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EVALUATION REPORT ON  
FIVE PILOT RURAL ELECTRIC COOPERATIVES  
IN INDIA

A.I.D.  
Reference Center  
Room 1656 NS

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Rural Electrification Admin.

June 23, 1971

Report on Interim Evaluation of Five  
Rural Electric Cooperatives in India

Purpose of the Report:

This study was conducted as a result of an interagency request from the Agency for International Development to the Rural Electrification Administration. The objective of the assignment was to evaluate the pilot rural electric cooperative program in India which is being funded through a 70-30 participation agreement between USAID and the Government of India. The project receives direct technical assistance under a contract between the United States and the National Rural Electric Cooperative Association. The request for the evaluation listed seven areas to be covered by the study.

Approach to Study:

The evaluation covered a period from March 28, 1971, to May 13, 1971. During the first two weeks and preliminary to any field work, time was spent in New Delhi reviewing background information on the project. USAID personnel were most helpful. They made available all of their files relating to this program and talked openly and objectively about the history and developments to date. The NRECA office in AID also opened its files to me and provided copies of the weekly and quarterly progress reports. Individual project team members were in New Delhi during the week of April 5 to meet with Dr. Venables. This gave me the opportunity to discuss with them questions regarding the development and formation of the cooperatives. I had splendid cooperation from the team members and found each of them most willing

to discuss problems relating to the development of their individual rural electric cooperative as well as the strengths and weaknesses in the cooperative approach to rural electrification in India.

These first two weeks also afforded me the opportunity to become acquainted with representatives of the Rural Electrification Corporation. The Rural Electrification Corporation was established primarily as a lending agency to finance rural electrification schemes. It is extremely young, the date of registration being July 25, 1969. The key employees were not on the job until January and February of 1970 and they have not had sufficient time to establish all the essential operating policies. At the time of my visit the organization was staffed with 120 employees and was developing considerable capability in the fields of Electrical Engineering, Accounting and Finance and Project Analysis.

This organization was established to:

- (1) finance rural electrification schemes in the country.
- (2) subscribe to special rural electrification bonds that may be issued by the State Electricity Boards.
- (3) promote and finance rural electricity cooperatives in the country.
- (4) administer the moneys received from time to time from the Government of India and other sources as grants or otherwise for the purposes of financing rural electrification in the country.

REC is an autonomous organization with broad general powers residing in its chairman. The equity share capital of the organization is owned by the Government of India except for the small number of shares held by directors. The capitalization of this bank at this

particular time is Rs 150 crores over a five-year period. Seventy percent of the capitalization or Rs 105 crores will be supplied by AID from P.L. 480 funds and 30 percent or Rs 45 crores will be provided by the Government of India. Directors are appointed by the Government of India. They have no specified term but serve at the pleasure of the Government. The managing director and technical director, in addition to being employees, are full-time board members. While the chairman of the board has complete authority to decide all matters, the organization is generally under the jurisdiction of the Minister of Irrigation and Power.

Mr. Bandyopadhyay, managing director of REC, and his staff were extremely helpful. They provided valuable insight into the purposes and objectives of the Rural Electrification Corporation, its relationship to the five pilot rural electric cooperatives and the State Electricity Boards. I was given access to material from REC's files relating to loan policies and procedures to date and the schemes which they have financed. On April 9th, I left New Delhi and spent until May 6th visiting the five pilot rural electric cooperatives.

Although it was not always convenient to do so, I tried to meet in each state with all persons who had some association with the rural electrification program to obtain their views. I met with the State Cooperative Registrars in two states and with representatives of the State Electricity Boards in three states. I met with the boards of directors of three of the pilot systems and at each project

spent considerable time talking with the project manager and engineer. Approximately one-half of my time at each project was spent in looking at the service areas. I observed the potential for irrigation pump sets and other types of industrial development and inspected in a very general manner electric facilities acquired from the Electricity Boards and new line construction by the cooperatives' labor forces. The other half of my time was spent reviewing the internal operations of the cooperatives.

Findings:

At the very outset it is important to make clear the limitation preventing an in-depth evaluation at this time. These rural electric cooperatives are extremely young -- the oldest having been in operation since October 12, 1970, and the youngest since March 29, 1971. Three of the five -- The Mula-Pravara Electric Cooperative Society, Ltd., at Rahuri, Ahmednagar District, Maharashtra; The Co-operative Electric Supply Society, Limited, Lucknow, Uttar Pradesh; and the Kodinar Rural Electricity Cooperative Society, Limited, at Kodinar, Gujarat.-- did not begin operations until 1971 and the other two -- The Hukeri Taluka Co-operative Rural Electricity Society, Ltd., at Hukeri, Belgaum District, Mysore; and the Cooperative Electric Supply Society, Ltd., Sircilla, Andhra Pradesh -- in October and November 1970, respectively.

Three of the cooperatives were billing consumers for electric service for the first time during March and April of 1971. Plant

accounts had not been established on several of the cooperatives since cost data on property acquired from the Electricity Boards was not yet available. Statistical data even for the two organizations that began operating in 1970 covered too short a period (less than six months) to permit any type of meaningful evaluation. Any judgment on the economics of these rural electric cooperative operations or comparisons of actual operations with projected cost and revenue data was impossible at this time. Therefore, this report should not be viewed as any criticism of the efforts of the NRECA team members to date. It should be viewed rather as a recommendation for project development from this point.

It seems advisable to comment briefly on the progress made since September 1969, the date when the team members arrived in India. Phase IV of the project to be implemented by NRECA was to be related to assistance in the construction, energization and development of the five rural electric cooperatives. This assumed that all preliminary work on organization had been completed. This was not the case. When the five team members arrived they found that the projects to which they were assigned were not ready to move into operation. Most of the organizational work prerequisite to beginning operations had not been completed. In some cases the board of directors had not been formed or appointed by the State Cooperative Registrar, State license had not been issued, State guarantee required for the loan from REC had not been given, wholesale power arrangements with the State Electricity

Boards were not completed, and REC had not finalized its loan procedures. It was not until the period from April to July 1970 that these projects received their operating loan from REC amounting to Rs 1 lakh, giving them some working capital.

The NRECA team members did a very commendable job in working with various State and Central Government officials to obtain the required state approvals and with REC to obtain the operating and construction loans. The NRECA team members supplied the drive and motivation necessary to placing a new organization in operation and accomplished what local management could not have accomplished in the same time period. Being employees of the State Government on deputation, the project managers and engineers felt they could not have exerted the pressure on their superiors within State Government to get action as the team members were able to do. The NRECA team members have been most competent in this area and have maintained a very fine working relationship with State officials. Their ability to establish such a rapport had an impact on moving these projects ahead under some severe handicaps. Without the effort of the NRECA team members in obtaining state official approvals, it is doubtful that these projects would be in operation even now.

It is perhaps desirable to cover my findings under the seven objectives established for the evaluation.

1. Assess the usefulness and effectiveness of technical assistance provided under this project.

There is insufficient operating data to this point to properly evaluate the technical assistance provided in relationship to the scope of work in the task order. Although working under some extreme handicaps, some very fine things have been accomplished. The NRECA team members have had a measurable impact on many facets of the cooperatives' operations but there is much more that needs to be done. Being in operation for such a short period of time, there are many phases of electric utility operation that they have not had the opportunity to establish. There are also areas that the team members recognize need considerable strengthening. These areas relate particularly to accounting records, work order procedures, work flow, materials handling, internal control, delegation of authority, member education, public relations and others. Early reports on NRECA's approach to providing advice and assistance to the cooperatives indicated that it proposed the use of personnel across projects in their particular field of expertise. Some of this has been accomplished. Mr. Taylor has visited two projects and assisted in establishing accounting records but other than that there has been little exchange of team members. While the idea certainly has merit, it would seem to me that such exchange cannot be effective unless it is done under some well coordinated plan and under proper supervision. To carry out this type of program, someone must have the responsibility for determining the nature of advice and assistance needed and who can best supply it.

In travelling between these projects and reviewing methods of handling construction and operating matters, there is an indication of lack of coordination but this is perhaps to be expected under the present arrangement. Each team member will naturally do things the way he has learned them from his experience -- he will promote his areas of strength -- he will be less effective in other areas. To assure proper development in all phases of the cooperative's operations and with some degree of unification, each pilot cooperative should have an individual project development plan. This plan should be done under the direction and supervision of a sixth team member who would have overall responsibility for the supervising of the electrification specialists. The plan should involve the manager and engineer of the project in this development and be approved by the local board of directors. It should be fairly well detailed and cover the various areas of electric utility operations, such as, financial planning, organization, physical plant, engineering, power supply, power sales, internal operations, member education, public relations, board function and relationship, and delegation of authority. The plan should assign areas of responsibility and target dates for accomplishment. USAID and REC should support the developed plan and the electrification specialists should exert every effort with the board and managers to see that the plan is carried out. By involving the project manager, engineer and board of directors in the development of the plan should be the means to gaining their support.

## BEST AVAILABLE DOCUMENT

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Project development also suffers somewhat from the fact that the project team members have no resource people readily available to them. The problems in India are somewhat different from those experienced in other developing countries. Team members cannot use construction design standards and materials from the U.S.A. with which they are greatly familiar. They must work with and help to improve what is available there. The Chief of Party, Mr. Lyle Robinson, is extremely capable and was to provide engineering advice and assistance to team members. However, he has not been free to do this because of the heavy demand on his time in development of the Lucknow project and in committee work with REC.

It would be my recommendation that an engineering consultant be added to the USAID/NRECA contract on a short-term basis to assist in construction design and other engineering matters. There will be a great demand for engineering advice and assistance as these projects move into construction and operation. The engineer should work closely with REC in developing standards for materials and construction design. He should assist electrification specialists in establishing a program to reduce the extremely high losses of electric energy on these projects and to establish a meter testing program. He should work with the State Electricity Boards to bring about improvement in the quality of wholesale service to the cooperatives. At the present time the 11 KV supply owned and operated by the Electricity Boards

is subject to numerous outages and great voltage fluctuations. An engineering study should be made regarding the application of breakers and sectionalizing devices on the 11 kV system to prevent the loss of the complete feeder when faults occur in the line, and the application of a voltage regulating device to hold the bus voltage within reasonable limits. Also, the open-type fusing arrangement used in many states on the 11 kV is a constant source of problems.

There has been some concern with the present location of project team members and what effect, if any, this has had on effectiveness and usefulness. I did not find any impairment in the development of these projects because of the location of team members at least up to this point. In fact, since a large amount of time was required in working with state officials, present locations would seem to have been advantageous. There should be no reason for change in the Poona, Hyderabad and Lucknow areas. Lucknow is the headquarters town of the Cooperative Electric Supply Society, Limited, and the men located at Poona and Hyderabad are within reasonable travel time of their projects.

Bangalore and Ahmedabad are a considerable distance from the projects in those states increasing the cost of travel and in at least Gujarat State requiring excessive travel time due to the lack of air service. I realize that there are other factors that must be considered in locating people, particularly where children of school age are involved. My comments are merely from the standpoint of time and cost.

NRECA has already taken steps to locate the men in Mysore and Gujarat States nearer the project sites. This should improve the effectiveness of team members in these states as they move into the more critical construction and operation phases.

2. Review and appraise the management and operation of each of the five pilot cooperatives.

From my discussions with them and observing what work they have done to this point in establishing the cooperatives, each project manager and engineer on the five pilot cooperatives seems to be well qualified for his position. The problem is not with the individuals who presently occupy these positions but in finding qualified replacements when they leave. All of these persons are employees of state governments and each expressed a desire to return to his position with the state government when his commitment to the cooperative has been fulfilled. In some cases the period of deputation will end in January 1972. They gave many reasons for not wanting to stay with the cooperative:

1. Board of directors would not delegate authority and permit them to utilize their education and experience in the development of the cooperative.
2. Adequate housing and schooling were not available in these small rural communities for their families.
3. No opportunity for advancement with the cooperative.
4. Employee benefits were better with the State.

There is no doubt that these cooperative organizations could continue to function with management and engineering supplied by the State Electricity Boards under either a deputation plan or through a contractual arrangement. If, however, the rural electric cooperative movement is to have a place of permanency in the electrification of rural India, then these organizations must be able to attract competent management and engineering talent on the basis of job opportunities and future benefits that they can provide to qualified people. This is a very critical matter and consideration must be given in the project development plan to the needs of these cooperatives if they are to attract and hold qualified managers and engineers. A permanent manager and engineer must be obtained in sufficient time in order that training can be provided before the present manager and engineer return to their state jobs.

Training of personnel is also essential to the success of these organizations. Some cooperatives are using linemen obtained from the Electricity Board but they must begin a training program for linemen so that they can function independent of the electricity boards. Each cooperative needs a second person trained in accounting to keep some continuity in that department. This training should be handled within the organization.

3. Appraise the performance of the cooperatives in distributing electricity to rural communities in comparison with similar services provided by the State Electricity Boards.

An evaluation in terms of a statistical measure of how well the cooperative segment has been distributing electric service in rural areas compared to the State Electricity Boards could not be accomplished at this time because of the lack of operating history on the part of the cooperatives. I did attempt to obtain some information by interviewing local managers and engineers, members of boards of directors, representatives of REC and representatives of various state governments. There were some that I talked with who felt that the State Electricity Boards can and should do the rural electrification job because they have the personnel and the know-how and are required to provide electric service to everybody in the state who desires it. The State Electricity Boards in the opinion of some have been hindered in carrying out this responsibility due to the lack of funds for plant expansion. If money were made available to them, the Electricity Boards would in their opinion take the responsibility for providing the electrification. The boards of directors of the pilot rural electric systems that I interviewed had, however, a completely opposite view on how the electrification of rural India can best be accomplished. They were extremely strong in their support of the rural electric cooperative approach. It was their feeling that the Electricity Boards are too big and unruly and are subject to the political pressures and influences of the high density cities and towns. Representatives of State Electricity Boards often require payment from the people as a condition to obtaining electric service, a requirement that most rural people cannot meet. The president

of one board stated that if the intent of the pilot program is to uplift the rural people economically and socially, then rural electrification must be intensive as well as extensive. In his opinion it would not be possible for the Electricity Boards to carry on this type program because rural electrification looks at a very vast area of the country. Even if provided with the loan capital, the Electricity Boards, in the opinion of these cooperative directors, would take considerably more time to electrify the areas that the cooperatives will electrify in four to five years. One board president stated that the State Electricity Boards would take 50 years or more to electrify all the villages.

The rural electric cooperative approach on the other hand is more responsive to the needs of rural people. Its line extension policies are more liberal and it does not seek payment from the people. Its board members and employees live in the rural areas and therefore are vitally interested in and affected by the development of the rural community. With the exception of one case, the managers and engineers on deputation also felt that the cooperative approach could be more responsive to the electrification needs of rural India.

There are three outstanding examples of how the boards and managers are responding to the needs of their rural people and communities:

(1) At two of the board sessions that I attended (Hukeri Cooperative Society, Mysore, and the Kodiner Rural Electricity Cooperative Society, Gujarat) the directors discussed ways that the

cooperative might help to improve the economic and social conditions of their people. Many of the rural people do not have funds for the initial capital outlay for house wiring and the purchase of irrigation pump sets. The boards felt that they could pay for these improvements if permitted to do so on an installment basis. The boards expressed an interest in exploring with REC the possibility of making a small amount of loan capital available for the cooperative to relend to people for the financing of house wiring and electric pump sets. This amount would be scheduled for repayment on a monthly basis along with their billing for electric service. The Rural Electrification Administration's Section 5 program in this country did much to improve the standard of living in rural America by financing house wiring and the purchase of other types of equipment on the farm. Such a program would, no doubt, have a tremendous impact on improving the social conditions of the people in rural India.

(2) On the Lucknow project, I had the opportunity to accompany the manager, Mr. Tonega, and the electrification specialist, Mr. Robinson, on a service call received the day before from the owner of a freezer-locker plant. This local businessman was storing potatoes in an effort to stabilize the market price. The voltage meter at the plant showed low voltage and he had shut down the equipment to prevent damage to the motors. By the time we arrived, the potatoes had been moved outside since the owner expected a long delay in handling the service problem. He was extremely high in his praise of the cooperative in handling his service problems. He related that prior to the

cooperative taking over the electric service in the area, he had been served by the Electricity Board. He had requested increased transformer capacity to handle his expanded plant needs and for eight months had received no response from the Electricity Board. Within a very short time after the cooperative went into operation, new transformers were installed and service to his business was greatly improved.

(3) At the Cooperative Electric Supply Society, Sircilla, Andhra Pradesh, I observed rural people cooperating in a plan with the local manager, Mr. Abdul Karim Kahn, to get electric service to their villages. Due to limited resources, equipment and personnel, the cooperative advised some villages that there would be considerable delay in getting electric service to their community. Village people were supplying their own bullock carts for transporting heavy concrete steel reinforced poles and other materials to their villages. They were supplying labor for the loading and transportation of the materials, and digging holes at no cost to the cooperative. In another case the village had even furnished at its cost a truck to transport materials.

These are just three examples of how the board of directors, management and rural people are working together to bring the benefits of electric service to their communities.

If there is to be a meaningful comparison sometime in the future between the performance of the cooperatives in providing electric service to rural areas with that of the Electricity Boards, then both organizations must be judged on the same set of criteria. Both should be judged on the scope of the electrification job undertaken and their ability to satisfy the same prescribed financial objectives.

4. Analyze progress in establishing the cooperative institutions and project a time schedule for independent management and operation.

There is no operating history upon which to make a determination of the financial soundness of these projects. Any attempt at this time to establish a time schedule for independent management and operation would be purely guesswork. They certainly will need considerable help for the next three to five years. On a continuing basis they are going to need some central source to which they can look for expert advice in various fields -- much like REA has provided for the cooperatives in our country. REC should be strengthened to provide technical advice and assistance in the fields of engineering, accounting and management. This type assistance is essential if these cooperatives are to take their place in the electric utility field as capable, financially sound organizations.

5. Suggest revision in the NRECA outline for establishing cooperative electric distribution institutions as appropriate for India based on the experience of the five pilot cooperatives.

From what limited review I was able to make on this point, these projects are not functioning under the plan originally envisioned by NRECA. The original plan favored the establishment of a new Central Government Rural Electrification Act and state acts which would grant to the rural electric cooperatives the necessary corporate powers to get this job done. A new Rural Electrification Act was never passed. An effort should still be made to obtain legislation at the Central and State Government levels. As they are presently constituted, these cooperatives operate under a limited license with a rather cloudy future. For example: In Gujarat State the license granted the cooperative gives the Electricity Board the right to invade the cooperative's service area

to serve any attractive load requiring 50% of the contract demand of the cooperative. Also, after 10 years and with approval of the Government, the Electricity Board may revoke the license if it is "competent" for the board to do so. Other states have similar language which leaves unclear the right of the cooperative to function beyond the initial period. In questioning the State Registrars and managers on this point, it is their opinion that the license would be extended unless the cooperative was financially incapable of serving the public. If this is true, then certainly the State officials should not object to a modification of the license to make clear the conditions under which the State might have the right to deny the extension.

In my opinion if rural electric cooperatives are to be promoted and if they are to be effective in serving the public, then a new Rural Electrification Act at the Central and State Government levels is a must. These organizations are different than other types of cooperatives. They are providing a vital service to the public and should be treated separately.

6. Suggest guidelines and a time schedule for completion of this project as indicated by observations made during the field studies. This schedule may suggest independent programs and different completion dates for the individual projects.

The individual projects have been in operation for too short a time to establish any time schedule for complete withdrawal of USAID/NRECA assistance. It would seem to me, however, that the amount and length of time outside assistance is needed will depend largely

upon how rapidly some central source of expert assistance and control is developed within India. If REC can be developed into a strong organization to provide management and engineering assistance and utilize its lending power to control local management and bring about changes where required, then assistance from AID could be eliminated. As I commented in item 4, I believe assistance will be needed for the next three to five years.

7. Analyze whether or not USAID/NRECA should assist Rural Electric Corporation directly, and if so, in which areas and in what time period.

There is definitely a need to work more closely with REC to help strengthen that organization. If administrative and engineering positions are added to the USAID/NRECA contract it should be the responsibility of these people to work more closely with REC on matters of administration and engineering.

Summary of Conclusions:

1. Steps should be taken to obtain Central and State Government legislation which would let the rural electric cooperatives function independently rather than at the sufferance of the State Electricity Boards. This is essential if the electric cooperative movement is to expand and grow in India. As a minimum, the right of the rural electric cooperative to operate after the initial license period should be clarified.
2. Two positions should be added to the USAID/NRECA contract. One position would be the Chief of Party with overall administrative

responsibilities. The electrification specialists would be completely under him and all flow of information to and from the project leaders would be coordinated through him. He should have broad experience in the field of administration and preferably in administering rural electrification programs on a national basis. He will serve as liaison with AID and work closely with REC. One of his prime duties will be to work with the individual team leaders in assisting them to develop a defined Project Development Plan and to obtain technical advice and assistance in specialized fields, as needed.

The seventh member of the team should be an Electrical Engineer with experience in design, construction and operation of rural electric distribution systems. This consulting need could be provided for by means of short-term assignments - 3 to 6 months. It will be his responsibility to work closely with REC, the State Electricity Board and Manufacturers to bring about standardization in materials and design. He should work with REC and the State Electricity Boards to improve the quality of service available to the rural cooperatives off the 11 kV bus of the Electricity Boards.

The Electrical Engineer should also assist the local manager, engineer and electrification specialist in setting up a program for testing meters and reducing system losses. During my field inspection tours I found cases where meters were either failing to operate or operating inaccurately. This can affect drastically system losses and revenues to these rural electric systems, particularly where the meters

were failing to operate on fairly high irrigation pump demands. At the present time the pilot systems have no method for testing meters. To transport them to the offices of the State Electricity Boards would be time consuming, costly and extremely inconvenient. A relatively inexpensive means of testing, utilizing a portable standard, should be developed. A rotating standard could be calibrated from time to time by the Electricity Board.

System losses were excessively high on the two systems where information was sufficiently accurate to permit me to check this. In one case I found the system losses to be running in the neighborhood of 40%; in the other case, about 23% to 25%. The cause of the high losses is due primarily to poor metering of loads, excessively long secondaries and failure of the Electricity Board to provide nominal voltage at the 11 kV bus. In discussing design with some of the project engineers, their design practice is to limit the length of the secondary to a 9% voltage drop. Because of the high cost of lost energy, consideration should be given to the savings that can be realized through a shortening of the secondaries. Shorter secondaries would also provide greater reliability of service. These two factors ought to be measured against the additional cost of providing more transformer centers that would be required.

3. REC should be flexible in advancing loan funds under the individual project schemes. Indications are that cooperatives might be able to complete construction ahead of the five-year schedule established with REC for the loan if material is available. In view of rising material costs, the rural electric cooperatives should be permitted to accelerate construction if they can do so.

4. REC should relax its policy on the use and funding of interest cost in the first five years. Under present policy, these funds must be placed in a reserve and cannot be used for normal operating costs. Project costs are running over proforma estimates because of increased material costs. Power and energy losses are exceeding proforma estimates. In some cases power cost is exceeding proforma estimates. Indications are that cooperatives may not be able to fund interest cost at least in the first two years.
5. REC should expedite the standardization of materials and design for rural electric systems. Improvement in the design and standardization of distribution transformer centers would save considerable money. There is also a need to improve the secondary protective scheme for transformer centers. Too many transformers are lost due to secondary faults. Slugging of fuses is a common practice.
6. REC should take the lead in bringing about improvement in 11 kV delivery source for rural electric cooperatives. The present systems are subject to numerous outages and great voltage fluctuations.
7. REC should take the lead in recommending a country-wide scheme for protecting the farmers' irrigation pump motors from burn-outs due to the power system single phasing.
8. There is considerable need for urgency in correcting unsafe conditions on acquired electric property and to institute at each cooperative a safety program. REC should support a strong national

safety program among the cooperatives and electricity boards.

9. A study should be made of how the rural electric cooperatives can provide benefits comparable to the state governments to enable them to attract and hold competent employees.

10. A complete analysis should be made of the retail rate structures under which the cooperatives operate. In some cases the cooperatives seem to be caught in a wedge between wholesale power cost and retail pricing, both of which are controlled by the State Electricity Boards. Because the cooperative must use retail rate schedules established by the State Electricity Board in place of gearing retail rates to its own costs may cause several systems to sell large blocks of power below cost. For example, on one project the cooperative took over a sugar factory. The retail rate under which the electricity board sold power to the sugar mill is the exact same rate at which the cooperative purchases its power at wholesale for distribution. This means that the cooperative gets nothing for the large block of power sold to the sugar factory to cover loss energy, amortization of plant investment or to cover its other operating costs. It seems logical that if the cooperative cannot establish rates commensurate with its costs then the electricity board should reduce the cost of wholesale power. In other cases examined, the revenue from resale sales for irrigation may not be sufficient to cover power cost, cost of loss energy and fixed cost on investment.

11. In some instances wholesale power cost seems to be high. REC should investigate possibilities for reduction.

12. The electricity boards and the rural electric cooperatives, as borrowers from REC, should both be required to comply with the same loan policies relative to feasibility, financial achievements and area coverage.

13. The need for electrification in India is so great that an immediate effort should be made to start additional rural electric projects. Area feasibility studies should begin now and at least 10 more electric cooperatives started during the next year. The electrification specialists could supervise more than one project without impairing their effectiveness. NRECA could supply technical help to assist REC in the preparation of the area feasibility studies.

There was a strong feeling among some of the people associated with this project that additional starts in the cooperative sector should not begin until the cooperatives have been proven successful. The statement was made that it would probably take another three years to determine the success of the five pilot rural electric systems. No criteria, however, exists for determining the success of the pilot projects. It should, in my opinion, be more than a straight financial test since the cooperatives will have a material impact on the productivity of the farming area, provide for a labor, material and equipment market, and will improve the standard of living and the economic conditions of rural people.

To date, REC's total loan commitments have been Rs 6,944.693 lakhs. Of that amount, only Rs 1,280.713 lakhs have been committed to the cooperatives, or 18.5% of the total loans to date. Rs 5,563.78 lakhs, or 81.5%, have been committed to the Electricity Boards.

If no new starts are made in the cooperative sector for three years, the balance of the Rs 150 crores will go to the Electricity Boards and this would mean that the cooperative sector would receive only 8.6% of the present funds committed to this program. If 10 new rural electric cooperatives are started, requiring approximately Rs 2,817.56 lakhs, then the cooperatives' part of the present commitment would amount to 28%, with 72% being available for the Electricity Boards. The 72-28 split of financial resources would give the cooperative sector a more reasonable allocation and a better opportunity to determine its worth to the country.

14. A complete in-depth evaluation should be made after the five pilot systems have been in operation for at least one year and have accumulated at least twelve months' operating data. This should be done no earlier than May or June of 1972.

AID:13 Jan. '69

## Project Proposal

## EXPANDED RURAL ELECTRIFICATION IN INDIA

Proposal:

To grant excess U.S.-owned unconvertible Indian rupees as part of the initial seed capital of an Indian Rural Electrification Corporation to support a five year program to speed the spread of rural electrification for village lighting, farm pumpsets and small rural industry. The Government of India would also contribute capital, providing not less than 30% of the official contribution. Additional funds would be sought by means of rural bonds.

The proposal has several attractive features:

1. Investment in rural electrification will be greatly expanded through this program in the next five years as compared with previous periods. Electrification will enable a major acceleration of pumpset connection thereby providing an important assist to the "green revolution". Doubling the number of energized pumpsets on private farms is a feasible target in the coming five years. An assured supplementary water supply reduces or eliminates the risks of applying fertilizer and enables farmers to take advantage of the short growing season of new high yielding seeds by double cropping.

2. Electrification will also provide village lighting - now available in only 10% in India's villages - with highly favorable effects on education and the quality of life for millions of villagers. An expansion of power will also help spread rural industrialization in the form of small workshops, food canning factories and the like.

3. The Corporation will finance rural electrification via three methods:

a. loans to State Electricity Boards - for screened projects.

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b. subscription to debentures issued to the rural public - designed to help tap potential additional rural savings.

c. loans to rural electricity cooperatives - including those being strengthened by U.S. technical assistance plus others that may be stimulated by this program.

4. The Corporation will insist on proper planning, accounting and management of projects its finances, and will assist the State Boards in these areas where necessary. Priority will be given to areas of greatest agricultural potential. Special consideration will be given to areas where cultivators have subscribed to rural electricity bonds, thus demonstrating their willingness to invest their own resources.

5. Corporation projects will charge consumers more realistic rates, as compared to presently subsidized rates. Such rates will ensure financial soundness of the projects, will enable the Corporation to set up a revolving fund, and will help ensure that electrical lines are put first into areas offering the highest economic returns.

Scope:

The five year program contemplates U.S. and Indian contributions totalling Rs. 1,500 million. The annual phasing is visualized on a rising scale after a prudently slow beginning. Current plans are for five annual programs of Rs. 100, 200, 300, 400 and 500 million.

On the proposed 70/30 ratio of contributions, thus, the total U.S. contribution would be up to Rs. 1,050 million and the Indian share would be Rs. 450 million.

The U.S. maximum contribution would be reserved for the full five year program but actual cash transfers would be made in phases. Subsequent to the

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transfers for beginning operations during the Corporation's first two years, U.S. contributions will be made available only after review of the progress of the program and would be, of course, subject to India providing its agreed contribution as well as to general program policies and priorities.

The maximum U.S. contribution of Rs. 1,050 million would represent about 45% of the currently accumulated excess rupees derived from PL 480 sales. In addition to the PL 480 generations, the U.S. Treasury holds a still larger accumulation of rupees received from other aid programs-- in quantities far in excess of the needs for U.S. official purposes in India for the foreseeable future.

It should be understood that the accumulated rupees are not convertible into dollars and, by the terms of the PL 480 sales, are not generally available for expenses outside of India or for exports from India. For this reason, and to avoid misunderstanding, the figures have been given in rupees in this proposal. For purposes of comparison, however, the U.S. rupee contribution of Rs. 1,050 million can be said, on paper to be the equivalent of \$140 million.

The five year program creates no dollar aid obligation whatsoever. India manufactures electrical equipment and supplies of the type required in the planned rural installations and no imports of such are needed.