60.2 percent of its income while irrigators consumed 48.2 percent of the period's KWH but furnished only 21.2 percent of its income. (See Attachment Tables.)

The relatively high rates charged to residential consumers would normally create an incentive for the co-ops to expand the number of residential consumers as much as possible. However, service to residential consumers in the rural areas also usually entails high fixed unit costs -- in installation, maintenance, billing, etc. -- because of the sparse number of households per kilometer of line.[2] Thus, the financial viability of the co-ops often depends on serving as many clusters of consumers -- towns, villages, etc. -- or as many high usage consumers -- large industries, irrigators, etc. -- as possible in order to maximize either the number of consumers or the amount of use per kilometer of line. It is for this reason that COERAM has recently taken over and integrated the private power company which had been serving the town of Juigalpa, population

---

[1] August is a high rainfall month in which irrigation is usually not necessary for most operations.

[2] CONODER has judged that an average of at least six or seven users per kilometer is necessary to amortize the capital costs and cover the recurrent (maintenance, billing, etc.) of a single-phase line.

11,000, and this is also why CONODER is very interested in supplying power to the town of Chinandega, population about 50,000.

ISSUES IN RURAL ELECTRIFICATION IN NICARAGUA

The brief preceding discussion of certain aspects of rural electric cooperatives in Nicaragua suggests a number of issues confronting not only the cooperatives but also ENALUF, the GON and external sources of potential funding for rural electrification. These issues concern primarily the benefits of rural electrification and the role of cooperatives.

BENEFITS OF RURAL ELECTRIFICATION

A general discussion of the benefits of rural electrification and how those benefits can be measured and increased may be found in the body of this report. Here, the discussion will be confined to the alleged, the actual, and the potential benefits in Nicaragua. It should be emphasized that the comments presented here are based on the observations and judgments of the DAI evaluator in three cooperative areas over a period of two weeks. As mentioned in the body of the report, there were no existing data available on the type, incidence or distribution of benefits nor were there any instruments in place for gathering such data.

Production

Even a cursory tour of the cooperative areas reveals that electricity is being used in several (apparently) productive ways. Chief among these is providing power for irrigation. Most of the larger, more progressive farmers in the co-op areas had adopted or intended to adopt irrigation: the electric bill at the Somoza rice farm, which was using five electric motors to pump water into three main channels at the rate of between 12,000 and 20,000 gallons per minute, was often in excess of $10,000 per month. Other ways in which electricity was being used in apparently productive ways included the provision of power for milking and milk cooling machines and for several agro-processing industries, such as the chick hatching factor and a slaughterhouse which was under construction in the Boaco area.

It should be pointed out, however, that there are no data to show whether the availability of electricity was a factor in starting these productive activities or whether electricity is cheaper and more productive than alternative forms of energy. Most of the production activities in the areas pre-dated the arrival of central station electricity. The Somoza rice farm, for example, was using diesel generators to pump water for irrigation before the establishment of the cooperative. The farm, moreover, still uses the generators as auxiliary pumps and still operates its entire rice mill off diesel. Most large

agricultural and industrial users of electricity felt that diesel generators were more reliable, and that electricity was more convenient and a bit cheaper. No one had hard figures on comparative costs although the Somoza farm was planning to run its rice mill for one month off cooperative electricity to test its economic benefits before committing itself fully toward the cooperative.

Employment

Employment benefits were equally difficult to measure. Certainly new industry creates new employment. The chick hatchery near Masaya, which had existed for only three months, employed 11 persons and planned to employ 60 at full capacity. The two milk cooling factories near Boaco employed seven and two people respectively. One dairy farm with its own milk cooler and milking machines employed 15 cowboys and four people to operate the milking machines and the cooler. Since the installation of the equipment, the number of cows and the number of cowboys had increased, but the number of hands needed for milking had decreased because of the greater productivity of the milking machines. Except for homes selling soft drinks from refrigerators, there was virtually no evidence of small-scale self-employment using electrical equipment. At least one man, on the other hand, complained that his cart-making and grain transportation business had declined because of the availability of storage facilities and even sales in the government-operated grain silos.

MICROFILMED FROM BEST AVAILABLE COPY

Social Benefits

Some social benefits from electricity could be assumed. Light in the home affords a measure of safety and electricity provides opportunities for the purchase of appliances and communication equipment. In the three cooperative areas, most of the homes had light bulbs and an electric iron. A few homes also had radios, television sets, phonographs and refrigerators. None of the homes surveyed had more sophisticated appliances such as sewing machines or washing machines which would free the time of women and their daughters. Part of the reasons for this was economic: the household income in most of the homes surveyed ranged from about $25 to $110 per month. Another probable reason was that none of these homes had ever been visited by a cooperative representative to explain the different uses of electricity.

Outside the home, most of the social benefits of electricity were confined to the larger towns where hospitals, clinics and social centers were located. One rural elementary school had a large aperture in the wall where an electricity meter had previously been located. It was explained that the school had had electricity at one time, but it was decided to disconnect it to avoid paying the minimum monthly charge since the school was never used at night.

Distribution of Benefits

Most electrification officials in Nicaragua believed that the vast majority, perhaps 90 percent or more, of the inhabitants in the areas surveyed by the cooperatives were receiving the benefits of electricity. As a consequence, the officials were surprised to learn that based on a comparison of the number of known users to official estimates of population in each area and based also on the household survey of the DAI evaluator, it was judged that not more than half of the populations in the co-op areas were living in houses with electricity.

The most important single factor in determining who gets electricity and who does not is clearly proximity to one of the single-phase or three-phase distribution lines. However, even along the distribution lines, as many as half the households in two areas surveyed did not have electricity. Although many non-users said they wanted and could afford electricity but simply hadn't had an opportunity to didn't know how to get it, many others did not believe they could afford it. In either case, non-users appeared more economically disadvantaged than users. Among all households informally surveyed (not counting large farms, plantations, etc.) the median income of users was about $700 per month while the median for non-users was closer to $400. If these figures were verified in a more rigorous survey, one would have to conclude that rural electrification in Nicaragua is not an activity directly benefitting the poorest of the poor.

In terms of production, benefits are even more skewed toward the higher income groups in the cooperative areas. Only large progressive farmers were using irrigation and other modern farming or ranching technology requiring electric energy. Each of the cooperative areas counted a number of industries which probably increased employment for some members of the rural poor, but there were virtually no cottage or household industries or crafts using electrical equipment that might be affordable by poorer people in the rural areas. In the area of CAEER No. 1, for example, there were only seven establishments (all located in the town of Tisma) which were classified as small businesses or industries on the co-op's membership list. In the area of COERAM, there were none.

ROLE OF COOPERATIVES IN RURAL ELECTRIFICATION

Two related questions arise concerning cooperatives and rural electrification in Nicaragua. First, are cooperatives, as opposed to state-owned or privately-owned utilities, the preferred means of distributing electricity to rural Nicaragua? Second, if cooperatives are preferred, how should they be organized and run in order to maintain their viability while at the same time making electrification an instrument of development?

MICROFILMED FROM BEST AVAILABLE COPY

The present state of the cooperatives in Nicaragua can be summarized as follows:

- The financial status of all the cooperatives is somewhat precarious. This is not as much due to poor management as it is to the nature of the market and the rate structure which the cooperatives are forced to accept;

- In order to place themselves on a sounder financial footing, the cooperatives are inevitably trying to grow larger and more urban;

- The cooperatives are really cooperatives in name only. They are organized and run more like private limited ownership corporations; and

- In general, the cooperatives do little more than distribute electricity. The fact that they do so at a cost which is probably higher than would be incurred by ENALUF raises the question of whether the cooperatives should not be taken over by ENALUF.

ENALUF and the GON have recently signed a loan agreement with the Inter-American Development Bank to finance rural electrification in two new areas of Nicaragua -- Rama and Matagalpa. The loan is a two-step credit agreement: a Bank loan to the GON and a GON loan to ENALUF. During part of the repayment period, ENALUF will pay back its loan to GON at an interest rate which will be four percent higher than the rate at which the GON will pay back its loan to the Bank. According to the loan agreement, the differential will be used to create "a special government fund under ENALUF to finance the promotion of rural electric cooperatives in the country."[1] A commitment to

---

[1] Loan agreement, p. 2.

promote rural electrification through cooperatives, in other words, was made a condition of the loan. The only problem with this is that all the ENALUF and GON officials with whom the future expansion of rural electrification was discussed indicated that electricity in the two new areas and in all future areas would be distributed, not through cooperatives, but through an expansion of the transmission and distribution system of ENALUF itself.[1] Most of the officials were in fact unaware of the provision of the Bank loan cited above.

The primary reason given by the officials for preferring ENALUF over cooperative distribution of electricity was that ENALUF would eliminate the "extra layer of management" necessary to run cooperatives and that the savings from this would result in a more viable distribution system and perhaps even cheaper electricity to the consumer. The officials saw no development benefits from the cooperatives per se aside from acting as a mechanism for the distribution of electricity.

ENALUF does in fact charge less for selling retail electricity to its primarily urban consumers than the co-ops charge to their primarily rural members. Although data at hand do not permit a judgment as to whether ENALUF would be able to sell electricity more cheaply in the countryside than the cooperatives, it is probably safe to assume that they would not sell

---

[1] This statement of intent was voiced by officials from the Rural Electrification Department of ENALUF and from the Government financed Instituto Agropecuaria and the GON program INVIERNO.

MICROFILMED FROM BEST AVAILABLE COPY

it more expensively. Thus, if the cooperatives in Nicaragua exist and function for no other reason than to sell electricity, unshakeable logic would force one to agree with the opposition of the government officials to cooperatives in the new areas.

However, rural electric cooperatives can and, in some cases, do have an impact on development which goes beyond merely distributing electricity. Cooperatives in Nicaragua sometimes serve as local organizations which permitted citizens to assemble to discuss problems and projects of mutual benefit.

There were three trends in Nicaragua, however, which mitigated against the use of cooperatives as development instruments. The first is the domination of the ENALUF and the GON in the making of important cooperative decisions, ranging from the hiring of personnel to the setting of rates. The second was the domination of the internal decisionmaking of the cooperatives by their more well-to-do members coupled with the virtual absence of participation among the majority of lower class members. The third is the tendency of the cooperatives to grow very large and more urban, the size factor inexorably diluting the possibility of mass participation and the urban factor skewing internal decisions toward urban concerns.

Already the rate structure of the cooperatives, while in principle encouraging productive-oriented uses of electricity, is highly regressive, making electricity expensive to the poor and less expensive to the more well-to-do. Even on a strictly

cost-benefit basis, the low irrigation rates can hardly be justified. R. W. Beck Associates had recommended, for example, that on the basis of pure costs, irrigation rates should be raised by 223 percent. (Table B-III)

TABLE B-III

COSTS AND REVENUES OF VARIOUS CATEGORIES OF ELECTRICITY USAGE IN NICARAGUA[a]

Class of Service	Total Cost of Service	Actual Revenues	Deficiency	
			Amount	Percent
Residential	63,049	48,694	14,355	29.5
Commercial	25,566	17,991	7,575	42.1
Small Industrial	50,803	27,453	23,350	85.1
Large Industrial	54,891	22,330	32,561	145.8
Governmental	8,784	5,782	3,002	51.9
Street Lighting	5,700	3,015	2,685	89.0
Irrigation	14,687	4,542	10,145	223.3
Pumping	11,140	5,979	5,161	86.3
Sale for Resale	38,425	17,179	21,246	123.7
TOTAL	273,045	152,965	120,080	78.5

[a] Source: R. W. Beck Associates, "Rate and Revaluation Study -- First Phase." February 1975, p. I-7.

The principal issue facing rural electric development through cooperatives in Nicaragua, then, can be summarized as follows:

> Are the cooperatives to be seen merely as rather expensive and less than optimally efficient mechanisms for distributing electricity to rural Nicaragua or can they be made into truly effective mechanisms for delivering development benefits to the rural poor?

If the co-ops function only as electricity distributors, they probably have little future in Nicaragua. If they become development mechanisms, their future would appear more secure.

ATTACHMENT TABLES ANNEX A

TABLE B-IV

NUMBER OF CONSUMERS - TOTAL
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	85,960	63.3	92,945	63.2	8.13
Cooperatives:					
COERAM (Boaco)	6,705	4.9	7,320	5.0	9.17
CONODER (Chinandega)	4,960	3.7	5,251	3.6	5.87
CAEER No. 1 (Masaya)	2,346	1.7	2,600	1.8	10.83
CODERSE (Las Segovias)	2,832	2.1	4,065	2.7	43.54
COERDRI (Rivas)	6,780	5.0	7,195	4.9	6.08
Sub-Total	23,623	17.4	26,431	18.0	11.89
Other Distributors	26,162	19.3	27,587	18.8	5.45
TOTAL	135,745	100.0	146,960	100.0	8.26

Source: Instituto Nacional de Energia Electrica, *Memoria Annual 1975*, p. 44.

TABLE B-V

SALES IN KWH - TOTAL
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	541,723,104	85.2	562,595,407	83.5	3.85
Cooperatives:					
COERAM (Boaco)	6,087,169	.9	11,753,915	1.7	93.09
CONODER (Chinandega)	27,466,337	4.3	28,497,969	4.2	3.76
CAEER No. 1 (Masaya)	3,979,931	.6	4,171,727	.6	4.82
CODERSE (Las Segovias)	2,118,265	.3	7,253,275	1.1	242.42
COERDRI (Rivas)	9,008,070	1.4	10,672,752	1.6	18.48
Sub-Total	48,657,772	7.7	62,349,638	9.2	28.13
Other Distributors	45,207,042	7.1	49,113,605	7.3	8.64
TOTAL	635,589,918	100.0	674,058,650	100.0	6.05

Source: Ibid., p. 32.

TABLE B-VI

NUMBER OF CONSUMERS - RESIDENTIAL
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth Rate
	Number	Percent	Number	Percent	
ENALUF	82,099	64.0	89,425	63.3	8.92
Cooperatives:					
COERAM (Boaco)	5,967	4.6	7,039	5.0	17.97
CONODER (Chinandega)	4,489	3.5	4,966	3.5	10.63
CAEER No. 1 (Masaya)	2,307	1.8	2,568	1.8	11.31
CODERSE (Las Segovias)	2,648	2.1	3,917	2.8	47.92
COERDRI (Rivas)	6,352	5.0	6,839	4.8	7.67
Sub-Total	21,763	17.0	25,329	17.9	16.39
Other Distributors	24,363	19.0	26,492	18.8	8.74
TOTAL	128,225	100.0	141,246	100.0	10.15

Source: Ibid., p. 45.

TABLE B-VII

SALES IN KWH - RESIDENTIAI
1974 and 1975

	1974		1975		Growth Rate
	KWH	Percent	KWH	Percent	
ENALUF	112,044,349	76.9	131,628,016	75.5	17.48
Cooperatives:					
COERAM (Boaco)	2,374,689	1.6	3,102,042	1.8	30.63
CONODER (Chinandega)	3,444,817	2.4	4,313,790	2.5	25.23
CAEER No. 1 (Masaya)	1,162,910	.8	1,623,889	.9	39.64
CODERSE (Las Segovias)	726,647	.5	2,619,087	1.5	260.43
COERDRI (Rivas)	3,897,992	2.7	4,330,069	2.5	11.08
Sub-Total	11,607,055	8.0	15,988,877	9.2	37.75
Other Distributors	22,103,546	15.1	26,747,968	15.3	21.01
TOTAL	145,754,950	100.0	174,364,861	100.0	19.63

Source: Ibid., p. 33.

TABLE B-VIII

NUMBER OF CONSUMERS - IRRIGATION
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	341	66.7	359	62.1	5.28
Cooperatives:					
COERAM (Boaco)	39	7.6	64	11.1	64.10
CONODER (Chinandega)	85	16.7	105	18.1	23.53
CAEER No. 1 (Masaya)	5	1.0	8	1.4	60.00
CODERSE (Las Segovias)	-	-	1	.2	-
COERDRI (Rivas)	17	3.3	19	3.3	11.76
Sub-Total	146	28.6	197	34.1	34.93
Other Distributors	24	4.7	22	3.8	-8.33
TOTAL	511	100.0	578	100.0	13.11

Source: Ibid., p. 50.

TABLE B-IX

SALES IN KWH - IRRIGATION
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	35,614,647	67.1	40,688,756	64.6	14.25
Cooperatives:					
COERAM (Boaco)	1,047,822	2.0	5,338,171	8.5	409.45
CONODER (Chinandega)	15,666,048	29.5	15,241,988	24.2	-2.71
CAEER No. 1 (Masaya)	93,643	.2	445,591	.7	375.84
CODERSE (Las Segovias)	0	-	2,326	.1	-
COERDRI (Rivas)	233,381	.4	793,178	1.3	239.86
Sub-Total	17,040,894	32.1	21,821,254	34.6	28.05
Other Distributors	384,815	.7	508,190	.8	32.06
TOTAL	53,040,356	100.0	63,015,874	100.0	18.81

Source: Ibid., p. 38.

TABLE B-X

NUMBER OF CONSUMERS - COMMERCIAL
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	1,471	38.5	826	50.4	-43.85
Cooperatives:					
COERAM (Boaco)	501	13.1	-	-	-
CONODER (Chinandega)	218	5.7	14	.9	-93.58
CAEER No. 1 (Masaya)	31	.8	9	.5	-70.97
CODERSE (Las Segovias)	96	2.5	6	.4	-93.75
COERDRI (Rivas)	93	2.4	37	2.2	-60.22
Sub-Total	939	24.5	66	4.0	-92.97
Other Distributors	1,417	37.0	748	45.6	-47.21
TOTAL	3,827	100.0	1,640	100.0	-57.15

Source: Ibid., p. 46.

TABLE B-XI

SALES IN KWH - COMMERCIAL
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	64,413,476	89.2	60,601,471	91.2	-5.92
Cooperatives:					
COERAM (Boaco)	1,069,133	1.5	855,134	1.3	-20.02
CONODER (Chinandega)	364,299	.5	406,431	.6	11.57
CAEER No. 1 (Masaya)	469,804	.6	160,799	.2	-65.77
CODERSE (Las Segovias)	201,954	.3	66,431	.1	-67.11
COERDRI (Rivas)	800,074	1.1	1,097,565	1.7	37.18
Sub-Total	2,905,264	4.0	2,586,360	3.9	-10.98
Other Distributors	4,919,903	6.8	3,290,458	4.9	-33.12
TOTAL	72,238,643	100.0	66,478,289	100.0	-7.97

Source: Ibid., p. 34.

TABLE B-XII

NUMBER OF CONSUMERS - LARGE INDUSTRIES
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	512	60.5	540	68.6	5.47
Cooperatives:					
COERAM (Boaco)	36	4.3	37	4.7	2.78
CONODER (Chinandega)	42	5.0	41	5.2	-2.38
CAEER No. 1 (Masaya)	2	.2	4	.5	100.00
CODERSE (Las Segovias)	18	2.1	11	1.4	-38.89
COERDRI (Rivas)	34	4.0	15	1.9	-55.88
Sub-Total	132	15.6	108	13.7	-18.18
Other Distributors	202	23.9	139	17.7	-31.19
TOTAL	846	100.0	787	100.0	-6.97

Source: Ibid., p. 47.

TABLE B-XIII

SALES IN KWH - LARGE INDUSTRIES
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	269,415,004	90.4	257,754,017	89.3	-4.33
Cooperatives:					
COERAM (Boaco)	948,574	.3	1,257,305	.4	32.55
CONODER (Chinandega)	7,453,803	2.5	7,954,993	2.8	6.72
CAEER No. 1 (Masaya)	2,225,033	.8	1,796,027	.6	-19.28
CODERSE (Las Segovias)	817,307	.3	3,882,112	1.3	374.99
COERDRI (Rivas)	3,121,059	1.0	3,389,861	1.2	8.61
Sub-Total	14,565,776	4.9	18,280,298	6.3	25.50
Other Distributors	13,991,389	4.7	12,531,530	4.4	-10.43
TOTAL	297,972,169	100.0	288,565,845	100.0	-3.16

Source: Ibid., p. 35.

TABLE B-XIV

NUMBER OF CONSUMERS - PUBLIC LIGHTING
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	598	83.3	669	84.2	11.87
Cooperatives:					
COERAM (Boaco)	13	1.8	16	2.0	23.08
CONODER (Chinandega)	44	6.1	35	4.4	-20.45
CAEER No. 1 (Masaya)	1	.2	1	.1	0.00
CODERSE (Las Segovias)	26	3.6	36	4.5	38.46
COERDRI (Rivas)	20	2.8	22	2.8	10.00
Sub-Total	104	14.5	110	13.8	5.77
Other Distributors	16	2.2	16	2.0	0.00
TOTAL	718	100.0	795	100.0	10.72

Source: Ibid., p. 49.

TABLE B-XV

SALES IN KWH - PUBLIC LIGHTING
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	11,366,626	77.1	13,750,340	76.9	20.97
Cooperatives:					
COERAM (Boaco)	292,897	2.0	503,614	2.8	71.94
CONODER (Chinandega)	265,815	1.8	281,903	1.6	6.05
CAEER No. 1 (Masaya)	28,541	.2	29,614	.2	3.76
CODERSE (Las Segovias)	81,465	.6	168,366	.9	06.67
COERDRI (Rivas)	181,257	1.2	208,268	1.2	14.90
Sub-Total	849,975	5.8	1,191,765	6.7	10.21
Other Distributors	2,520,266	17.1	2,933,655	16.4	16.40
TOTAL	14,736,867	100.0	17,875,760	100.0	21.30

Source: Ibid., p. 37

TABLE B-XVI

NUMBER OF CONSUMERS - GOVERNMENT OFFICES
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	838	55.8	1,018	57.2	21.48
Cooperatives:					
COERAM (Boaco)	146	9.7	158	8.9	8.22
CONODER (Chinandega)	82	5.5	90	5.0	9.76
CAEER No. 1 (Masaya)	-	0.0	10	.6	-
CODERSE (Las Segovias)	44	2.9	94	5.3	113.94
COERDRI (Rivas)	252	16.8	245	13.8	-2.78
Sub-Total	524	34.9	597	33.6	13.93
Other Distributors	139	9.3	163	9.2	17.27
TOTAL	1,501	100.0	1,778	100.0	18.45

Source: Ibid., p. 48.

TABLE B-XVII

SALES IN KWH - GOVERNMENT OFFICE
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	21,993,649	91.0	28,184,732	90.0	28.15
Cooperatives:					
COERAM (Boaco)	151,607	.7	215,973	.7	42.46
CONODER (Chinandega)	271,555	1.1	298,864	1.0	10.06
CAEER No. 1 (Masaya)	-	0.0	115,807	.4	-
CODERSE (Las Segovias)	290,892	1.2	514,953	1.6	77.03
COERDRI (Rivas)	512,510	2.1	588,813	1.9	14.89
Sub-Total	1,226,564	5.1	1,734,410	5.6	41.40
Other Distributors	949,784	3.9	1,387,252	4.4	46.06
TOTAL	24,169,997	100.0	31,306,394	100.0	29.53

Source: Ibid., p. 36.

TABLE B-XVIII

NUMBER OF CONSUMERS - WATER PUMPS
December 31, 1974 and December 31, 1975

	December 31, 1974		December 31, 1975		Growth
	Number	Percent	Number	Percent	Rate
ENALUF	101	86.3	108	79.4	6.93
Cooperatives:					
COERAM (Boaco)	3	2.6	6	4.4	100.0
CONODER (Chinandega)	-	-	-	-	-
CAEER No. 1 (Masaya)	-	-	-	-	-
CODERSE (Las Segovias)	-	-	-	-	-
COERDRI (Rivas)	12	10.2	15	11.0	25.00
Sub-Total	15	12.8	21	15.4	40.00
Other Distributors	1	.9	7	5.2	600.00
TOTAL	117	100.0	136	100.0	16.24

Source: Ibid., p. 51.

TABLE B-XIX

SALES IN KWH - WATER PUMPS
1974 and 1975

	1974		1975		Growth
	KWH	Percent	KWH	Percent	Rate
ENALUF	26,875,353	97.1	29,988,075	92.4	11.58
Cooperatives:					
COERAM (Boaco)	202,447	.7	481,676	1.5	137.93
CONODER (Chinandega)	-	-	-	-	-
CAEER No. 1 (Masaya)	-	-	-	-	-
CODERSE (Las Segovias)	-	-	-	-	-
COERDRI (Rivas)	261,797	1.0	264,998	.8	1.22
Sub-Total	464,244	1.7	746,674	2.3	60.84
Other Distributors	337,339	1.2	1,716,878	5.3	408.95
TOTAL	27,676,936	100.0	32,451,627	100.0	17.25

Source: Ibid., p. 39.

TABLE B-XX

CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY CATEGORY OF CONSUMER
COERAM - April 1976

	Member-Consumers		Energy Consumed (KWH)		Value of Sales (U.S.$)	
	Number	Percent	Number	Percent	Dollars	Percent
Residential	8,851	96.5	522,960	30.0	64,258	58.5
Irrigation	76	.8	1,045,210	59.9	31,401	28.6
Small Business and Industries	0	0	0	0	0	0
Large Business and Industries	38	.4	30,855	1.8	6,108	5.6
Public Lighting	17	.2	47,769	2.7	2,617	2.4
Government Offices	181	2.0	24,587	1.4	1,437	1.3
Water Pumps	7	.1	72,552	4.2	3,943	3.6
TOTAL	9,170	100.0	1,743,933	100.0	109,764	100.0

Source: COERAM Financial Statement, April 1976.

TABLE B-XXI

ONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY CATEGORY OF CONSUMER
CODERSE - March 1976

	Member-Consumers		Energy Consumed (KWH)		Value of Sales (U.S.$)	
	Number	Percent	Number	Percent	Dollars	Percent
Residential	4,468	95.7	242,201	26.2	22,215	36.9
Irrigation	9	.2	33,341	3.6	1,008	1.7
Small Business and Industries	21	.5	39,416	4.3	2,693	4.5
Large Business and Industries	19	.4	512,460	55.4	28,875	47.9
Public Lighting	37	.8	23,238	2.5	1,286	2.1
Government Offices	114	2.4	74,316	8.0	4,160	6.9
Water Pumps	0	0	0	0	0	0
TOTAL	4,668	100.0	924,972	100.0	60,237	100.0

Source: CODERSE Financial Statement, March 1976.

TABLE B-XXII

CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY CATEGORY OF CONSUMER
COERAM - August 1976

	Member-Consumers		Energy Consumed (KWH)		Value of Sales (U.S.$)	
	Number	Percent	Number	Percent	Dollars	Percent
Residential	8,946	96.0	472,931	33.5	59,277	61.1
Irrigation	77	.8	636,236	45.0	18,614	19.2
Small Business and Industries	0	0	0	0	0	0
Large Business and Industries	61	.6	147,033	10.4	10,367	10.7
Public Lighting	18	.2	60,883	4.3	3,350	3.4
Government Offices	213	2.3	32,990	2.3	1,900	2.0
Water Pumps	7	.1	63,734	4.5	3,464	3.6
TOTAL	9,322	100.0	1,413,807	100.0	96,972	100.0

Source: COERAM Financial Statement, August 1976.

TABLE B-XXIII

CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY CATEGORY OF CONSUMER
CAEER No. 1 - August 1976

	Member-Consumers		Energy Consumed (KWH)		Value of Sales (U.S.$)	
	Number	Percent	Number	Percent	Dollars	Percent
Residential	2,942	98.6	144,278	54.5	16,642	69.0
Irrigation	10	.4	4,183	1.6	149	.6
Small Business and Industries	7	.2	17,144	6.5	1,176	4.9
Large Business and Industries	5	.2	47,500	17.9	3,351	13.9
Public Lighting	4	.1	11,306	4.3	614	2.5
Government Offices	9	.3	654	.2	39	.1
Water Pumps	7	.2	39,785	15.0	2,160	9.0
TOTAL	2,984	100.0	264,850	100.0	24,131	

Source: CAEER No. 1 Financial Statement, August 1976

TABLE B-XXIV

CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY CATEGORY OF CONSUMER
CODERSE - January, July 1976

	Member-Consumers		Energy Consumed (KWH)		Value of Sales (U.S.$)	
	Number	Percent	Number	Percent	Dollars	Percent
Residential	4,639	95.9	1,942,990	31.5	191,112	44.3
Irrigation	8	.2	76,785	1.3	2,415	.5
Small Business and Industries	19	.4	282,968	4.6	19,697	4.6
Large Business and Industries	19	.4	3,149,838	51.1	178,398	41.4
Public Lighting	38	.8	180,640	2.9	9,992	2.3
Government Offices	112	2.3	526,947	8.6	29,763	6.9
Water Pumps	0	0	0	0	0	0
TOTAL	4,835	100.0	6,160,168	100.0	431,379	100.0

Source: CODERSE Financial Statements, January, July 1976.

TABLE B-XXV

CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY CATEGORY OF CONSUMER
COERAM - January, July 1976

	Member-Consumers		Energy Consumed (KWH)		Value of Sales (U.S.$)	
	Number	Percent	Number	Percent	Dollars	Percent
Residential	8,535	96.2	3,084,252	32.9	381,635	60.5
Irrigation	72	.8	4,563,364	48.7	136,435	21.6
Small Business and Industries	0	0	0	0	0	0
Large Business and Industries	46	.5	813,511	8.7	61,748	9.8
Public Lighting	17	.2	363,971	3.9	19,728	3.1
Government Offices	191	2.2	183,149	2.0	10,746	1.7
Water Pumps	7	.1	360,211	3.8	21,043	3.3
TOTAL	8,868	100.0	9,368,458	100.0	631,333	100.0

Source: COERAM Financial Statements, January, July 1976

ANNEX C

TABLE OF CONTENTS

BOLIVIA

INTRODUCTION C-1

OVERVIEW OF BOLIVIAN ELECTRIFICATION C-1

BACKGROUND C-1

GENERATION AND TRANSMISSION C-3

Bolivian Power Company C-3
ENDE C-3

DISTRIBUTION C-4

ELFEC C-4
CRE C-6
Other Distributors C-7

REGULATION AND RATES C-8

GOVERNMENT POLICIES AND PROGRAMS AND AID ASSISTANCE . . C-10

THE NRECA-ASSISTED COOPERATIVE IN SANTA CRUZ C-11

INTRODUCTION C-11

CRE MEMBERSHIP AND CONSUMPTION C-12

CATEGORIES OF CONSUMERS AND USE OF ELECTRICITY C-14

CO-OP ORGANIZATION AND MANAGEMENT C-16

PERSONNEL C-19

FINANCIAL VIABILITY C-20

USER SURVEY C-20

ISSUES IN BOLIVIAN RURAL ELECTRIFICATION C-22

ANNEX C: BOLIVIA

INTRODUCTION

This annex will provide relevant data on electrification in Bolivia, including the role of cooperatives in Bolivian electrification and the history of NRECA's technical assistance in Bolivia. In addition, the issues discussed in the body of the report will be reviewed within the context of the future of rural electrification in Bolivia.

The data in this annex are based on interviews, observations, and materials collected during a one-week field trip to Bolivia by a DAI evaluator. During the trip, the evaluator held discussions with Bolivian and USAID officials at La Paz, with NRECA representatives in Cochambamba and with cooperative officials in Santa Cruz, and also conducted a brief inspection of facilities and energy use in the Santa Cruz area.

OVERVIEW OF BOLIVIAN ELECTRIFICATION

BACKGROUND

Electricity was first introduced in Bolivia in the town of Cochabamba shortly after the turn of the century. Because

of the country's vast size and uncertain political situation in the first few decades of this century, several different power companies were established in different towns and were mostly financed by private, often foreign, capital.

History and diversity have combined to create a situation today in which division of electrification responsibility in Bolivia is quite complicated. Basically, there are two large companies which generate and transmit most of the country's electricity with responsibility divided geographically. A third organization is theoretically responsible for rural electrification. In the cities and surrounding areas, the two large companies share distribution responsibilities with smaller private companies and cooperatives.

Rural electrification in Bolivia still exists more on the drawing board than in fact. Most town and city dwellers in Bolivia now have central station electricity but the vast majority of rural people either do not have electricity at all or rely on electricity from small privately-owned or cooperatively-owned diesel generators. The Government of Bolivia (GOB) has developed a program to expand and rationalize rural electrification and much of this program is being partially financed by AID loans. For the time being, however, one remains struck by the anomaly of the fact that the largest AID-financed, NRECA-assisted "rural" electric cooperative is basically set up to service the 250 thousand urban dwellers of the City of Santa Cruz.

GENERATION AND TRANSMISSION

As mentioned, two large companies generate most of the bulk electricity in Bolivia. One serves La Paz and the highland areas while the other serves the rest of the country.

Bolivian Power Company

The company serving the Altiplano is the Bolivian Power Company (Compania Boliviana de Energia Electrica, S.A.) which was organized in 1925 as a public power company to serve the City of La Paz and later the town of Oruro. In terms of plant investment, generation of energy and population served, Bolivian Power is the largest electric utility in Bolivia. Bolivian Power has also been tapped to supply bulk power to the proposed new rural electric cooperative which will distribute electricity in the La Paz Altiplano area near Lake Titicaca.

ENDE

The company serving most of the rest of Bolivia is the Empresa Nacional de Electrididad S.A. (ENDE) which was created by the Bolivian government in 1965 for the purposes of developing a national plan for the electrification of all Bolivia and is part of the Ministry of Energy and Hydrocarbons. ENDE has responsibility for the generation and transmission of electricity to all areas of Bolivia except where Bolivian Power has the concession. ENDE generates from hydroelectric plants in

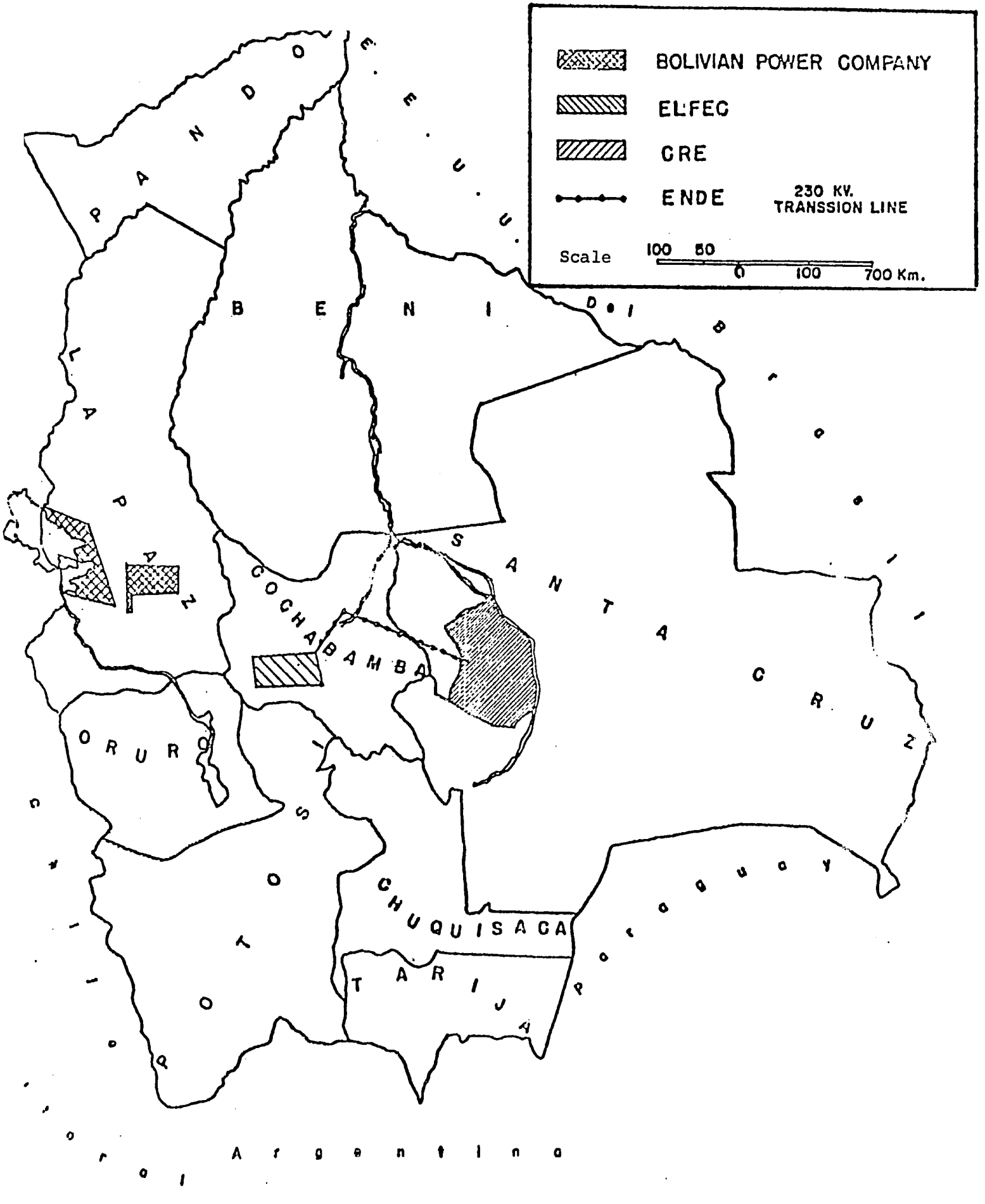
Cochabamba and Santa Isabel and from a diesel/gas thermal plant in Santa Cruz. It is ENDE which supplies electricity to all the cooperatives and private companies to which NRECA has lent technical assistance. ENDE is a mixed corporation with both private and public shareholders.

DISTRIBUTION

Concessions for the distribution of electricity have been granted mainly on a departmental basis. (See map on following page) Bolivian Power not only generates but also distributes electricity for the departments of La Paz and Oruro. In the other departments, ENDE shares distributing responsibilities with private companies and cooperatives. Most of these distributors have received or are receiving AID and NRECA assistance.

ELFEC

The concession for most of the department of Cochabamba is with the Empresa de Luz y Fuerza Electrica Cochabama S.A. (ELFEC). Created in 1908, ELFEC is a mixed corporation with private and public shareholders and is the oldest existing utility in Bolivia. ELFEC previously generated and transmitted its own electricity but since the creation of ENDE in 1965, ELFEC's functions are now basically in distribution.


BOLIVIAN POWER COMPANY
ELFEC
CRE
ENDE
230 KV. TRANSSION LINE
Scale
100 50 0 100 700 Km.
PANDO
BENI
LA PAZ
COCHABAMBA
SANTA CRUZ
ORURO
POTOSI
CHUQUISACA
TARIJA
Argentina

ELFEC's main service area is the town of Cochabama, population 250,000. However, in 1968, ELFEC formed a rural electrification office and began to extend its service to the rural areas of the Department of Cochabamba. For this purpose, ELFEC received technical assistance from the Peace Corps and from NRECA.

In order to facilitate rural electrification in Cochabamba, it was decided to organize or expand four to six cooperatives in the provinces which would purchase electricity from ELFEC and redistribute it to members. NRECA and the Peace Corps helped to establish or re-organize the co-ops for this purpose. In 1972, however, an AID/NRECA evaluation concluded that the cooperatives were so small and poorly managed that they could not attain financial viability without heavy subsidization from ELFEC. Some thought was given to merging the four cooperatives but regional rivalries among other problems precluded this possibility. In the end, it was decided that the co-ops would be absorbed by ELFEC itself and ELFEC would take over responsibility for the distribution of electricity to rural as well as urban areas in Cochabama. NRECA is no longer under contract to assist ELFEC.

CRE

The concession for much of the vast Department of Santa Cruz has been granted to the Cooperativa Rural de Electrification (CRE). CRE, was organized in 1962 but it was not until

MICROFILMED FROM BEST AVAILABLE COPY

1970 that the co-op formally took over as the distributing utility for the City of Santa Cruz and surrounding areas. CRE purchases its bulk electricity from ENDE and distributes it at present to Santa Cruz and to the towns of Warnes, Montero, Portachuelo, General Saavedra and Mineros. An on-going AID project will extend the system farther into rural areas. More details on CRE will be given in following pages.

Other Distributors

There are three other major utilities in Bolivia which distribute electricity in defined concessionary areas. All are sub-borrowers of the current AID loan and all are receiving technical assistance from NRECA. They are (1) Cooperativa Electrica de Sucre, S.A. (CESSA); (2) Servicios Electricos de Potosi, S.A. (SEPSA); and (3) Servicios Electricos de Tarija S.A. (SETAR). As the names indicate, only CESSA is organized as a cooperative; the other two are private, limited holding companies of which ENDE is a shareholder. The new distributor in the Lake Titicaca region will also be a cooperative. CESSA, SEPSA and SETAR are all organized with towns as the major recipients of electricity although all three companies also serve some irrigators and agro-processing industries in surrounding areas.

MICROFILMED FROM BEST AVAILABLE COPY

REGULATION AND RATES

The electric regulatory agency in Bolivia is the Direccion Nacional de Electricidad (DINE) which was established in 1962. Like ENDE, DINE is a part of the Ministry of Energy and Hydrocarbons. Its decisions concerning concessions, rate structures, company take-overs and norms of service can thus be assumed to reflect government policies.

Unlike in Nicaragua, DINE has not established special wholesale power rates for the cooperatives or other rural electric programs. CRE is charged a flat rate which reflects ENDE's costs of generation and transmission. The CRE rate is slightly higher than the ELFEC rate which is not a flat rate but is based on a demand energy type of rate structure. Presumably the slightly lower rate to ELFEC reflects the lower costs to ENDE of generating and transmitting energy to ELFEC.

Retail rates are also designed to over costs for each category of consumer. CRE as adopted (with DINE's approval) seven different rates for seven categories of consumers. The two industrial rates are of the demand-energy type. The others are all flat rates with no difference by amount of usage. Commercial rates are the highest and industrial rates the lowest, but the differentials are not so great as they are ir Nicaragua. (See Table C-I)

TABLE C-I

CRE - RATE STRUCTURE BEGINNING 1-6-76
(in $b and U.S.$)[1]

	$b	U.S.$
Residential		
Energy Charge (per KWH)	0.95	.05
Minimum Monthly Charge	18.92	.95
General I		
Energy Charge (per KWH)	0.92	.05
Minimum Monthly Charge	51.80	2.59
General II		
Energy Charge (per KWH)	1.36	.07
Minimum Monthly Charge	69.82	3.49
Industrial I		
Demand Charge (per KW)	29.00	1.45
Energy Charge (per KWH)	0.60	.03
Minimum Monthly Charge	Equivalent to the demand charge	
Industrial II (High Tension)		
Demand Charge (per KW)	35.00	1.75
Energy Charge (per KWH):		
First 200 KWH x KW (per KWH)	0.60	.03
Additional KWH (per KWH)	0.52	.03
Minimum Monthly Charge	Equivalent to the demand charge	
Public Lighting		
Energy Charge (Per KWH)	0.96	.05
Irrigation		
Energy Charge (per KWH)		
From midnight to 1800 hours and from 2300 to 2400	0.56	.03
From 1800 to 2300	1.68	.08

[1] Exchange rate: U.S. $ = $b 20.

GOVERNMENT POLICIES AND PROGRAMS AND AID ASSISTANCE

It is the policy of the GOB to expand electrification into rural areas. Accordingly, the government created the Instituto Nacional de Electrificacion Rural (INER) in 1970 to develop, finance and execute the installation of electric service in the rural areas of Bolivia. The program which INER, in cooperation with ENDE, has created aims mostly to increase the capacity of existing urban-based utilities although the new cooperative planned for the Lake Titicaca area will be almost entirely rural in scope.

Much of the INER program is being financed by two AID loans totalling $17.3 million which will support rural electrification sub-projects in six of the nine departments of Bolivia. ENDE is the principal borrower of these loans with INER one of six sub-borrowers. The others are ELFEC, CRE, CESSA, SEPSA and SETAR. Although cost overruns due mainly to increases in Bolivian labor costs and also the worldwide energy crisis necessitated a redesign of the overall program in 1974 to make the same funding stretch farther, it is estimated that the same number of rural residents will be served as originally planned. For CRE, it is estimated that by 1986 the number of urban residential member-consumers will increase to 35,000 and the number of rural residential member-consumers will increase to 11,700. Only slight increases are projected for commercial and official consumers, but the number of small rural industries is expected to increase

from 654 in 1977 to 2,274 in 1986 while the number of large industrial consumers will increase from 153 in 1977 to 288 in 1986.

THE NRECA-ASSISTED COOPERATIVE IN SANTA CRUZ

INTRODUCTION

The Cooperative Rural Electrica (CRE) in Santa Cruz is one of two cooperatives to which NRECA has given long-term assistance and is the only one which goes by the name "rural."[1] NRECA's assistance in Santa Cruz dates back to 1962 when the manager of the Blue Ridge Rural Electric Cooperative of North Carolina, on assignment with NRECA, first suggested the idea of, and drew up a feasibility study for, establishing a rural electric cooperative in Santa Cruz. Eight years were to pass, however, before the co-op actually started billing its own consumers. The GOB had to be convinced not only that an electrification project was a good investment in the Santa Cruz area but that the cooperative form was the proper method of managing electric distribution. Finally, it was agreed in 1965 that the co-op would be formed; however, the co-op would not generate

---

[1] The other is the Cooperativa Electrica de Sucre which is organized as a cooperative but was established mainly to serve the City of Sucre. NR is also assisting in the establishment of the new rural electric cooperative in the Lake Titicaca area.

its own electricity but would purchase it from ENDE. AID loans were then negotiated, NRECA assistance was enlisted and construction of facilities begun.

The Santa Cruz cooperative was the only electric distributor which was actually visited by the DAI evaluator. Comments and observations on rural and cooperative electrification made in the following section, therefore, will be limited to a discussion of CRE.

CRE MEMBERSHIP AND CONSUMPTION

The first observation is that CRE is, at present, a rural co-op in name only. Of its 27,200 members, about 23,000 are residents of the City of Santa Cruz and most of the rest live in one of the five smaller towns served by the co-op. According to management, only about 50 members have listed their occupation as farmer. (See Table C-III) The current extension of the lines into the rural areas will greatly increase the number of rural consumer members in the future. However, by 1985 it is still expected that there will be about three times as many urban members as rural members.[1]

---

[1] 35,000 in the urban areas and 11,600 in the rural areas.

MICROFILMED FROM BEST AVAILABLE COPY

The growth of the co-op since its inception in 1970 has been nothing short of startling. The City of Santa Cruz was officially turned over to CRE in October 1970 with a total of 9,500 consumers. At the end of the first year of operation, membership was at 15,000 and demand in KWH was at 8,200; by the end of 1975, membership was over 26,000 and demand in KWH surpassed 18,000. From 1973 to 1975, annual revenues more than doubled -- from $1.24 million to $2.51 million. Some of this was made possible by an increase in KW capacity from 3,500 KW in 1970 to 36,000 KW in 1975. ENDE will soon (and may have already) added another turbine to its generating plant which will increase capacity to 45,000 KW.

Perhaps the greatest factor contributing to the growth of CRE, however, has been the increase in the population of Santa Cruz itself which has grown from less than 100,000 in the mid-1960's to more than 250,000 in 1976. Aside from natural increase factors (more live births than deaths per annum) and the trend in all areas of the countryside to lose population at the expense of the cities, two factors have undoubtedly contributed to the rapid growth of Santa Cruz. One has been the encouragement of the Bolivian government for people to migrate from the overpopulated Altiplano area of Bolivia to the less densely populated southeastern lowlands. The other factor has been the improvements in the city's infrastructure base, not the least of which has been the city's electrification.[1] Thus, while

---

[1] In 1963, Santa Cruz was served by a private company with only 4,000 residential and commercial consumers.

the increasing population of Santa Cruz may have contributed to the co-op's growth, it may also have been the increasing availability of electricity which contributed to the population increases. Even today, there remain an estimated 50,000 to 60,000 people in Santa Cruz who still do not have electricity.

CATEGORIES OF CONSUMERS AND USE OF ELECTRICITY

As is the case with most power companies, most of CRE's consumers -- 82 percent -- are residential. Residential members are also the greatest users of electricity (about 36.2 percent of the co-op's energy in May 1976) and provide more of the co-op's revenue (35.5 percent in May 1976) than any other category of user. The next largest category in terms of KWH used and revenue provided is industrial users, followed by commercial establishments and government facilities.

The co-op's rate structure is such that no single member can be said to be carrying the rest. However, small industries may be said to be getting some advantage compared to all the other users. In May 1976, the co-op's 79 small industrial members purchased nearly 30 percent of the co-op's electricity, but contributed only 22 percent of the month's revenues. (Table C-II)

There is little disparity between Santa Cruz and the other towns in terms of differences in KWH used and revenue provided:

TABLE C-II

MEMBER-CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES
BY CATEGORY OF SALES - CRE - BOLIVIA
May 1976

Category	Member-Consumers	Energy Consumed (KWH [000])	Value of Sales (U.S. $)
Residential (Urban)	22,311	2,733	122,717
Residential (Official and Rural)	942	362	15,909
Commercial	3,803	937	62,339
Large Industry	110	320	13,051
Small Industry	79	2,225	77,520
Seasonal	9	612	37,822
Public Lighting	1	363	16,595
TOTAL	27,255	7,552	345,952
January Through May 1976:			
Residential (Urban)		13,372	590,030
Residential (Official and Rural)		1,742	75,773
Commercial		4,646	300,098
Large Industry		1,096	63,810
Small Industry		10,267	346,602
Seasonal		1,623	134,337
Public Lighting		1,271	83,748
TOTAL		34,017	1,594,398

TABLE C-III

MEMBER-CONSUMERS, ENERGY CONSUMED AND VALUE OF SALES BY COMMUNITY
CRE, Bolivia - May 1976

Community	Member-Consumers	Energy Consumed (KWH [000])	Value of Sales (U.S. $)
Santa Cruz	23,300	6,586	2[illegible]3,896
Warnes	383	400	14,919
Montaro	2,578	811	32,173
Saaveera	155	194	6,216
Portachualo	575	93	4,420
Minero	269	43	2,829

Santa Cruz used 81.0 percent of the co-op's KWH in May 1976 and provided 82.4 percent of the revenue while the other towns used 19.0 percent of the KWH and provided 17.6 percent of the revenue. On a cost accounting basis, however, the city, as pointed out by the co-op manager, is definitely subsidizing the smaller towns since the unit cost of providing electricity to the more densely populated city (houses per line, KWH demand per household, etc.) is bound to be less than the cost of serving the towns. As the distribution lines of the co-op are extended to ever greater distances in the countryside, it can be expected that, on a cost basis, the amount of the city's subsidy of the outlying areas will increase.

CO-OP ORGANIZATION AND MANAGEMENT

The organization of the CRE co-ops was similar to the organization of the co-ops in Nicaragua. A general assembly of all members meets once a year and elects the members of the board of directors. Each of the 12 board members is elected for a three-year term and the terms are staggered with four members of the board up for election at each annual Assembly meeting. The last Assembly meeting was attended by about 200 members, or something less than one percent of the membership. The board meets twice a month to discuss co-op affairs.

The co-op is divided into five branches below the general manager: accounting, engineering and planning, operations, district staff and assistance to members. (See the organization chart on the following page) Of particular interest is that the engineering and planning branch has a permanent projects division which is currently in charge of the expansion of the co-op as called for in the AID loan.

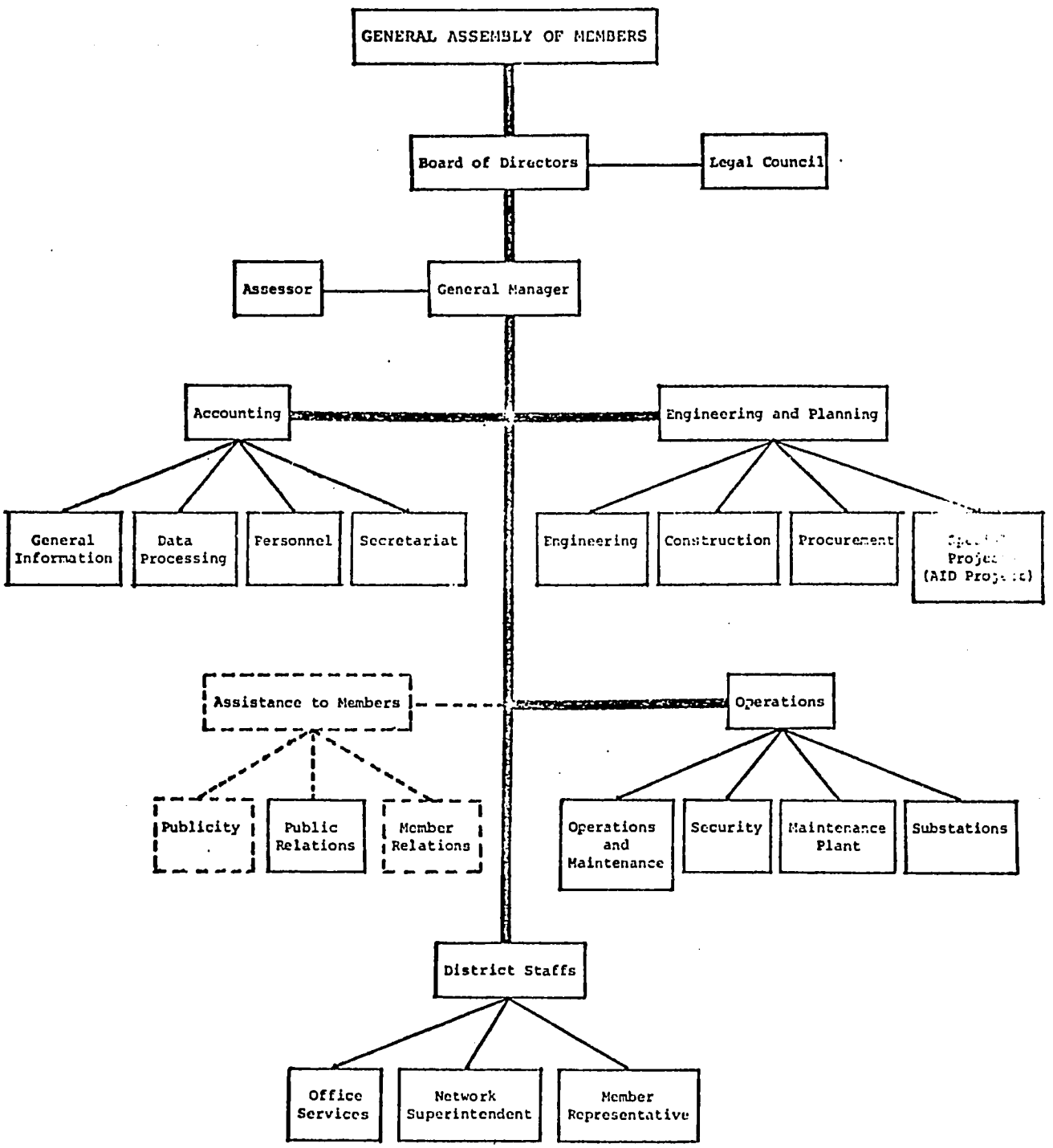
One similarity between the Nicaraguan co-ops and CRE, however, was that the co-ops in both countries had member services (sometimes called promotion, education and sales) departments in name only. Of the four positions in CRE's Members Services Department, the only one which was filled was in public relations, a section responsible for publishing the annual report and other periodic publications. The CRE management reportedly has intended for some time to fill the other positions in the department but has not yet found qualified candidates.

According to the CRE's organizational plan, the functions of the Member Services Department include:

- Strengthening the Co-op's relations with its members;
- Selling energy and insuring its efficient use; and
- Development of new areas to effectively meet the requirement of new areas.

With the planned expansion of the co-op into new areas with different types of consumers and different uses of elec-

CRE ORGANIZATION CHART



tricity, it would seem particularly important that the positions in the Member Services Department be filled.

PERSONNEL

There are between 110 and 120 employees on the staff of CRE, considerably more than on the staff of any of the co-ops in Nicaragua. The larger staff is, of course, required and permitted by the larger membership and volume of sales.

The top management of the co-op are highly educated and well qualified for their jobs. The manager since 1969 is a civil engineer with prior experience in both business and government planning. The manager has also visited the United States on several occasions where he has seen the operations of American electric cooperatives and where he has also taken a special NRECA course in the organization and management of cooperatives.

The heads of all the departments are also university educated and at least two department heads -- Administration and Operations -- have attended special NRECA training courses in the United States. Not only the head of the engineering department but also at least three of his subordinates are all university-trained engineers.

FINANCIAL VIABILITY

In general, CRE can be said to be in good financial shape. DINE sets an upper limit of nine percent as the maximum legal margin at which cooperatives can operate. If profits exceed nine percent, the co-op should either pay dividends or lower prices. For several years, CRE has either attained or exceeded the nine percent limit but has managed to use the excess without penalty for expansion or for further amortization of its long-term debt. The healthy margin of the co-op is due largely to the fact that its energy rates are the highest in Bolivia.

USER SURVEY

The user survey conducted by the DAI evaluator in the CRE area was of necessity more abbreviated than the survey in Nicaragua but included some inspection of existing distribution lines in the rural areas as well as a visit to areas where future lines are to be strung.

The most obvious observation was, of course, that very few of the current users could be called rural. Even where three-phase or single-phase lines did exist in the rural areas, there were many homes which were bypassed.

On the other hand, prospective consumers were eagerly awaiting the arrival of lines and there was a great deal of potential for production and social benefits of electrification. On the way to the town of Los Chacos, for example (one of the towns which will soon receive CRE electricity), a man was picked up who happened to be in charge of running the town's diesel powered water pump. The man was on his way back from his weekly trip to Warnes where he purchased the fuel necessary to run the motor. If an electric motor replaced the diesel, costs would go down and the man would no longer have to make his weekly trips. In the same town, a store owner estimated that she paid some $b900 per month for kerosene for her refrigerators and lights; it was estimated by one of the co-op officials that her electricity bill for the same usage would be about $b200 per month.

Although most of the prospective members knew that they were going to receive central station electricity, none had been visited personally by a co-op member. The same held true for the smattering of rural residents who already had CRE electricity. Like in Nicaragua, the users were happy to have their electricity but did not realize they were members of a cooperative. None of the users surveyed could recall any interaction with the co-op aside from paying their bills.

ISSUES IN BOLIVIAN RURAL ELECTRIFICATION

Many of the issues in Bolivian rural electrification are similar to those in Nicaragua or the Philippines but a few have their own twists.

Perhaps the number one policy issue can be defined as the urban-rural issue. As mentioned, there is nothing in Boliva today that resembles a rural electric cooperative. Moreover, with the possible exception of the proposed cooperative in Lake Titicaca area of the Altiplano, there is little prospect that there will be any rural electric cooperatives in Bolivia in the near future. This is because all planned expansion of lines into the rural areas will start from large urban bases. Santa Cruz, with its quarter million population and growing all the time, is the base of CRE; Cochabamba, about the same size as Santa Cruz is the base of ELFEC (which is of course not a cooperative but is destined to serve the rural areas). The issue here is will cooperatives with dominant urban membership have the incentives to finance further expansion into the rural areas when it is already clear that, on a cost accounting basis, the urban consumer is subsidizing the rural consumer? And even if expansion continues, won't most of the decisions made be inevitably in favor of the urban, perhaps even the urban commercial consumer?

This type of issue may, in the long run, of course, be moot because there is some question about the continuing

autonomy, even the continuing existence of cooperatives in Bolivia. CRE, virtually alone among the cooperatives, has managed to survive and even retain a measure of autonomy largely, the evaluator believes, for three reasons: its size, its urban base, and its location in a traditionally isolated area of Bolivia. Like most national authorities, however, the Government of Bolivia is traditionally suspicious of large, autonomous organizations, located on the perimeter and enjoying some loyalty from local populations.

The urban-rural issue may be moot for an even more simple reason. The impression of the DAI evaluator was that there was little existing popular participation, either urban or rural, in the decisionmaking processes of CRE. The mix of membership is of little importance if members have little influence over decisionmaking.

Another issue of concern both to Bolivian participants and to NRECA is the issue of impact evaluation. As pointed out in the body of this report, there is a tremendous need to know what the impact of rural electrification is in order that rural electrification can be made to serve the goal of development. Some steps have already been taken in this direction in Bolivia: a recent study by Development Associates has mapped out a set of indicators of socioeconomic impact which, with some work and adaptation, could be made usable as a basis for evaluation; also NRECA has begun to use survey-type data-gather-

ing instruments to raise basic feasibility questions in areas such as the Lake Titicaca.

However, neither of these efforts is sufficient. In the first, place, the feasibility studies and the indicators study need some serious revamping to make them useful as decis making tools. More importantly, there is a need to institutio alize this evaluation capability within the electrification network of Bolivia. At present, CRE does not even have a member relations department, let alone sufficient personnel within that department to collect socioeconomic data on a regular basis.

Thus, the first step is to convince CRE and or ENDE of the importance of impact evaluation so that they will take steps toward increasing their capability. To do this, since there would be no immediate return on this investment in new personnel, some government incentive, perhaps a short-term grant may be necessary. The alternative would be to locate thi capability either in ENDE or some outside research institution.